Volume 9

ON BEHALF OF
Satnam Millennium Ltd

IN RESPECT OF

Outline application for a new residential neighbourhood including C2 and C3 uses; local centre including food store up to 2000m², A1-A5 (inclusive) and D1 use class units of up to 600m² total (with no single unit of more than 200m2) and family restaurant/ pub of up to 800m2 (A3/A4 use); site for primary school; open space including sports pitches with ancillary facilities; means of access and supporting infrastructure at Peel Hall, Warrington

AT PEEL HALL, WARRINGTON

ADDENDUM 2 TO ENVIRONMENTAL STATEMENT DOCUMENTS AND FIGURES *(Volume 9)*

PART 1

March 2020

Landscape Institute
Registered practice

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Landscape Architecture • Ecology • Environmental Planning & Assessment • Arboriculture

BASELINE DOCUMENT AND FIGURES

APP 6 Parameters Plan (1820_35)- New Plan

APP 7 Agricultural Land Classification Map (Replacing original ES Appendix APP 7)

APP 14 Cross Section North-South (1820_31)

APP 16 Indicative Sports and Recreation Provision (1820_28)

APP 17 Site Location Plan (drawing number. 140367-D-002 Rev B) prepared by 3DReid

BASELINE DOCUMENT AND FIGURES

APP 6 Parameters Plan (1820_35)- New Plan

KEYS

- Site Boundary
- Areas with the Site excluded from the development
- Public right of way
- Boundary between the historic townships of Arbury and Houghton (Important Hedgerow)
- Boundary between the historic townships of Arbury and Winwick (Important Hedgerow)
- Peel Hall Manor Farm Moat Area (Archeological Feature)
- Gas Main and Easement
- 8m Water Vole buffer zone to Spa Brook.
- Existing Culvert
- Proposed Allotments
- Existing areas of off site vegetation
- Existing areas of woodland, trees, hedgerows and vegetation to be retained.
- 10m Foraging bat corridor
- Existing Pond to be retained
- Proposed Attenuation Pond
- Proposed Great Crested Newt Mitigation Pond
- CH. Location for Care Home
- LC. Location for Local Centre
- S. Location for Primary School
- Location for Community Facility
- Location for Bus Gate
- R. Developable Land to include for pedestrian and cycle links between plots.
- A. Area suitable for apartments (In line with noise assessment)
- Indicative Road Line
- Radley Common
- Boundary to Buffer Zone (In line with noise assessment)
- Boundary to Area Suitable for apartments (In line with noise assessment)
- Proposed wildlife corridor
- 4metre High Acoustic Barrier (In line with noise assessment)
- Proposed Tree/ Shrub Planting
- Proposed Sports Pitches/ Public Open Space

*Note: Heights shown are proposed from ground level. Heights shown are fixed and take precedent over number of storeys shown.

PEEL HALL, WARRINGTON

Parameters Plan

Project: PEEL HALL, WARRINGTON	
Title: Parameters Plan	
Client: Satnam Millennium Ltd	
Date: January 2020	Scale: 1:2,500@A1
Drawn: SW/ DS	Drawing No. 1820_35
Checked: DA/ DS	Revision: A

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BASELINE DOCUMENT AND FIGURES

APP 7 Agricultural Land Classification Map (Replacing original ES Appendix APP 7)

Key:

Site Boundary

Post 1988 Agricultural Land Classification (England) (date from Magicmap.com)

- Grade 2
- Grade 3A
- Grade 3B
- Grade 4
- Other

PEEL HALL, WARRINGTON

APPENDIX APP7
Agricultural Land Classification
Scale: NTS

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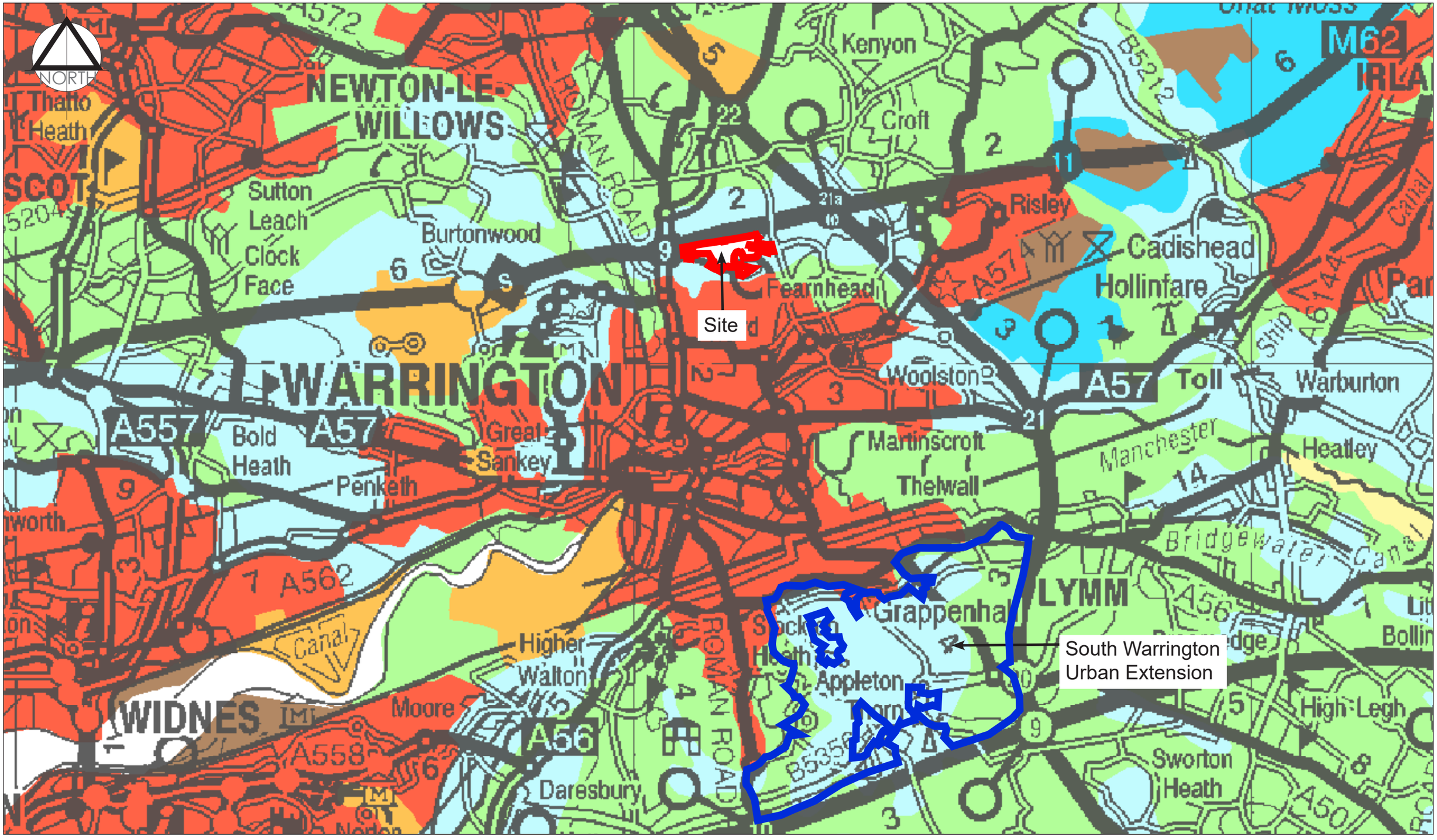

Key:

Site Boundary

Map Extract Published by Natural England 2010- North West Region 1:250,000 Series Agricutlural Land Classification

Grade 1 | Grade 2 | Grade 3 | Grade 4 | Grade 5 | Non Agricultural | Urban

PEEL HALL, WARRINGTON

APPENDIX APP7
Wider Agricultural Land Classification Map
Scale: NTS

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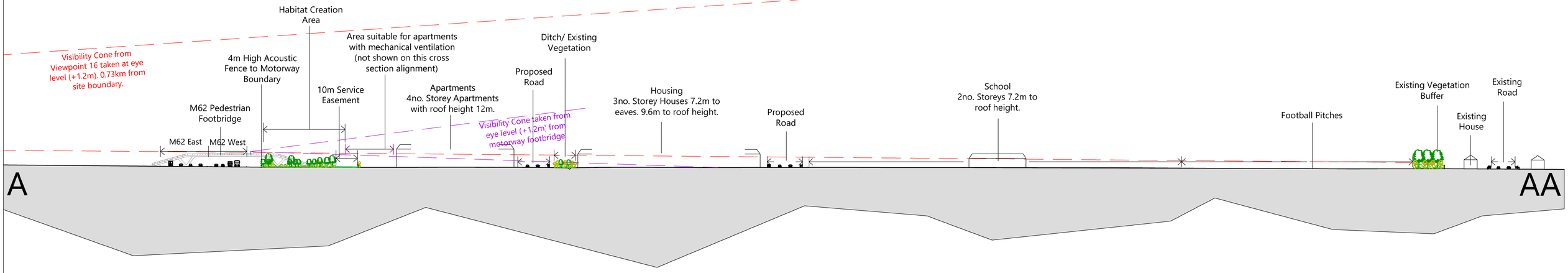
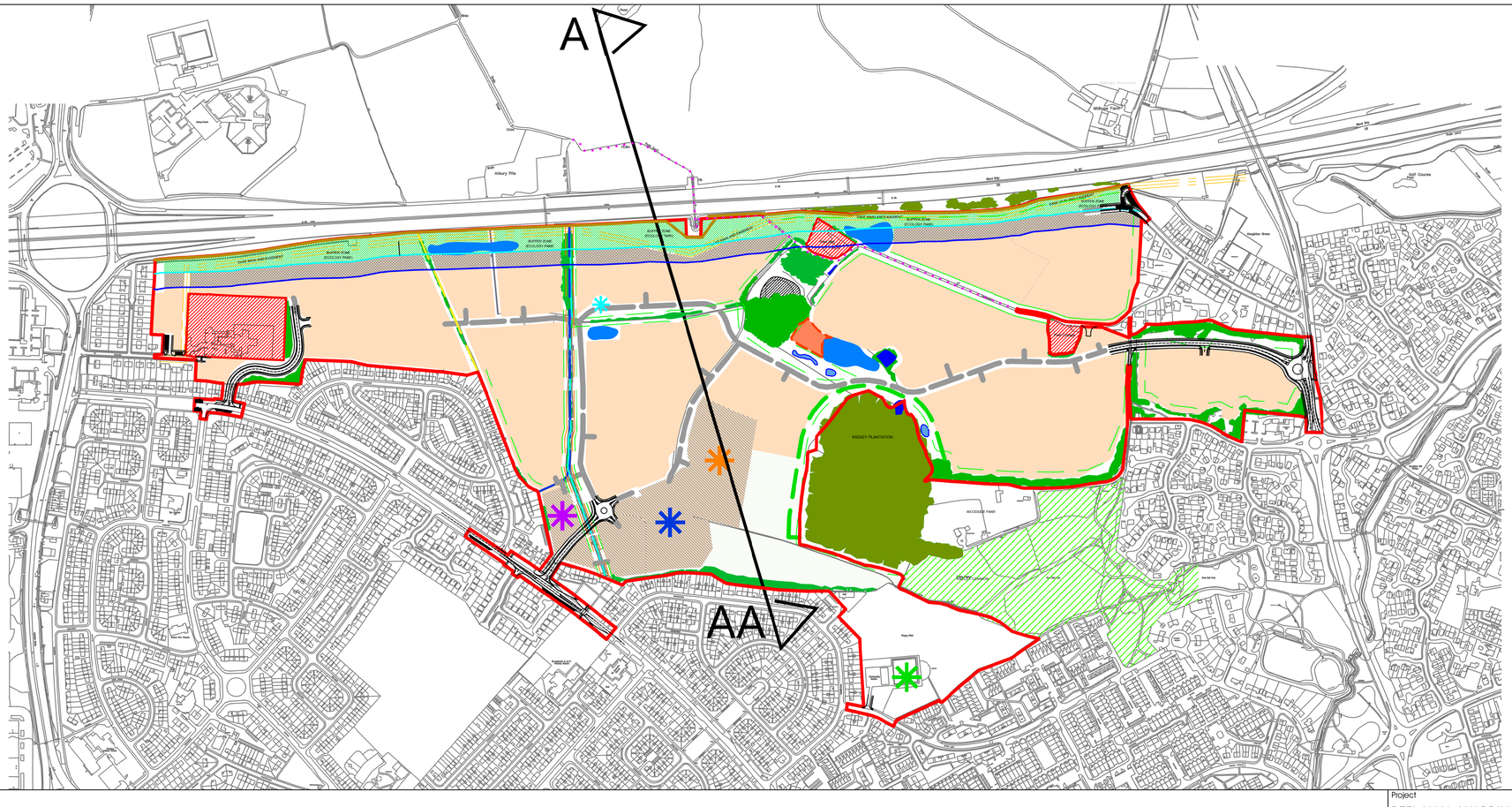
BASELINE DOCUMENT AND FIGURES

APP 14 Cross Section North-South (1820_31)

1:1,000@A1



Not to Scale



PEEL HALL, WARRINGTON

Cross Section

FIGURE APP 14

Project	PEEL HALL, WARRINGTON
Title	Cross Section
Client	Satnam Millennium Ltd
Date	November 2017
Scale	1:1,000@A1
Drawn	SW
Drawing No.	1820_31
Checked	DA/ DS
Revision	C

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BASELINE DOCUMENT AND FIGURES

APP 16 Indicative Sports and Recreation Provision (1820_28)

KEYS

- Site Boundary
- Proposed Footpath/ Re-surfacing existing
- Proposed Tree Planting
- Existing Trees

PEEL HALL, WARRINGTON

Indicative Sports and Recreation Provision

FIGURE APP 16

Project: PEEL HALL, WARRINGTON	
Title: Indicative Sports and Recreation Provision	
Client: Satnam Millennium Ltd	
Date: 28.06.16	Scale: 1:1,250@A1
Drawn: SW/ DS	Drawing No.: 1820_28
Checked: DA/ DS	Revision: J

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BASELINE DOCUMENT AND FIGURES

APP 17 Site Location Plan (drawing number. 140367-D-002 Rev B) prepared by 3DReid

Notes

Do not scale from this drawing.

All dimensions are to be checked prior to construction and any discrepancies are to be identified to the Architect.

N

0 50 100 150 200m

AREAS

TOTAL AREA	639,255 m2 156,97 acres

Note, all areas based on OS data, not measured surveys.

A	31.01.18	Red line boundary updated	MD
A	07.07.16	Issued for Planning	JHD

ISSUED FOR PLANNING

Revisions

Client

Satnam Millennium Ltd

Project

Peel Hall Masterplan

Title

Site Location Plan

Scale	Size	Date	Drawn	Checked
1:2500	A1	June'16	JHD	DB

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Architecture Conservation
Interiors Masterplanning
Partnerships Sustainability

Drawing No. Rev.

140367 - D - 002 B

ECOLOGY

ECO 1 Phase 1 Habitat Plan

ECO 2 Selected Raw Desk Study Data

ECO 3 Great Crested Newt Mitigation Strategy

ECO 4 Bat Mitigation Strategy

ECO 5 Hedgehog Mitigation Strategy

ECO 6 Water Vole Protection Strategy

ECO 7 Site Concerns Map (Including Invasive Species)

ECO 8 Relevant Wildlife Legislation

ECO 9 2019 Phase 1 Habitat Survey Data

- APP 1: Detailed Phase 1 Habitat Maps (Drawings 1820-T1-A to -I)
- APP 2: Site Concerns Map
- APP 3: Phase 1 Survey Photographs

ECO 10 2019 Roosting Bat Surveys

- APP 1: Bat Survey Plans (Drawings 1820-T2-01 & 1820-T2-02)
- APP 2: Raw Data - Preliminary Bat Roost Assessment of Buildings
- APP 3: Raw Data - Dusk Emergence Bat Survey
- APP 4: Survey Photographs

ECO 11 2019 Foraging Bat Surveys

- APP 1: Figures 1820-T3-01 & -02: Transect routes
- APP 2: Figure 1820-T3-03: Overview of common pipistrelle bat activity
  Figure 1820-T3-04: Overview of noctule bat activity
  Figure 1820-T3-05: Overview of soprano, nathusius & natterer's bat activity
- APP 3: Raw transect data

ECO 12 2019 Breeding Bird Survey

- APP 1: Map 1: Peel Hall – Breeding Bird Survey Map - Visit 1
  Map 2: Peel Hall - Breeding Bird Survey Map - Visit 2

ECO 13 2019 Barn Owl Habitat Suitability Assessment

ECO 14 2019 Water Vole Survey

- APP 1: Appletons Drawing 1820-T6-01: Water vole survey plan & results

ECO 15 2019 Great Crested Newt Survey

- APP 1: Appletons Drawing 1820-T7-01: Pond locations and GCN Survey results
- APP 2: Pond photographs

ECO 16 2019 Badger Survey

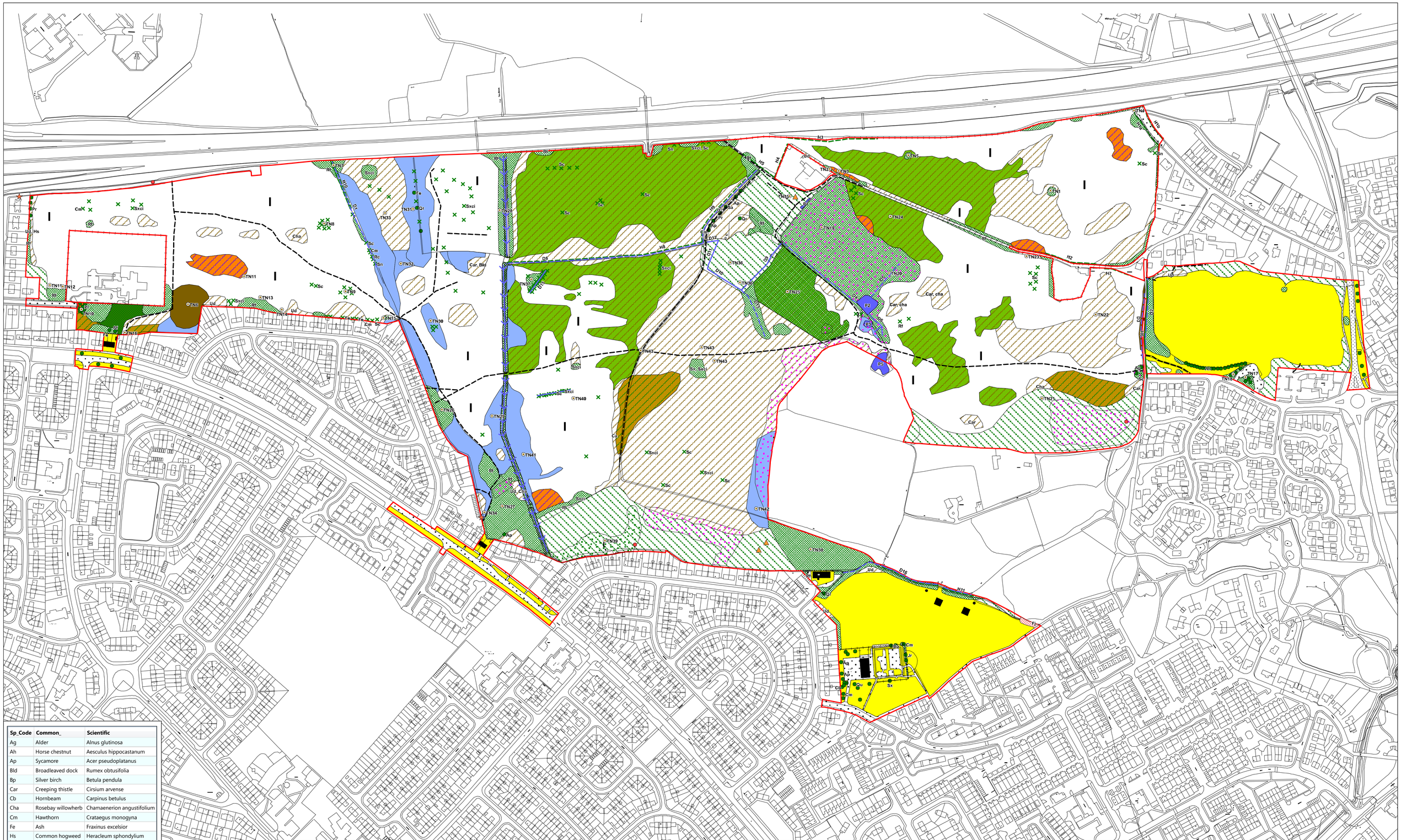
- APP 1: Drawing 1820-T8-01 – Badger Survey Plan and Results

ECO 17 2019 Hedgerow Regulations Survey

- APP 1: Site Map and Hedgerows
- APP 2: Hedgerow photographs

ECOLOGY

ECO 1 Phase 1 Habitat Plan



Sp_Code	Common_	Scientific
Ag	Alder	Alnus glutinosa
Ah	Horse chestnut	Aesculus hippocastanum
Ap	Sycamore	Acer pseudoplatanus
Bld	Broadleaved dock	Rumex obtusifolia
Bp	Silver birch	Betula pendula
Car	Creeping thistle	Cirsium arvense
Cb	Hornbeam	Carpinus betulus
Cha	Rosebay willowherb	Chamaenerion angustifolium
Cm	Hawthorn	Crataegus monogyna
Fe	Ash	Fraxinus excelsior
Hs	Common hogweed	Heracleum sphondylium
Jk	Japanese knotweed	Fallopia japonica
Jr	Walnut	Juglans regia
Pr	Cherry sp.	Prunus sp.
Qr	Pedunculate oak	Quercus robur
Qu	Oak sp.	Oak
Rc	Dog rose	Rosa canina
Rf	Bramble	Rubus fruticosus ag. sp.
Sa	Rowan	Sorbus aucuparia
Sc	Goat willow	Salix caprea
Sf	Crack willow	Salix fragilis
Sn	Elder	Sambucus nigra
Sx	Willow sp.	Salix
Sxci	Grey willow	Salix cinerea
Ud	Common nettle	Urtica dioica

- Amenity grassland
- Bare ground/Hard-standing
- Bracken
- Building/structure
- Defunct native species poor hedgerow
- Dense scrub
- Dry ditch
- Hedgerow
- Introduced shrub
- Marshy grassland (Non-priority)
- Plantation broadleaved woodland
- Pond
- Scattered scrub
- Scattered trees
- Species poor improved grassland
- Swamp
- Tall ruderal
- Tall ruderal-grassland mosaic
- Tall ruderal-scrub mosaic
- Tall ruderal-scrub-grassland mosaic
- Wet ditch
- Fence
- Spa brook
- Desire line
- Cotoneaster
- Giant hogweed
- Himalayan balsam
- Japanese knotweed
- Montbretia
- Virginia creeper
- Target notes
- Red line boundary

0 500
metres
Scale 1:2,400

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Site at Peel Hall, Warrington

Phase 1 Habitat Plan

Satnam Millennium Ltd

Drawing: 1820-T1-MR
Revision: 0
Date:31/01/2020

Drawn by: LM
Checked by: SW
Scale: 1:2400 @ A3

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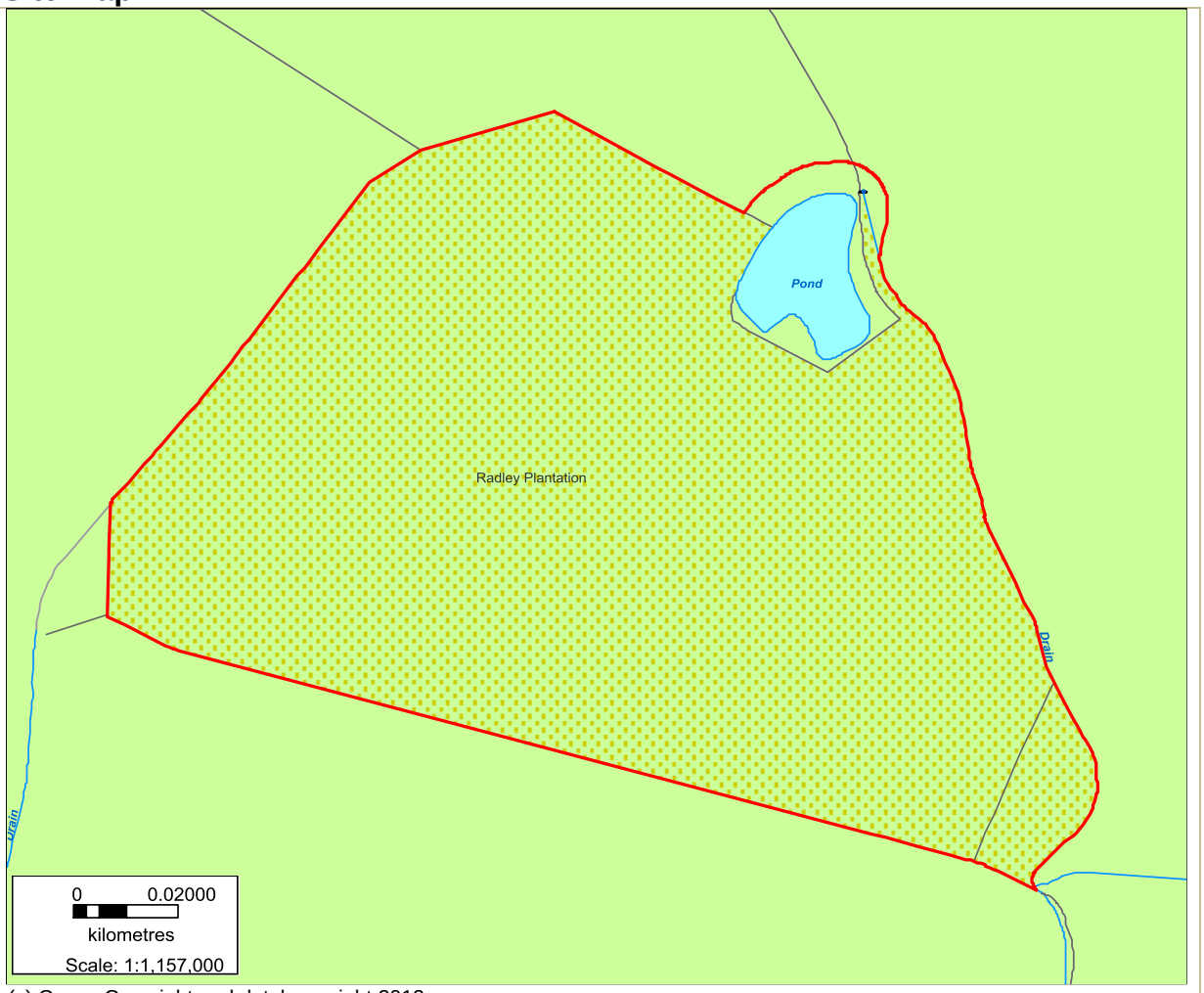
ECOLOGY

ECO 2 Selected Raw Desk Study Data

Site name: Radley Plantation and Pond **Site code**: WA047

Site map:



Site name: Radley Plantation and Pond	**Site code**: WA047
Ward: Poplars and Hulme	**Grid reference**: SJ616915
Area: 1.70 ha	**Ownership**: The Woodland Trust
Date of Notification: 10/03/2014	
Date of Revision:	
Status: Local Wildlife Site	

Description:

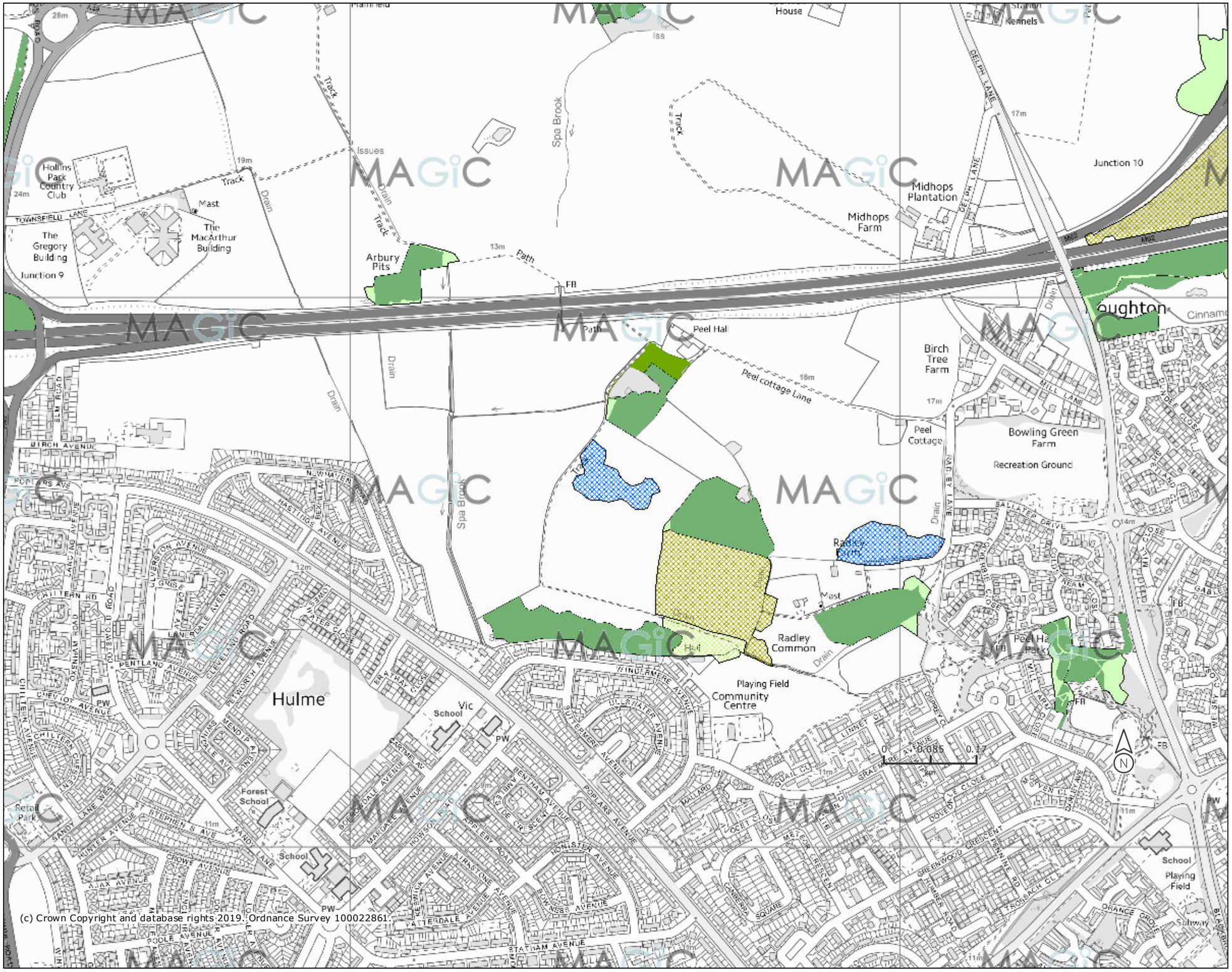
Mixed broadleaf plantation, with a reasonably good structure although not conforming to any NVC community. Large, mature sycamore, pedunculate oak and ash form the main canopy with frequent mature wild cherry. There is evidence of ash regeneration and much under-planting.

Hazel, hawthorn, rowan and field maple form the understorey. The ground flora of the plantation is typically impoverished. There is a pond of moderate to good quality in the north east corner which is becoming surrounded by scrub and Himalayan balsam.

A locally rare species of cranefly (*Prionocera subserricornis)* has been recorded by the pond.

Criteria for selection:	H20 Ponds and ditches H26 Accessible natural greenspace
Most recent survey:	04/09/2013
Inventories:	

Habitat Inventories



Legend

- Priority Habitat Inventory - Deciduous Woodland (England)

National Forest Inventory (GB)

- Assumed woodland
- Broadleaved
- Cloud \ shadow
- Conifer
- Coppice
- Coppice with standards
- Failed
- Felled
- Ground prep
- Low density
- Mixed mainly broadleaved
- Mixed mainly conifer
- Shrub
- Uncertain
- Windthrow
- Young trees
- Priority Habitat Inventory - Traditional Orchards (England)

Projection = OSGB36
xmin = 359700
ymin = 390800
xmax = 363300
ymax = 392600

0 0.1 0.2
km

Map produced by MAGIC on 16 December, 2019.

Site Check Report Report generated on Wed Dec 18 2019
You selected the location: Centroid Grid Ref: SJ61439156
The following features have been found in your search area:

SSSI Impact Risk Zones - to assess planning applications for likely impacts on SSSIs/SACs/SPAs & Ramsar sites (England)

1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW?
2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING:
All Planning Applications
Infrastructure
Airports, helipads and other aviation proposals.
Wind & Solar Energy
Minerals, Oil & Gas
Rural Non Residential
Residential
Rural Residential
Air Pollution
Livestock & poultry units with floorspace > 500m², slurry lagoons > 750m² & manure stores > 3500t.
Combustion
General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.
Waste
Composting
Discharges
Water Supply
Notes 1
Notes 2
GUIDANCE - How to use the Impact Risk Zones
/Metadata_for_magic/SSSI IRZ User Guidance MAGIC.pdf

1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW?
2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING:
All Planning Applications
Infrastructure
Airports, helipads and other aviation proposals.
Wind & Solar Energy
Minerals, Oil & Gas
Rural Non Residential
Residential
Rural Residential
Air Pollution
Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons > 750m² & manure stores > 3500t).
Combustion
General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.
Waste
Composting
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1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW?
2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING:
All Planning Applications
Infrastructure
Airports, helipads and other aviation proposals.
Wind & Solar Energy
Minerals, Oil & Gas
Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction.
Rural Non Residential

Residential
Rural Residential
Air Pollution
Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons > 750m² & manure stores > 3500t).
Combustion
General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.
Waste
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/Metadata_for_magic/SSSI IRZ User Guidance MAGIC.pdf

ECOLOGY

ECO 3 Great Crested Newt Mitigation Strategy

GREAT CRESTED NEWT MITIGATION STRATEGY

Introduction

A Mitigation Licence will avoid the killing and injury of GCN (and all other amphibians on site), during site clearance works by the trapping and translocation of amphibians from the proposed development area to newly created or enhanced receptor habitats.

Applying for a Natural England Mitigation Licence requires GCN population size survey data that is from within the most recent two spring survey seasons.

The proposed mitigation outlined by this report includes the following key elements:

- Aquatic and terrestrial habitat creation
- GCN exclusion
- Permanent mitigation features
- Precautionary working method statement (for pond creation areas and 'distant' habitat only)

The current report has been prepared to demonstrate how impacts on GCN can be avoided and the favourable conservation status of the local population can be maintained and enhanced as part of proposals. A mitigation strategy overview is depicted on Drawing 1820-A4-01, which demonstrates the overall recommended approach, however detailed mitigation plans will be produced at the detailed planning stage.

A detailed mitigation plan would include a plan of fence-line positioning to take account of existing baseline habitats, required trap density (traps/ha) and priority development/access areas, and include a long-term management plan for the site.

Aquatic habitat creation

To compensate for the loss of one breeding pond, a minimum of two new ponds shall be created, in line with Natural England guidance (English Nature, 2001).

Ponds must be created well in advance of any translocation work, in order to ensure the habitats are suitable receptor habitats. Suitable replacement breeding ponds for GCN can be created in as little as six months across a growing season, although ideally ponds should be created one to two years prior to GCN translocation to enable the establishment of plant and invertebrate populations.

Structure

Ponds of between 100m^2 and 300m^2 in size are optimum for GCN, with gently sloping and undulating scalloped margins (0.05m – 0.5m deep). This creates shallows for the colonisation by wetland and emergent plants. A deeper "sump" area would increase the likelihood of open water remaining present during periods of dry weather.

Ponds should be created in clusters, rather than in isolation and it is recommended that several smaller ponds are created rather than one very large one, as this method of pond habitat creation gives scope to provide varied pond types, and the risk of fish introduction and persistence is reduced.

The spoil arising from digging new ponds can be left on site as un-compacted mounds or banks. If mixed with other materials such as clean rubble, this can provide a good newt shelter/hibernation site, with cracks, fissures and, in time, small mammal burrows and tussocky vegetation. If raised banks are planted with hedgerows, the refugia value for great crested newts may be further increased.

Planting

Native species such as yellow iris (*Iris pseudacorus*), common water plantain (*Alisma plantago-aquatica*), Water forget-me-not (*Myosotis palustris*) and marsh marigold (*Caltha palustris*) are examples of suitable invertebrate attracting species that can be planted as marginal and emergent vegetation. Bulrush (*Typha* spp.) should not be planted as it can quickly become invasive. Additionally, the planting of trees and shrubs near to the pond should be avoided as the pond could become choked with leaves. Growth of emergent species should ideally be managed to ensure that 75% of the pond is open water.

Terrestrial habitat creation

There needs to be adequate area to allow for at least an equivalent population as that existing at the donor site. Hence, in theory receptor sites should be of equivalent size to the habitat due to be lost. However, smaller sites may be allowable if it can be demonstrated that the receptor site will be of a higher habitat quality. As such, terrestrial receptor sites for translocated great crested newts typically comprise an area of habitat creation on land with good connectivity with ponds but which currently has low to negligible value for amphibians. However, the closest areas of negligible/low value habitat for GCN are located over 330 metres from the pond to be displaced, and partially fragmenting an existing small population is unlikely to deliver conservation benefits. As such, the focus of this mitigation strategy is a combination of habitat creation and enhancement instead.

Given that a maximum count of one GCN was recorded by the 2019 survey work, it is considered unlikely that the habitats on site are ‘at capacity’ in terms of great crested newt population size. In combination with pond creation, terrestrial habitat enhancement proposals will further increase this potential capacity. Taking the above into account, it is not considered that the translocation of a small population of GCN to enhanced habitats will adversely impact upon population health or conservation status.

Habitats immediately surrounding retained and created ponds shall be enhanced by a mosaic of woodland, scrub and grassland creation and the installation of at least six hibernacula is recommended, the design of which is shown on Plate A3.1. These shall be installed prior to amphibian translocation. Logs gained from tree removal/pruning during site clearance shall also be installed as log-piles and/or dead hedges throughout the retained/created habitat areas as hibernaculum/refugia.

This design mimics artificial and natural conditions in which great crested newts have frequently been found over-wintering. Dimensions should not be below 2m length x 1m width x 1m height. The illustrated design would be suitable for locating on an impermeable substrate. On free-draining substrates, the design is largely similar but the bulk of the fill is sited in an excavated depression in the ground. Hibernacula should ideally be positioned across a site, both close to and distant from breeding ponds, always in suitable terrestrial habitat and above the flood-line.

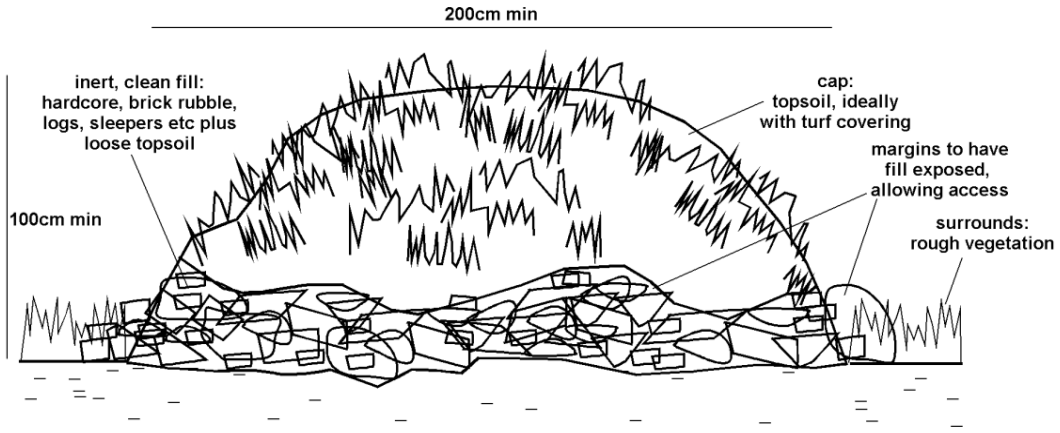


Plate A3.1: Hibernacula (English Nature, 2001)

Post-development

Ponds will be screened off with fencing and or hedging (preferably including hawthorn or blackthorn) to discourage access. Lockable gates may be required to allow monitoring and management access, or to allow controlled entry by school groups etc. Wildlife information boards can also be used to increase public awareness and discourage disturbance.

Long-term habitat enhancement shall include the establishment of species-rich invertebrate attracting grassland, woodland thinning where appropriate and pond enhancement.

GCN Exclusion – immediate and intermediate habitats

To avoid injury or harm to GCN during site clearance and construction works, amphibians shall be captured and excluded from the breeding pond to be displaced, and all habitats that may be impacted upon by the proposed development within approximately 250m of the two GCN pond/s. Amphibians shall be released into the newly created receptor ponds and habitat areas.

A combination of permanent amphibian fencing and upright temporary amphibian fencing (TAF) shall be installed around the boundaries of the proposed works area, and drift fencing shall be installed to split this area up into compartments, to allow for an appropriate density of pitfall traps for a small GCN population (50 traps/ha). Fencing layout shall be finalised as part of detailed planning permission and will take into account relative value of existing habitat areas, priority areas for access/development and pitfall trap density.

Pitfall traps shall be installed along the inside of the boundary fencing and both sides of the drift fencing, with carpet tiles also laid to increase capture efficiency. Installation of TAF and traps will require

localised vegetation removal and shall be completed under an ecological watching brief and in suitable weather conditions at an appropriate time of year. TAF design is shown on Plate A3.2 below.

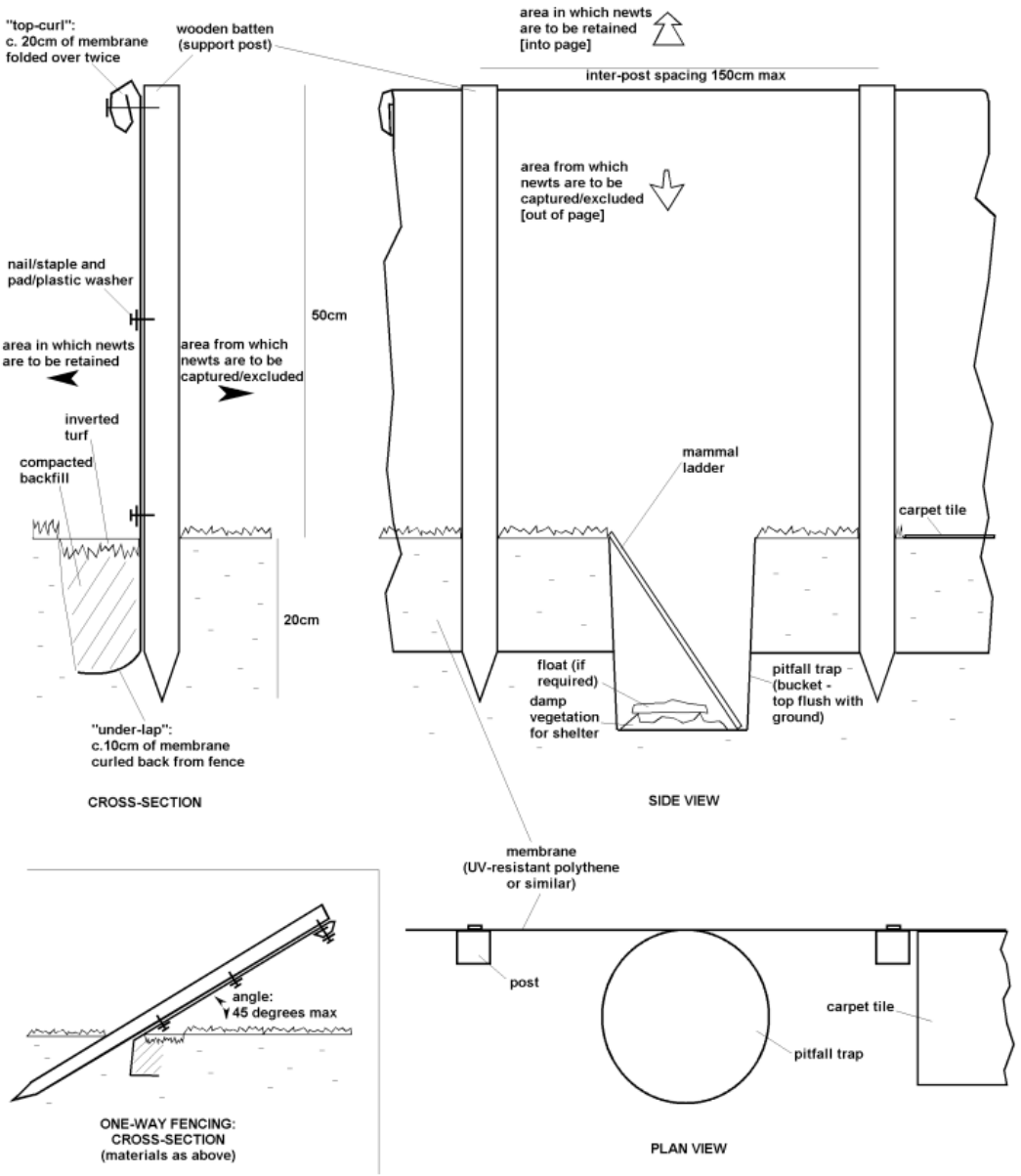


Plate A3.2: Temporary amphibian fencing design (English Nature, 2001)

Bucket traps and carpet tiles shall be checked every day prior to 10am for a minimum period of 30 days, with a minimum of five clear nights with no captures at the end of the trapping. Suitable trap nights are defined as those with minimum temperatures above 5°C, with recent rainfall. If temperatures fall below this minimum level, and no great crested newt captures occur, the night shall be discounted and the trapping period shall be extended. The trapping period may also need to be extended if there is a dry period, as amphibians are less likely to move during hot, dry weather.

Should the last 5 days of trapping not be clear of great crested newt, a further 5 days of trapping will be required from day of the last GCN trapping, and so forth, until a period of 5 clear days at the end of trapping has been attained.

Any GCN or other amphibians trapped shall be placed outside of the development area at the receptor site areas.

Grass shall be cut to 150mm above ground level after 25 days of trapping and tall ruderal and scrub vegetation shall be cut to 300mm above ground level under an ecological watching brief. This will encourage movement of any remaining amphibians towards the TAF. Upon completion of trapping, grass and ruderal vegetation shall be cut to ground level and scrub shall be removed.

On completion of trapping, the pitfall traps and drift fencing shall be removed under an ecological watching brief. All holes left by the removal of pitfall traps shall be backfilled to prevent any animals being inadvertently trapped. Fencing shall only be removed in suitable weather conditions and at an appropriate time of the year, once amphibians are no longer hibernating. Perimeter amphibian exclusion fences adjacent to retained/created habitats shall remain in place for the duration of the construction period to ensure newts do not re-enter the site. Where perimeter boundary fencing ends, it shall terminate in a 'J-hook' pattern to further discourage any dispersal into the construction area.

On completion of the development, all perimeter amphibian exclusion fencing shall be removed, aside from the permanent amphibian fence/wall (see below), which will prevent GCN and amphibians dispersing across the proposed link road to be constructed between two areas of GCN habitat containing retained and created ponds. All fence removal shall be completed under an ecological watching brief, in suitable weather conditions and at an appropriate time of year.

Permanent mitigation features

A proposed link road will displace the current GCN breeding pond and fragment dispersal habitat between ponds to either side, which presents a high risk of increased amphibian mortality post-development. A permanent amphibian fence/wall shall be constructed along both sides of this road to prevent dispersal across the road to prevent over-road dispersal (Plate A3.3). To allow for continued habitat connectivity, amphibian underpasses will be installed at gaps in the permanent fence/wall which will allow wildlife to cross beneath the road (see Plate A3.4).

As this road will be the main link road, underpasses with grid roofs are not recommended owing to the risk of rock salt causing skin problems to amphibians.

Amphibian friendly drainage kerbs shall be installed adjacent to drainage grids (see Plate A3.5 below) wherever practicable throughout the development.

Plate A3.3: examples of permanent amphibian barrier types

Plate A3.4: Examples of amphibian underpasses

Plate A3.5: Amphibian friendly kerb

Precautionary Working Method Statement – distant habitat

For all land to be impacted upon over 250 metres from the GCN pond/s, and for the areas of land to be initially impacted upon for pond creation, a precautionary working method statement shall be followed for any vegetation clearance work, comprising the following:

Tree Removal Methods

Any tree removal shall be felled by hand using a chainsaw and shall be cut no lower than 150mm above ground. The resultant log and brash piles of the felled tree shall not be left within the proposed works area overnight, unless stored off the ground within a skip or similar. Where appropriate, logs and brash shall be used to create hibernacula for amphibians outside of the works area.

Removal of grassland and scrub habitat

Any scrub and grassland to be removed shall be directionally strimmed away from the northern site perimeter within the active season for amphibians (March – October, weather dependent), to a height of no less than 150mm. The areas shall be left undisturbed for at least two nights so that any amphibians present are allowed to disperse to suitable habitats off site. Arisings shall then be removed and either taken offsite, stored off the ground in skips or on pallets to prevent the creation of refugia suitable habitats within works areas.

Removal of refuges

The base and roots of any cut trees shall be carefully dug up under the supervision of a suitably experienced ecologist so that potential refuges can be examined for the presence of amphibians.

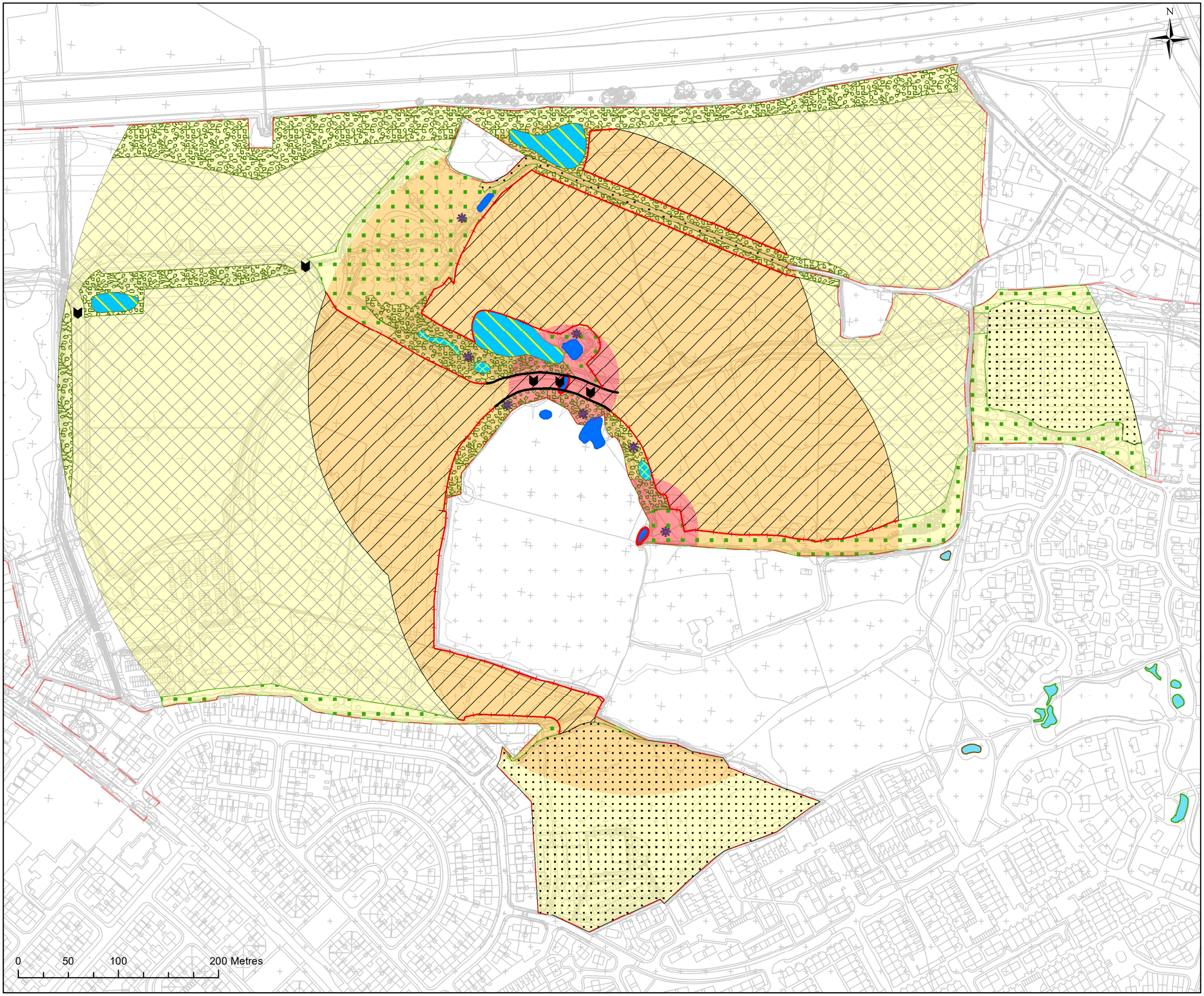
Potential hibernation and resting areas shall be checked by a suitably experienced ecologist prior to removal and removed by the ecologist if possible. Potential hibernation/resting areas generally consist of sheltered or subsurface cavities, such as those found within rubble piles, beneath stone slabs, at the base of grass tussocks, between tree roots and within mammal holes.

Worker Awareness and Sympathetic Working Practices

Contractors shall be given a 'toolbox talk' in respect of the potential presence of amphibians including GCN and all contractors shall be made aware of how to identify GCN.

If any common amphibians are found during site-based works, they shall be removed carefully to the GCN receptor site.

Works shall avoid creating temporary hibernation/refuge features mid-development. For example, any spoil heaps shall be smoothed over before the end of each working day to seal any crevices and rubble, wood, stone, boards or metal sheets shall ideally be stored off the ground on pallets or in skips. Staff shall demonstrate awareness when working and moving materials.



Legend

- Site boundary
- Pond subject to GCN surveys - positive result
- Pond subject to GCN surveys - negative result
- Pond dry at time of survey
- Pond over 250 metres from closest built development - not surveyed
- 50m offset from GCN pond
- 250m offset from GCN ponds
- 500m offset from GCN ponds
- Habitat of negligible value to GCN
- Land & pond required to be trapped out for min. 30 days under Natural England EPSM licence (~13.92ha)
- Section of Temporary Amphibian Drift Fencing to be removed upon completion of development works only
- Permanent Amphibian Fence - to remain in place for perpetuity
- Works to be completed under PWMS (~19.98ha)
- Pond to be created
- Habitat creation - woodland, scrub and species-rich grassland (~4.33ha)
- Pond to be created as part of SUDS
- Amphibian 'underpass'
- Hibernacula to be created
- Retained habitats to be enhanced (~3.23ha)

Great Crested Newt Mitigation Strategy

Drawing: 1820-A4-01
By: PB
Date: Jan 2020
Site name: Site at Peel Hall, Warrington

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ECOLOGY

ECO 4 Bat Mitigation Strategy

BAT MITIGATION STRATEGY

An overview of the Bat Mitigation Strategy is provided as Drawing 1820-A5-01, attached to the current Appendix. Further detail is provided in the text below.

Development design

Habitat creation and management

- Impacted woodland edge habitats along the south of the development shall be reinstated with native wildlife attracting shrubs
- 10metre buffers zones have been incorporated into parameters plan along key foraging corridors invertebrate attracting semi-natural habitats.
- Bat boxes shall be erected upon existing, retained trees, and bat bricks shall be integrated into new builds (See Plate A4.2). Bat boxes shall be sited as high as possible and above three metres in height. Bat bricks on buildings shall be positioned as close to the eaves or gable apex as possible. Boxes shall be positioned at locations sheltered from strong winds and exposed to the sun for part of the day (usually S/SW).
- Once installed, a bat box cannot legally be removed, or opened, without a licence. For more information contact an experienced ecologist.
- Habitat corridors shall be retained across the development site in the form of retained woodland and hedgerow habitats. Trees shall be planted either side of the proposed access roads through hedgerows, canopies of which shall be allowed to spread to bridge any gaps created. These are known as 'hop-overs' (see Figure A4.1 below & Drawing 1820-A5-01).

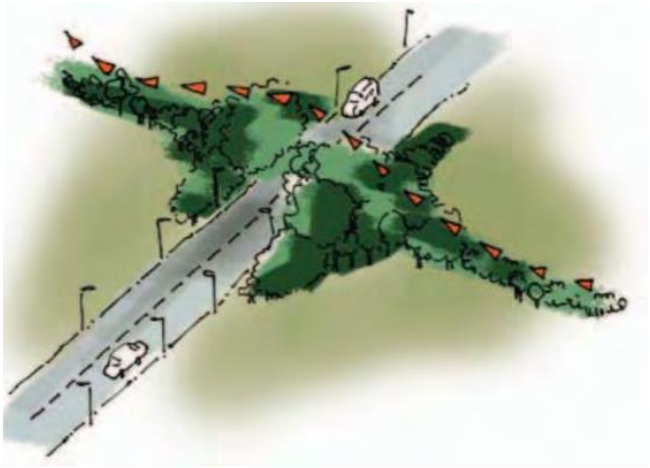


Figure A4.1: 'Hop-over' for bats created by canopy spread and gap in streetlights (Collins, 2016)

- The southern-most playing field shall be retained as open, unlit grassland.
- Three ponds and numerous other SUDS features shall be created on site which shall be planted up with invertebrate attracting species.

- Habitat creation shall involve a range of habitats and plant types to encourage a diversity of insects, which in turn will attract different bat species. A variety of flower species that bloom from Spring to Autumn shall be utilised, including both annuals and herbaceous perennials, along with the inclusion of night flowering blossoms.

Lighting design

Appletons Drawing 1820-A5-01, depicts the proposed bat foraging/commuting corridors that shall be retained across the site for foraging bats (all green, blue and yellow habitat areas).

- No lighting should be installed within these designated areas.
- The lighting programme shall be designed to ensure light levels at these areas do not exceed 1 lux. To achieve this lux level, only the minimum light levels needed for safety shall be installed adjacent to red areas and shall be directed away from red zones using luminaire accessories such as hoods, cowls, louvres and shields where necessary.
- Any lighting unavoidably affecting these zones shall be timed to switch off or dim between specific hours to provide some dark periods for bats. The main peak of nocturnal insect abundance occurs at and soon after dusk.
- Lighting of the proposed sports pitches, if required, should be restricted to winter months between November and March.

Site wide measures:

- Any bare bulbs and any upward pointing light shall be eliminated to minimise light spill.
- Narrow spectrum bulbs shall be utilised to lower the range of species affected by lighting.
- Light sources that emit minimal ultra-violet light and white and blue wavelengths of the light spectrum shall be avoided.
- Lights which peak higher than 550 nm with minimal ultra-violet light and a warm to neutral colour temperate (<4,200 kelvin) shall be utilised to reduce impacts upon bats.
- Low pressure sodium or high pressure sodium lamps shall be used instead of mercury or metal halide lamps, due to UV filtration characteristics.
- Reflective surfaces under lights shall be avoided.
- The height of streetlight columns shall be kept to the minimum required for safety, and the spread of light shall be kept near to or below horizontal using flat cut off lanterns. Taller columns shall only be permitted when light can be directed downwards at an acute angle and thereby reduce horizontal spill.
- For any pedestrian lighting that is required, low level lighting shall be utilised that is as directional as possible and below 3 lux at ground level (preferably below 1 lux).

On site Pre-development (Prior to the commencement or any works on site including site clearance)

Construction exclusion zone

- A Heras fence barrier will be installed as part of a Tree Protection Plan for the site around the perimeter of the woodlands on site. This will double-up as a Construction Exclusion Zone for wildlife including roosting and foraging bats. Appropriate signage will be attached to fencing clearly communicating that the Construction Exclusion Zone shall not be entered due to protected wildlife, and the fence line shall not be moved.

- An ecologist shall attend site to check the positioning of the fence line prior to commencement of works.

On site Throughout works

Site staff awareness

- Contractors and site workers shall be given a 'toolbox talk' and be briefed daily/weekly during site briefings with respect to the presence of foraging and commuting bats, their legal status, and all mitigation/methodologies outlined within this report. Importantly, workers shall be made aware that any works to trees with low bat potential on site (as shown on Drawing 1820-A5-01) will contravene legislation and cause an offence under the Wildlife and Countryside Act 1981 (as amended), and the disturbance, removal or handling of bat boxes after installation could also violate wildlife legislation.

Tree removal/pruning

- If any tree work (e.g. pruning) is required to either of the trees with low bat roost potential, a precautionary check shall be undertaken by a bat-licenced ecologist immediately prior to the required pruning work. This check may either consist of a daylight check or a single nocturnal/dawn bat survey, dependent on the time of year and works in question.

- On the low chance that evidence of bats is identified, works to the tree would need to be postponed until after appropriate surveys have been undertaken and all necessary licensing and mitigation is in place.

Construction exclusion zone

- The Construction Exclusion Zone fence (and associated signage) specified above shall remain in place until the development is complete.

- Within the Construction Exclusion Zone there shall be:
    - No storage of materials;
    - No scaffolding;
    - No works of any kind, including (but not limited to) tree felling.

- If any work is required within the Construction Exclusion Zone, the project ecologist shall attend site to advise accordingly to ensure no offenses are committed under wildlife legislation.

Lighting

- During construction work, no artificial light required shall be positioned within areas of value to bats (blue, green and yellow habitat areas shown on Drawing 1820-A5-01). All artificial lighting required during construction work shall be directed away from these areas to avoid light spill.
- Between April and October, site activity shall commence after sunrise and finish before sunset and no lighting shall be left on overnight.

Vibration

- As a precaution, an ecologist shall be present during any piling works within 20 metres of the two trees with potential value for roosting bats. The ecologist shall stop works if it becomes apparent that trees with potential value for roosting bats are at risk of being negatively impacted by vibration, and any necessary checks shall be undertaken.

Dust

- Material such as Monarflex netting shall be installed on the Heras fencing around the exclusion zone to reduce the potential for dust spreading towards bat habitats. Monarflex netting is a thick continuous plastic sheet directly attached to the Heras fence and will not in any way act as a mist-net. During dry spells, measures shall be in place such as bowers to dampen down roads and work areas to prevent excessive dust.

Noise control

- No electronics must be left on unnecessarily and any generators are to be positioned away from trees with potential value for roosting bats to avoid fumes and noise
- Construction noise shall be controlled according to normal procedures and in all cases the best practicable means of minimising noise must be used. Guidance is given in British Standard BS 5228: Parts 1 and 2 (1997) and Part 4 (1992). Operational hours shall commence after sunrise and before sunset.

 **2F Schwegler Bat Box (General Purpose)** http://www.nhbs.com/title/158629/2f-schwegler-bat-box-general-purpose	 **1FS Schwegler Large Colony Bat Box** http://www.nhbs.com/title/160552/1fs-schwegler-large-colony-bat-box	 **1FF Schwegler Bat Box With Built-in Wooden Rear Panel** http://www.nhbs.com/title/158636?title=1ff-schwegler-bat-box-with-built-in-wooden-rear-panel	 **1FFH Schwegler Universal Bat Box** http://www.nhbs.com/title/177932/1ffh-schwegler-universal-bat-box
 **Habibat Bat Box - Custom Brick Facing** https://www.nhbs.com/habibat-bat-box-custom-brick-facing	 **Ibstock Enclosed Bat Box 'C'** https://www.nhbs.com/ibstock-enclosed-bat-box-c	 **1GS Schwegler Brick Roost** https://www.nhbs.com/1gs-schwegler-brick-roost	 **1MF Bat and Swift Nest Box** https://www.nhbs.com/1mf-bat-and-swift-nest-box

Plate A4.2: Examples of commercially available bat boxes and bat bricks

N

464 & 456 Poplars Avenue to be subject to bat survey prior to demolition of adjacent buildings

346 & 350 Poplars Avenue to be subject to bat survey prior to demolition / demolition of adjacent building

0 50 100 200 Metres

Legend

- Site boundary
- Key habitat corridor of value to bats
- Bat 'hop-over'
- Semi-natural habitats of value to bats to be created and protected from artificial light from the development (woodland /scrub /grassland /ponds)
- Unlit amenity grassland - created
- Areas of development to be protected from artificial light
- Semi-natural habitat of value to bats to be lost
- Habitats of value to bats to be retained, enhanced and protected from artificial light throughout construction and operational phases
- Tree with low potential value for roosting bats - to be retained and protected from artificial light and disturbance

Bat Mitigation Strategy

Drawing: 1820-A5-01
By: PB
Date: Jan 2020
Site name: Site at Peel Hall, Warrington

appletons

ECOLOGY

ECO 5 Hedgehog Mitigation Strategy

HEDGEHOG MITIGATION STRATEGY

Development / landscaping design

Gaps measuring a minimum of 13cm by 13cm shall be created within gravel boards at the bases of any fences on site, providing access for hedgehogs into and between residential gardens. Alternatively, gravel boards shall be lifted ~13cm from the ground.

Log piles shall be created within retained woodland habitats as refugia, and two hedgehog hibernation domes shall be installed within discrete, undisturbed habitats at the east of the site (Plate A5.1).

Wildlife underpasses shall be created beneath the roads on site at the two locations where roads cut through hedgerows (Plate A5.2). These are recommended as part of the great crested newt mitigation strategy and will allow access for both hedgehogs and amphibians.

Plate A5.1: Hedgehog dome

Plate A5.2: Examples of amphibian underpasses that will also allow hedgehog dispersal

Pre-construction and Site Clearance

Contractors shall be given a 'toolbox talk' in respect of the potential presence of hedgehog. This will highlight the precautionary methods to be in place throughout construction works to protect the species and include information on their recognition.

A suitably qualified ecologist shall check all suitable vegetation immediately prior to vegetation clearance. This is of particular importance during the winter months as hedgehogs maybe resting and hibernating within dense vegetation.

Piles of brashing shall be removed by hand. Note that any piles of brashing left overnight on site during the clearance phase shall also be removed by hand. Should this not be feasible, piles of brashing and vegetation arising from site clearance shall be checked by a suitably qualified ecologist and removed under ecological observation.

Any hedgehogs found shall be moved by the ecologist to a suitable similar habitat adjacent to the site, or allowed to move away on its own accord, before any further clearance can occur.

Throughout construction

As hedgehogs are more active during the night, any construction works that creates potential hazards such as voids and steep sided holes that could act as pitfall traps to hedgehogs shall be securely enclosed or covered over at the end of the day's work and shall not be left open overnight. If this cannot be avoided holes and trenches will have a means of escape, such as a plank or stout branch provided for any animals that may fall in. Any open-ended pipes and other material stored on site shall be covered and checked for hedgehogs within and between pipes before being moved.

ECOLOGY

ECO 6 Water Vole Protection Strategy

WATER VOLE MITIGATION STRATEGY

Development design

Drainage

- The SUDS and drainage must be been designed specifically to ensure no silt or pollutants enter the watercourse.

Habitat creation and management

- Buffer zones of at least 20 metres either side of Spa Brook have been incorporated into development plans. These buffer zones will planted with water vole friendly species, listed as Plate A6.1 at the end of this chapter (English Nature, 1998).

The development presents the opportunity to further enhance the watercourse for the local water vole population in the long term. This could include measures such as:

- Encouragement of grasses along the stream for water vole, through for reducing cover of ruderal, reed and scrub encroachment
- Planting of species listed within Water Vole Conservation Handbook (English Nature, 1998), provided as Plate A6.1 at the end of this chapter, along all stream and ditch corridors on site as well as any connecting SUDS/pond features.
- Design of the proposed ponds to possess areas of permanent standing water as well as shallow and ephemeral sections (see https://freshwaterhabitats.org.uk/wp-content/uploads/2013/09/pond-design.pdf for guidance) and planting of marginal and tall emergent species within the proposed ponds.

Pre-development (Prior to the commencement or any works on site including site clearance)

Works exclusion zone

- Spa Brook and Ditch 1 are the only features on site which were subject to major survey constraints. Prior to the start of any works on site, a works exclusion zone will be marked out with easily visible markers and/or fencing at a distance of 6m from Spa Brook and Ditch 1 (as shown on Drawing 1820-A7-01, attached). Sturdy fencing will be erected along the 6m markers. Fencing will be positioned so that no machinery can enter within 6m of Spa Brook or Ditch 1.

- Notices should be attached that state these fences are a works exclusion zone due to the potential presence of water vole, and that no works are to take place within the works exclusion zone unless they are undertaken with ecological supervision. A site briefing should also be given in order to outline the reasons for the works exclusion zone.

- Appropriate signage will be attached to fencing clearly communicating that the Construction Exclusion Zone shall not be entered due to protected wildlife, and the fence line shall not be moved.

- An ecologist shall attend site to check the positioning of the fence line prior to commencement of works and periodically throughout in order to ensure that the fence is still intact and functional.

Throughout works

Works Exclusion Zone

- All contractors will be made aware of the works exclusion zone during the initial site induction. All site operatives will be made aware that no site machinery will enter the works exclusion zone, no excavation will occur within the works exclusion zone, no devegetation shall be undertaken within the works exclusion zone and that all habitats and existing ground topography is to be retained in situ within this zone.

- Daily inspections of the fence will be conducted by a responsible member of site staff (or a suitably qualified ecologist) with a daily log book being maintained and any defects reported to the site supervisor and project ecologist immediately. Defects should be repaired as soon as they are noticed in order to maintain the visibility of the works exclusion zone.

- The project ecologist should inspect the fence at least once a month and ensure that the fence and log book are maintained.

Site Worker Vigilance

- Any signs of water vole presence will be reported to the project ecologist immediately and all work on site stopped until otherwise advised by a suitably qualified ecologist.

Good practice

- Good housekeeping with respect to food waste should be followed at all times. Food waste shall remain either in welfare cabin bins or in skips overnight in order to ensure that wildlife is not unduly enticed into the working areas to forage for food waste.

- Any holes or trenches left open overnight are to have means of escape provided such as a ramp or wide plank. Any open pipework with an outside diameter of greater than 150mm must be blanked off at the end of each work day to prevent wildlife entering/becoming trapped.

- All materials (especially any containing lime) to be securely stored out of access by wildlife.

Dust

- Material such as Monarflex netting shall be installed on the Heras fencing along the exclusion zone to reduce the potential for dust spreading towards water vole habitats. During dry spells, measures shall be in place such as bowers to dampen down roads and work areas to prevent excessive dust.

Pollution

- A separate Construction Environmental Management Plan shall be required to ensure protection of aquatic habitats throughout development work from indirect impacts such as pollution or siltation.

Noise control

- No electronics must be left on unnecessarily and any generators are to be positioned away from streams and ditches to avoid fumes and noise
- Construction noise shall be controlled according to normal procedures and in all cases the best practicable means of minimising noise must be used. Guidance is given in British Standard BS 5228: Parts 1 and 2 (1997) and Part 4 (1992). Operational hours shall commence after sunrise and before sunset.

Road creation works: Ecological supervision

- Prior to any works being undertaken within the works exclusion zone, the project ecologist will enter the area of works within the zone and undertake an intensive fingertip search for water vole within this area and 10m up and down-stream, as shown on Drawing 1820-A7-01, attached.
- The area of works will be marked out with hazard tape if necessary in order to ensure no further incursion into the work exclusion zone than is absolutely necessary will occur.
- A mini-digger with a toothless bucket shall be used to undertake any necessary excavations in this area. The project ecologist shall supervise the excavation and will be in a position to signal to the driver should excavation require halting for any reason.
- Should a water vole be seen prior to or during excavation works, all excavation works shall cease. The 6m works exclusion zone will be reinstated and an application for a Natural England licence is likely to be required.

N

Ditch 1

Spa Brook

0 40 80 160 Metres

Legend

Site boundary

Ditch / watercourse

6 metres Construction Exclusion Zones either side of ditches. Habitat to be retained, protected and enhanced.

Road construction points & works areas - Any work to be preceeded by inspection for water vole and strategic vegetation manipulation at an appropriate time of year.

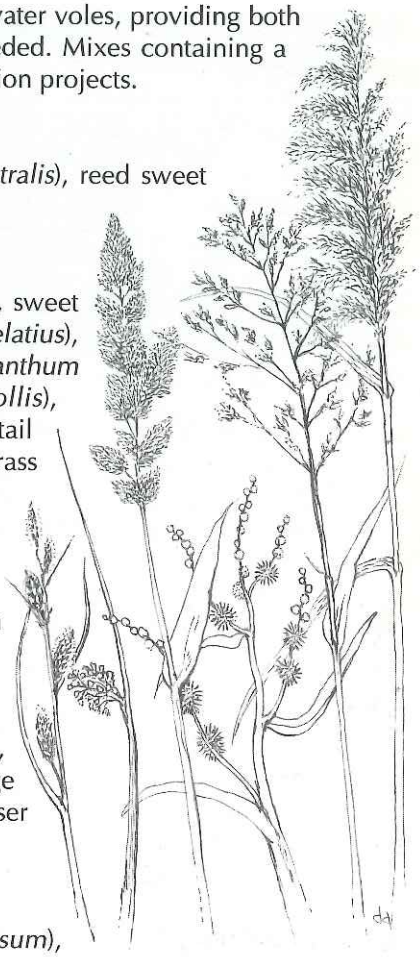
Water Vole
Protection Strategy

Drawing: 1820-A7-01
By: PB
Date: Jan 2020
Site name: Site at Peel Hall, Warrington

appletons

Providing plants for water voles

Below is a list of common species that may be considered important for water voles, providing both food and cover. Most aquatic plants are best transplanted rather than seeded. Mixes containing a selection of the list species may be sown in any restoration or habitat creation projects.



Reeds:
Reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites australis*), reed sweet grass (*Glyceria maxima*).

Grasses:
Meadow grasses (*Poa trivalis, P. pratensis*) cocksfoot (*Dactylis glomerata*), sweet grasses (*Glyceria fluitans, G. notata*), false oat-grass (*Arrhenatherum elatius*), tufted hair-grass (*Deschampsia caespitosa*), sweet vernal-grass (*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*), creeping soft-grass (*H. mollis*), creeping bent (*Agrostis stolonifera*), Timothy (*Phleum pratense*), marsh foxtail (*Alopecurus geniculatus*), meadow foxtail (*A. pratensis*), purple moor-grass (*Molinia caerulea*).

Rushes:
Hard rush (*Juncus inflexus*), soft rush (*J. effusus*), conglomerated rush (*J. conglomeratus*), sharp-flowered rush (*J. acutiflorus*), jointed rush (*J. articulatus*).

Sedges:
Greater tussock sedge (*Carex paniculata*), false fox-sedge (*C. otrubae*), hairy sedge (*C. hirta*), bottle sedges (*C. rostrata*), bladder sedge (*C. vesicaria*), pendulous sedge (*C. pendula*), black sedge (*C. nigra*), lesser pond-sedge (*C. acutiformis*), greater pond-sedge (*C. riparia*).

Water plants:
Branched bur-reed (*Sparganium erectum*), unbranched bur-reed (*S. emersum*), arrowhead (*Sagittaria sagittifolia*), common water-plantain (*Alisma plantago-aquatica*), flowering rush (*Butomus umbellatus*), broad-leaved pondweed (*Potamogetum natans*), hornwort (*Ceratophyllum demersum*), water-milfoil (*Myriophyllum spicatum*), yellow flag (*Iris pseudacorus*), bogbean (*Menyanthes trifoliata*), pond lilies (*Nymphoides peltata, Nuphar lutea, Nymphaea alba*), bulrush (*Schoenoplectus lacustris*), water crowfoots (*Ranunculus peltatus, R. aquatilis, R. penicillatus, R. fluitans*), water dropwort (*Oenanthe aquatica*), watercress (*Nasturtium officinale*).

Wetland/edge plants:
Bistort (*Polygonum amphibium*), marsh marigold (*Caltha palustris*), celery-leaved buttercup (*Ranunculus sceleratus*), lesser spearwort (*R. flammula*), greater spearwort (*R. lingua*), cuckoo flower (*Cardamine pratensis*), meadowsweet (*Filipendula ulmaria*), water avens (*Geum rivale*), marsh cinquefoil (*Potentilla palustris*), purple loosestrife (*Lythrum salicaria*), fool's watercress (*Apium nodiflorum*), angelica (*Angelica sylvestris*), marsh bedstraw (*Galium palustre*), Water forget-me-not (*Myosotis scorpioides*), water mint (*Mentha aquatica*), brooklime (*Veronica beccabunga*), marsh valerian (*Valeriana officinalis*), marsh sowthistle (*Sonchus palustris*), water figwort (*Scrophularia auriculata*), gypsywort (*Lycopus europaeus*).

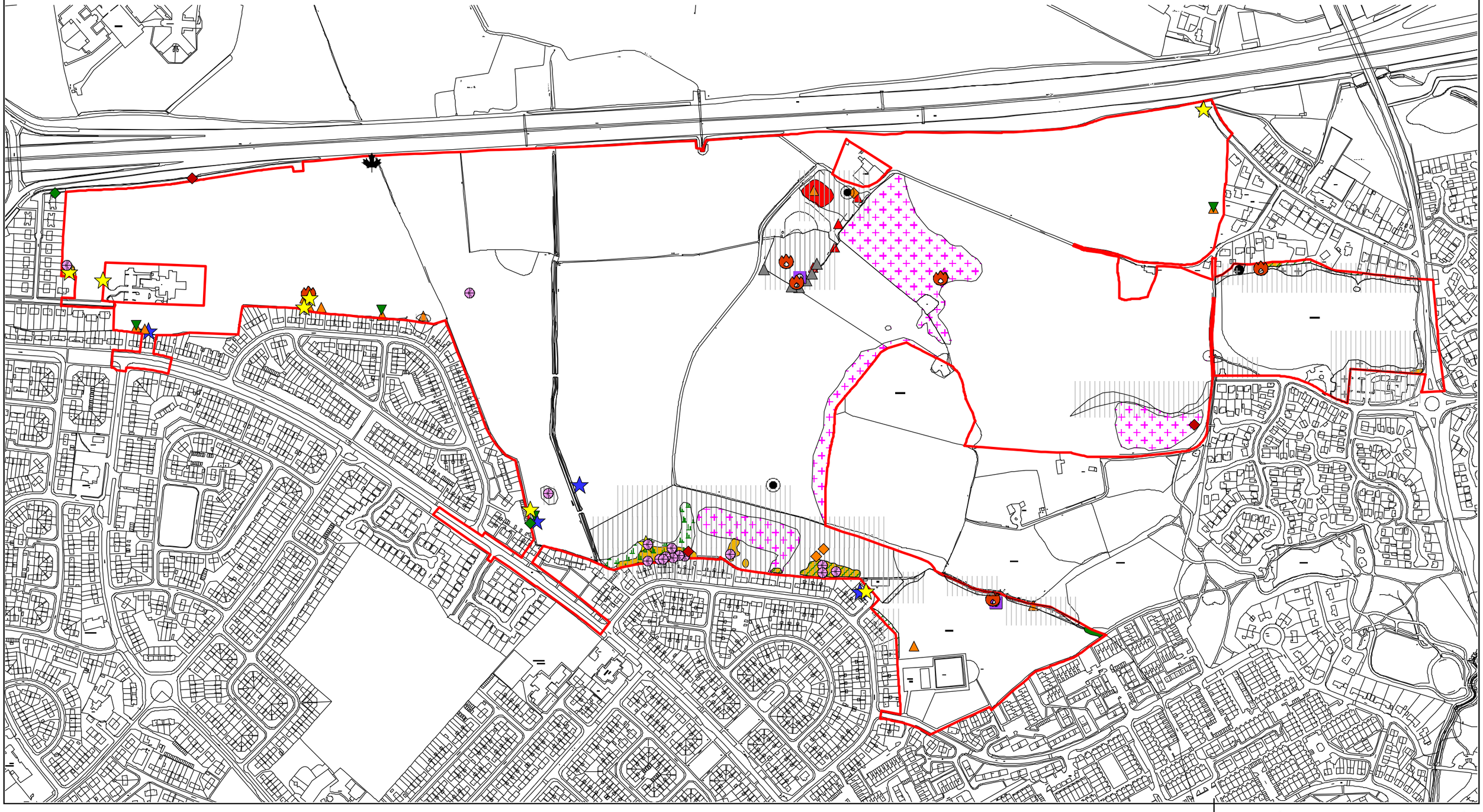
Greater tussock sedge (Carex paniculata).

Dryland/bank plants:
Garlic mustard (*Alliaria petiolata*), rosebay willowherb (*Chamerion angustifolium*), greater willowherb (*Epilobium hirsutum*), cow parsley (*Anthriscus sylvestris*), sweet cicely (*Myrrhis odorata*), ground elder (*Aegopodium podagraria*), common comfrey (*Symphytum officinale*), hemp agrimony (*Eupatorium cannibinum*), dandelion (*Taraxacum officinale*).

Woody shrubs and trees:
Crack willow (*Salix fragilis*), white willow (*S. alba*),

ECOLOGY

ECO 7 Site Concerns Map (Including Invasive Species)



Legend

Red line boundary

Anti-Social/Safety Concerns

- Air rifle target practice
- Evidence of drug use
- Marijuana growing operation
- Fire damage
- Open manhole
- Asbestos (concentrated)
- Asbestos (area)

Flytipping, Littering, and dumping

- Refurbishing/furniture waste
- Vehicle waste
- Discarded toys
- Non-green garden/ household waste (concentrated)
- Non-green garden/ household waste (area)
- Green garden waste (concentrated)
- Green garden waste (area)
- Pile of cans/bottles
- Area of low concentration food & drink waste
- Dog excrement in bags

Schedule 9 Invasive Species

- Japanese knotweed
- Giant Hogweed
- Himalayan Balsam
- Montbretia
- Cotoneaster
- Virginia creeper

%

0 250

metres

Peel Hall Farm, Warrington

Site Concerns Overview Map

Satnam Millienium Ltd

Drawn by: LM
Checked by: DS
Scale: 1:5000 @ A3

Drawing: 1820-T1
Revision: 0
Date: 18/10/19

Appletons
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BL1 3AD Tel: 01204 393006
Web: www.appletons.uk.com
Email: info@appletons.uk.com

ECOLOGY

ECO 8 Relevant Wildlife Legislation

RELEVANT PLANNING POLICY & LEGISLATION

This section provides an overview of the legislation and policy relevant to the ecology of the site.

Legislation
The applicable legislative framework for ecology and nature conservation is summarised as follows:

- Conservation of Habitats and Species Regulations 2010 (as amended);
- Wildlife and Countryside Act 1981 (as amended);
- Natural Environment and Rural Communities (NERC) Act 2006;
- Countryside and Rights of Way (CRoW) Act 2000;
- Town and Country Planning (Environmental Impact Assessment) Regulations 2011;
- The Hedgerows Regulations 1997;
- The Protection of Badgers Act 1992; and
- Wild Mammals Protection Act 1996.

Conservation of Habitats and Species Regulations 2017, as amended (Habitats Regulations 2010, as amended)
The Habitats Regulations 2017 consolidate and update the Conservation (Natural Habitats, &c.) Regulations 1994 and all its various amendments. The Habitats Regulations 2017 are the principal means by which the EEC Council Directive 92/43 (The Habitats Directive) as amended is transposed into English and Welsh law.

The Habitats Regulations 2017 place duty upon the relevant authority of government to identify sites which are of importance to the habitats and species listed in Annexes I and II of the Habitats Directive. Those sites which meet the criteria are, in conjunction with the European Commission, designated as Sites of Community Importance, which are subsequently identified as Special Areas of Conservation (SAC) by the European Union member states. The regulations also place a duty upon the government to maintain a register of European protected sites designated as a result of EC Directive 79/409/EEC on the Conservation of Wild Birds (The Birds Directive). These sites are termed Special Protection Areas (SPA) and, in conjunction with SACs, form a network of sites known as Natura 2000. The Habitats Directive introduces for the first time for protected areas, the precautionary principle; that is that projects can only be permitted having ascertained no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest.

The Habitats Regulations 2010 also provide for the protection of individual species of fauna and flora of European conservation concern listed in Schedules 2 and 5 respectively. Schedule 2 includes species such as otter and great crested newt for which the UK population represents a significant proportion of the total European population. It is an offence to deliberately kill, injure, disturb or trade these species. Schedule 5 plant species are protected from unlawful destruction, uprooting or trade under the regulations.

The Habitats Regulations 2010 were amended in August 2012 and in 2017 to ensure clearer transposition of the provisions of Articles 2, 3, 4(4) (second sentence) and Article 10 of the Wild Birds Directive, by giving additional and specific duties to relevant bodies. A number of amendments were also made to transpose more clearly certain elements of the Habitats Directive.

The Wildlife and Countryside Act (WCA) 1981 (as amended)
The WCA, as amended, consolidates and amends pre-existing national wildlife legislation in order to implement the Bern Convention and the Birds Directive. It complements the Habitat Regulations 2010 (as amended), offering protection to a wider range of species. The Act also provides for the designation and protection of national conservation sites of value for their floral, faunal or geological features, termed Sites of Special Scientific Interest (SSSIs).

Schedules of the act provide lists of protected species, both flora and fauna, and detail the possible offences that apply to these species. All relevant species specific legislation is detailed later in this Appendix.

The Countryside and Rights of Way (CRoW) Act 2000
The CROW Act, introduced in England and Wales in 2000, amends and strengthens existing wildlife legislation detailed in the WCA. It places a duty on government departments and the National Assembly for Wales to have regard for biodiversity, and provides increased powers for the protection and maintenance of SSSIs. The Act also contains lists of habitats and species (Section 74) for which conservation measures should be promoted, in accordance with the recommendations of the Convention on Biological Diversity (Rio Earth Summit) 1992.

The Natural Environment and Rural Communities (NERC) Act 2006
Section 40 of the NERC Act places a duty upon all local authorities and public bodies in England and Wales to promote and enhance biodiversity in all of their functions. Sections 41 (England) and 42 (Wales) list habitats and species of principal importance to the conservation of biodiversity. These lists superseded Section 74 of the CRoW Act 2000.

The Hedgerow Regulations 1997
The Hedgerow Regulations make provision for the identification of important hedgerows which may not be removed without permission from the Local Planning Authority.

UK Biodiversity Action Plan
The United Kingdom Biodiversity Action Plan (UK BAP), first published in 1994 and updated in 2007, was a government initiative designed to implement the requirements of the Convention of Biological Diversity to conserve and enhance species and habitats. The UK BAP contained a list of priority habitats and species of conservation concern in the UK, and outlined biodiversity initiatives designed to enhance their conservation status. Lists of Broad and Local habitats were also included. The priority habitats and species correlated with those listed on Section 41 and 42 of the NERC Act.

The UK BAP required that conservation of biodiversity was addressed at a County level through the production of Local BAPs. These were complementary to the UK BAP, however were targeted towards species of conservation concern characteristic of each area. In addition, a number of local authorities and large organizations have produced their own BAPs.

Species and Habitats of Material Consideration for Planning in England
In 2011, the government published the 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' to replace the previous England Biodiversity Strategy. In 2012 the UK BAP was replaced by the UK Post-2010 Biodiversity Framework.

Previous planning policy (and some supporting guidance which is still current, e.g. ODPM Circular 06/2005, now under revision), refers to UK BAP habitats and species as being a material consideration in the planning process. Equally many local plans refer to BAP priority habitats and species. Both remain as material considerations in the planning process but such habitats and species are now described as Species and Habitats of Principal Importance for Conservation in England, or simply priority habitats and priority species under the UK Post-2010 Biodiversity Framework. The list of habitats and species remains unchanged and is still derived from Section 41 list of the Natural Environmental and Rural Communities (NERC) Act 2006. As was previously the case when it was a BAP priority species hen harrier continues to be regarded as a priority species although it does not appear on the Section 41 list.

National Planning Policy
The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced.

Chapter 15, on conserving and enhancing the natural environment, sets out how the planning system should protect and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Chapter 15 of the NPPF states that: *to protect and enhance biodiversity and geodiversity, plans should:*

a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

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

a) *if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
b) *development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
c) *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*
d) *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.*

The following should be given the same protection as habitats sites:

a) *potential Special Protection Areas and possible Special Areas of Conservation;*
b) *listed or proposed Ramsar sites; and*
c) *sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.*

The presumption in favour of sustainable development does not apply where development requiring appropriate assessment because of its potential impact on a habitats site is being planned or determined.

The National Planning Policy Framework encourages net gains for biodiversity to be sought through planning policies and decisions. Using a biodiversity net gain approach can deliver measurable improvements for biodiversity by creating or enhancing habitats in association with development. Biodiversity net gain can be achieved on-site, off-site or through a combination of on-site and off-site measures. It may help local authorities to meet their duty under Section 40 of the Natural Environment and Rural Communities Act 2006.

Local Planning Policy

Policy QE5 of Warrington Borough Council's Adopted Local Plan Core Strategy (2014) addresses Biodiversity and Geodiversity:

The Council will work with partners to protect and where possible enhance sites of recognised nature and geological value. These efforts will be guided by the principles set out in National Planning Policy and those which underpin the strategic approach to the care and management of the borough's Green Infrastructure in its widest sense.

Sites and areas recognised for their nature and geological value are shown on the Policies Map and include:

- *European Sites of International Importance*
- *Sites of Special Scientific Interest*
- *Regionally Important Geological Sites*
- *Local Nature Reserves*
- *Local Wildlife Sites*
- *Wildlife Corridors*

Proposals for development which may affect European Sites of International Importance will be subject to the most rigorous examination in accordance with the Habitats Directive. Development or land use change not directly connected with or necessary to the management of the site and which is likely to have significant effects on the site (either individually or in combination with other plans or projects) and which would affect the integrity of the site, will not be permitted unless the Council is satisfied that;

- *there is no alternative solution; and*
- *there are imperative reasons of over-riding public interest for the development or land use change.*

Proposals for development in or likely to affect Sites of Special Scientific Interest (SSSI) will be subject to special scrutiny. Where such development may have an adverse effect, directly or indirectly, on the SSSI it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard the national network of such sites.

Proposals for development likely to have an adverse effect on regionally and locally designated sites will not be permitted unless it can be clearly demonstrated that there are reasons for the development which outweigh the need to safeguard the substantive nature conservation value of the site or feature.

Proposals for development which may adversely affect the integrity or continuity of UK Key habitats or other habitats of local importance, or adversely affect EU Protected Species, UK Priority Species or other species of local importance, or which are the subject of Local Biodiversity Action Plans will only be permitted if it can be shown that the reasons for the development clearly out weight the need to retain the habitats or species affected and that mitigating measures can be provided which would reinstate the habitats or provide equally viable alternative refuge sites for the species affected.

All development proposals affecting protected sites, wildlife corridors, key habitats or priority species (as identified in Local Biodiversity Action Plans) should be accompanied by information proportionate to their nature conservation value including;

- *a site survey where necessary to identify features of nature and geological conservation importance; an assessment of the likely impacts of the proposed development proposals for the protection and management of features identified for retention;*
- *an assessment of whether the reasons for the development clearly outweigh the nature conservation value of the site, area or species; and*
- *proposals for compensating for features damaged or destroyed during the development process*

Where development is permitted, the Council will consider the use of conditions or planning obligations to ensure the protection and enhancement of the site's nature conservation interest and/or to provide appropriate compensatory measures.

SPECIES SPECIFIC LEGISLATION

This section contains a summary of legislation with relation to the species present or potentially present in the survey area. The reader should refer to the original legislation for definitive interpretation.

Birds

The Wildlife and Countryside Act (WCA) 1981 (as amended) gives general protection to all wild birds in Britain (subject to the provisions of the act). It is an offence to intentionally or recklessly*:

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

It is also an offence for any person to have in his possession or control any live or dead wild bird, egg of a wild bird, or any part, or derivative, of such a bird or egg (subject to the provisions of the act).

Birds listed on Schedule 1 of the WCA 1981 (as amended) are protected by special penalties, and it is an offence to intentionally or recklessly*:-

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

*Reckless offences were added by the Countryside Rights of Way (CRoW) Act 2000.

*Reckless offences were added by the Countryside Rights of Way (CRoW) Act 2000.

Birds receive further protection through the Bern Convention, the Bonn Convention and the European Communities Council Directive on the Conservation of Wild Birds, or EC Birds Directive:

1. The Bern Convention aims to ensure the conservation and protection of wild bird species and their natural habitats (listed in Appendix II of the Convention), and to regulate the exploitation of those species (including migratory species) listed in Appendix III.
2. The Bonn Convention aims to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix I of the Convention), whilst species on Appendix II are generally of conservation concern and / or deemed to be able to benefit from international cooperation.
3. The EC Birds Directive is the tool through which the European Community meets its obligations for bird species under the Bern Convention and Bonn Convention. The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. Article 5 requires members to establish a general scheme of protection for all wild birds. Annex I contains a list of specially protected bird species. The EC Birds Directive is implemented in the UK by several statutes, including the WCA 1981 (as amended).

Several bird species are Species of Principal Importance for Nature Conservation in England, making them capable of being material considerations in the planning process.

The reader should refer to the original legislation for the definitive interpretation.

Invasive Flora

The Wildlife and Countryside Act 1981 provides the primary controls on the release of non-native species into the wild in Great Britain. It is an offence under section 14(2) of the Act to 'plant or otherwise cause to grow in the wild' any plant listed in Schedule 9, Part II. This list contains 36 plant species and their hybrids.

Section 33 of the Environmental Protection Act 1990 states that a person shall not:

- deposit controlled waste, or knowingly cause or knowingly permit controlled waste to be deposited in or on any land unless a waste management licence authorising the deposit is in force and the deposit is in accordance with the licence;
- treat, keep or dispose of controlled waste, or knowingly cause or knowingly permit controlled waste to be treated, kept or disposed of:
- in or on any land, or
- by means of any mobile plant,
- except under and in accordance with a waste management licence;
- treat, keep or dispose of controlled waste in a manner likely to cause pollution of the environment or harm to human health.

Mammals

It is an offence to kill any mammal (including rabbits, foxes, hedgehog and polecat) by cruel methods, as outlined within the Wild Mammals (Protection) Act 1996. In brief, the legislation states that:

- If, save as permitted by this Act, any person mutilates, kicks, beats, nails or otherwise impales, stabs, burns, stones, crushes, drowns, drags or asphyxiates any wild mammal with intent to inflict unnecessary suffering he shall be guilty of an offence.

The death of any mammal by crushing, asphyxia or dragging, such as may be caused by plant during construction may be classed as an offence if construction activities are undertaken without due regard for burrowing mammal species.

Bats

Bats and the places they use for shelter or protection (i.e. roosts) receive European protection under The Conservation of Habitats and Species Regulations 2010, as amended (Habitats Regulations 2010, as amended). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that bats, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2010 (as amended), states that a person commits an offence if they:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats; or
- damage or destroy a bat roost (breeding site or resting place).

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2010 (as amended) for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead bats, part of a bat or anything derived from bats, which has been unlawfully taken from the wild.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* (rather than deliberately) kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly** damage or destroy, *or obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

As bats re-use the same roosts (breeding site or resting place) after periods of vacancy, legal opinion is that roosts are protected whether or not bats are present.

The following bat species are Species of Principal Importance for Nature Conservation in England: Barbastelle Bat *Barbastella barbastellus*, Bechstein's Bat *Myotis bechsteinii*, Noctule Bat *Nyctalus noctula*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Brown Long-eared Bat *Plecotus auritus*, Greater Horseshoe Bat *Rhinolophus ferrumequinum* and Lesser Horseshoe Bat *Rhinolophus hipposideros*.

The reader should refer to the original legislation for the definitive interpretation.

Great Crested Newts

Great crested newts (GCN) and the places they use for shelter or protection receive European protection under The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that GCN, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2017, states that a person commits an offence if they:

- deliberately capture, injure or kill a GCN;
- deliberately disturb GCN;
- deliberately take or destroy eggs of a GCN; or
- damage or destroy a GCN breeding site or resting place.

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017 for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead GCN, part of a GCN or anything derived from GCN, which has been unlawfully taken from the wild. This legislation applies to all life stages of GCN.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* (rather than deliberately) kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly** damage or destroy, *or obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

Great crested newts are listed as Species of Principal Importance on the UK Post-2010 Biodiversity Framework (2012), and as such are material considerations in the planning process.

Water vole

The Wildlife and Countryside Act 1981 (as amended) was updated on 6th April 2008 and the protection which water vole receives was increased to make it an offence to:

- Intentionally kill, injure or take water vole from the wild;
- Possess or control live or dead water voles or derivatives;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection;
- Intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose; or
- Sell water voles or offer or offer or expose for sale or transport for sale.

In England and Wales, this Act has been amended by the Countryside and Rights of Way Act 2000 (CroW), which adds an extra offence, makes species offences arrestable, increases the time limits for some prosecutions and increases penalties. The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on Government Departments to have regard for the conservation of biodiversity and maintains lists of species and habitats which are of principal importance for the purposes of conserving biodiversity in England and Wales.

These lists include water vole. The Act provides a defence against the above where the action is the incidental results of an otherwise lawful operation and could not have been avoided (s.10(3)9c)). Licences are required to be applied for should the following activities which would otherwise be an offence, this includes:

- For scientific or educational purposes;
- For the purposes of ringing or marking;
- For conserving wild animals or introducing them into particular areas;
- Preserving public health or public safety;
- Preventing the spread of disease; and
- Preventing serious damage to any form of property or to fisheries.

Water voles are classed as a Species of Principal Importance in England. The reader should refer to the original legislation for definitive interpretation

ECOLOGY

ECO 9 2019 Phase 1 Habitat Survey Data

APP 1: Detailed Phase 1 Habitat Maps (Drawings 1820-T1-A to -I)

APP 2: Site Concerns Map

APP 3: Phase 1 Survey Photographs

SITE AT PEEL HALL, WARRINGTON

For

SATNAM MILLENNIUM LTD

ECO 9:
PHASE 1 HABITAT SURVEY DATA

METHODOLOGIES AND RESULTS ONLY

MAY – OCTOBER 2019

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CONTENTS:

The current report comprises the methodologies and survey data of Phase 1 Habitat Survey work only. Habitat desk study data, an overview of Phase 1 Habitat survey results, an impact assessment of proposals in relation to habitats and any associated mitigation is included in Chapter 6 of the Environmental Statement (March 2020).

1.0 METHODOLOGIES

1.1 A Phase 1 Habitat Survey was conducted following the methodology of the Joint Nature Conservation Committee (JNCC, 2010) and the Institute of Environmental Assessment (IEA, 1995). The Phase 1 Habitat Survey is a standard technique for classifying and mapping British habitats. The aim is to provide a record of habitats that are present on site. Data recorded during the field survey are discussed in Chapter 2.

1.2 Whilst every effort has been made to identify and map any invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act (1981, as amended), it should be noted that this was not a specific survey for these species.

1.3 Due to the size of the site, the site was split into compartments for purposes of surveying as detailed in Drawing 1820-T1-01. These compartments generally followed field or habitat boundaries and usually ranged between 4-10ha in size.

1.4 Recorded vegetation was given an abundance score following DAFOR (Dominant, Abundant, Frequent, Occasional, or Rare). Where appropriate, these values were prefixed by very or locally to provide more subtle biogeographical data. Full species lists and abundance scores are provided in Chapter 2, with Chapter 2 providing a brief summary of all habitats within the site. Maps are included as Appendix 1.

1.5 Species diversity within grassland areas followed the Magnificent Meadows methodology in order to identify species richness. In this methodology a surveyor walks a structured 'W' walk through a grassland stopping at regular intervals or random points to assess whether indicator species are rare, occasional or frequent. 10 stops were made within each grassland area (excluding amenity grasslands). Each stop required an examination of the vegetation in front of the surveyor in a rough 1 square metre area. Species were declared rare if they occurred in 1-2 stops out of 10 or were single instances of species having been noted outside of stops. Similarly, species designated occasional occurred in 3-4 stops; frequent species occurred in 5-6 stops, and so on. Additionally, species were sometimes referred to as being occasional but locally dominant, for example, as their presence dominated a stop point but they may have only been present at 3 stop points.

1.6 Injurious weeds were excluded from species diversity calculations, as per this methodology, but were recorded as having presence in the sward. Injurious weeds are defined under this methodology as creeping and spear thistles (*Cirsium arvense* and *Cirsium vulgare*), broadleaved and curled dock (*Rumex obtusifolius* and *Rumex crispus*), and common ragwort (*Senecio jacobaea*). The number of species found within each stop was then totalled and divided by the number of stops, giving a final index number that provided an empirical basis for species diversity within large swards.

1.7 A Phase 1 Habitat Survey map is provided as Appendix 1 (Drawing 1820-T1-01), which illustrates the location and extent of all broad habitat types recorded within the site area. Chapter 2 should be consulted for habitat descriptions, species lists and target notes. Photographs taken during the field survey are presented in Appendix 2.

1.8 The survey was carried out between May 2019 and October 2019. Weather conditions were generally dry at the time of survey, although a number of surveys undertaken later in the season were after periods of heavy rain. Survey temperatures ranged from 10-31°C.

1.9 For ease of surveying and writing, the site was broken down into nine compartments as well as boundary features and ponds. These are presented in Drawings 1820-T1-A to -I, Appendix 1, however, figures are also provided within the text for each compartment for ease of reference.

Survey constraints

1.10 The survey was undertaken between May and October 2019; whilst this does have the benefit of allowing for repeated site visits and assessment of areas of the site, this is a large period of time where some plants may be in or out of flower depending on the month of survey of that part of the site.

1.11 Some areas of the site were too densely vegetated to be examined closely; these areas are detailed within the habitat description.

2.0 RESULTS: COMPARTMENT A

2.1 Compartment A was a large and roughly triangular former arable field mostly surrounded by fences but with short sections of defunct hedgerows occurring locally. The field had been ploughed in the past and left fallow. In the south-west and south of the site were areas that were locally damp at the time of survey, with vegetation reflecting the underlying groundwater. Additionally, succession towards tall ruderal herb communities was present with occasional scrub to boundaries. This area is highlighted in Figure 1, below:

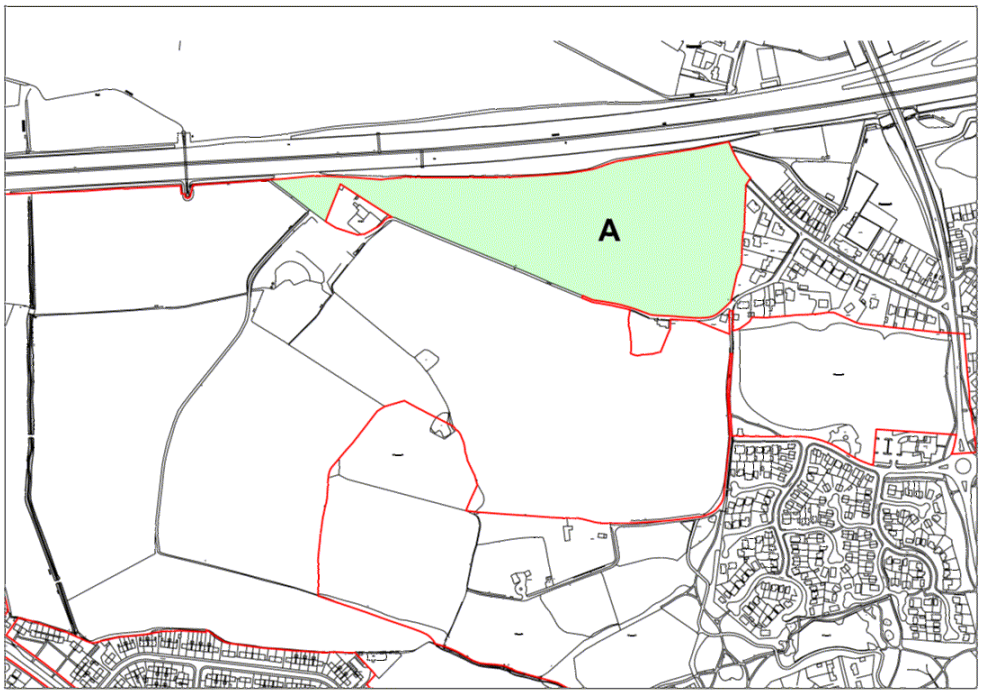

Figure 1: Compartment A, in light green, shown inside the site boundary in red

2.2 Compartment-level habitat data can be found within Drawing 1820-T1-A. Habitats found within Compartment A are listed in alphabetical order below, not in order of ecological importance.

- Bare ground/Hard-standing (J4)
- Defunct native species poor hedgerow (J2.2.2)
- Dense scrub (A2.1)
- Marshy grassland (B5)
- Scattered scrub (A2.2)
- Species poor improved grassland (B2)
- Tall ruderal herb (C3.1)
- Tall ruderal-grassland Mosaic (C3.1 and B2)

Bare ground/Hard-standing

2.3 An area of bare ground/hard standing to the far east of Compartment A comprised a residential road.

Defunct native species poor hedgerow

2.4 A defunct hedgerow (H1a) formed the boundary with Mill Lane. The hedge was approximately 3m high, historically pruned, unmanaged on the field side and not considered to be stock proof. The hedge was dominated by hawthorn (*Crataegus monogyna*) with occasional dogwood (*Cornus sanguinea*) and one holly (*Ilex aquifolium*) bush also present within the hedgerow itself. A single elder was growing in the field adjacent to this feature. The ground flora was considered to be poor and characterised by dense bramble on the field side with a more complex assemblage roadside, as described in Table 1, below.

Species	**Frequency of species within habitat**
Defunct Hedgerow Ground Flora (H1a)	
Dandelion *Taraxacum officinale* agg. sp.	A
Common mouse ear *Cerastium fontanum*	F
Common nettle *Urtica dioica*	F
Broadleaved dock *Rumex obtusifolius*	O
Foxglove *Digitalis purpurea*	O
Garlic mustard *Alliaria petiolata*	O
Herb robert *Geranium robertianum*	O
Ivy *Hedera helix*	O
Ramping fumitory *Fumaria muralis*	O
Red dead nettle *Lamium purpureum*	O
Ribwort plantain *Plantago lanceolata*	O
Sorrel *Rumex acetosa*	O
Yarrow *Achillea millefolium*	O

Table 1: H1a Ground Flora

2.5 H1b represents a defunct hedgerow opposite H1a, which had similar characteristics such as being approximately 2m high, historically pruned and hawthorn dominated; H1a also rarely featured elder. Ground flora was similar to that in Table 1, above, with the addition of occasional chickweed (*Stellaria media*), rosebay willowherb, common hogweed (*Heracleum sphondyleum*), dove's foot cranesbill (*Geranium mole*), sycamore saplings (*Acer pseudoplatanus*) and burdock (*Arctium minus*).

2.6 H2 represents a 2m tall hedgerow, occasionally maintained entirely dominated by hawthorn with tall ruderal vegetation such as rosebay willowherb and common nettle comprising the ground flora.

2.7 H3 was a defunct hedge 2-3m in height, poorly maintained with a row of trees behind it bordering the motorway. The hedgerow was co-dominated by hawthorn and blackthorn (*Prunus spinosa*). Ground flora

was notably poor and characterised by frequent common nettle and goosegrass (*Galium aparine*), with occasional bramble.

2.8 H4 was a defunct gappy and leggy unmanaged hedgerow approximately 3m tall. This hedgerow was dominated by hawthorn, with holly and elder rarely featuring. Elder growth was in decline as elder whitewash (*Hyphodontia sambuci*) fungus was present, which is indicative of dead wood.

2.9 H5 borders with Compartment E; therefore Section *Internal Boundary Features: Hedgerows* should be consulted.

Dense scrub

2.10 Dense scrub habitats were present to the boundaries of Compartment A. Dense scrub on the eastern boundary was characterised by dense and impenetrable bramble (*Rubus fruticosus* agg. sp.), with abundant common nettle (*Urtica dioica*) and frequent rosebay willowherb (*Chamaenerion angustifolium*) to the edges.

2.11 TN1 relates to a small patch of mature scrub in the middle of the grassland (see Photograph 1, Appendix 3). Rabbit burrows were present at the base of several shrubs, along with brash piles. Ground directly beneath the shrubs was largely barren with forbs to the edges. Scrub species were characterised by co-dominant elder and (*Sambucus nigra*), goat willow (*Salix caprea*). TN5 relates to a patch of mature scrub of a very similar character.

2.12 TN2 relates to an area formerly described as “a linear wetland area on the south-west boundary of the site.” This habitat was considered to be closer to a patch of former wetland transitioned to scrub with marshy grassland at the borders at the time of survey (see Photograph 2, Appendix 3). The former wetland transitioned to scrub was largely bare under the shrubs and trees, and banded by a row of common nettle. Goat willow was dominant, with occasional silver birch (*Betula pendula)*, with localised dominances of common nettle within the ground flora. Species diversity had significantly reduced in this area since the 2012 survey.

Marshy Grassland

2.13 Marshy grassland was generally characterised by the same grasses and forbs found within the species poor improved grassland habitats, but with additional dominances of soft rush (*Juncus effusus*). A small patch of marshy grassland was present at TN3 which had many of the species present within the species poor improved grassland habitats as well as locally abundant soft rush, locally frequent common figwort (*Scrophularia nodens*), changing forget-me-not (*Myosotis discolor*) and southern marsh orchid (*Dactylorhiza praetermissa*).

Scattered Scrub

2.14 Patches of scattered willow scrub characterised by goat saplings were occasionally present within the main grassland habitat.

Species Poor Improved Grassland

2.15 The primary habitat was a species poor improved grassland (see Photograph 3, Appendix 3). Grasses and grassland forbs were a constant presence in samples taken of the sward, although it should be noted that tall ruderal species such as creeping thistle (*Cirsium arvense*) were present throughout the sward in low to moderate densities showing a successional trend towards tall ruderal habitat. The species composition is presented in Table 2, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Grassland, Compartment A			
Soft rush *Juncus effusus*	VLD	Lesser trefoil *Trifolium dubium*	O, LF
Dandelion *Taraxacum officinale*	LA	Oilseed rape *Brassica napa*	O
Silverweed *Argentina anserina*	LA	Red clover *Trifolium pratense*	O, LA
Smooth meadow grass *Poa pratensis*	LA	Red fescue *Festuca rubra*	O
Common vetch *Vicia sativa*	A	Ribwort plantain *Plantago lanceolata*	O
Cock's foot *Dactylis glomerata*	A	Sorrel *Rumex acetosa*	O
Creeping bent *Agrostis stolonifera*	A	Wavy bittercress *Cardamine flexuosa*	O, LF
Creeping buttercup *Ranunculus repens*	A	White clover *Trifolium repens*	O
Meadow foxtail *Alopecurus pratensis*	A	Field bindweed *Convolvulus arvensis*	R
Yorkshire fog *Holcus lanatus*	A	Common hogweed *Heracleum sphondylium*	R
Creeping thistle *Cirsium arvense*	F	Common ramping fumitory *Fumaria muralis*	R
Meadow buttercup *Ranunculus acris*	F	False oat grass *Arrhenatherum elatius*	R
Rosebay willowherb *Chamaenerion angustifolium*	F	Greater willowherb *Epilobium hirsutum*	R
Scented mayweed *Matricaria chamomilla*	F	Groundsel *Senecio vulgaris*	R
Sweet vernal grass *Anthoxanthum odoratum*	F	Hairy tare *Vicia hirsuta*	R
Compact rush *Juncus conglomeratus*	VLO	Perennial rye grass *Lolium perenne*	R
Broadleaved dock *Rumex obtusifolius*	O	Rough meadow grass *Poa trivialis*	R
Changing forget-me-not *Myosotis discolor*	O, LA	Red dead nettle *Lamium purpureum*	R
Chickweed *Stellaria media*	O, LF	Slender speedwell *Veronica filiformis*	R
Common nettle *Urtica dioica*	O, LF	Spear thistle *Cirsium vulgare*	R
Common ragwort *Senecio jacobaea*	O	Teasel *Dipsacus follonum*	R
Curly dock *Rumex crispus*	O	Thale cress *Arabidopsis thaliana*	R
Cut leaved cranesbill *Geranium dissectum*	O		

Table 2: Species assemblage within species poor neutral grassland habitat, Compartment A

2.16 Excluding injurious weeds, it was calculated that this habitat yielded 7.9 species per square metre.

2.17 An area of fly tipped waste at the field entrance comprising wooden boards, various plastics and ridged concrete asbestos roofing materials was present at TN4. TN4 is representative of an area of flytipped garden waste, inclusive of brash piles, various plastics, litter and clippings (see Photograph 4, Appendix 3).

Tall Ruderal

2.18 Tall ruderal habitat was present to the boundary edges and within the centre of Compartment A, where successional changes from grassland to tall ruderal habitat were taking place. Tall ruderal monoculture stands of rosebay willowherb were present occasionally. Tall ruderal habitats were generally very similar in composition with minor variances in abundances e.g. all stands were dominated by rosebay willowherb, except for one, which was dominated by common nettle; therefore rosebay willowherb is described as being dominant within Table 3, below, with common nettle described as being abundant, locally dominant. Table 3 provides species assemblages for tall ruderal habitats withing Compartment A:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Tall Ruderal Habitats, Compartment A			
Rosebay willowherb *Chamaenerion angustifolium*	D	Cock's foot *Dactylis glomerata*	O
Common nettle *Urtica dioica*	A, LD	Creeping buttercup *Ranunculus repens*	O
Broadleaved dock *Rumex obtusifolius*	A	Cut leaved cranesbill *Geranium dissectum*	O
Creeping thistle *Cirsium arvense*	F	Meadow buttercup *Ranunculus acris*	O
Meadow foxtail *Alopecurus pratensis*	F	Oilseed rape *Brassica napa*	O
Scented mayweed *Matricaria chamomilla*	F	Sweet vernal grass *Anthoxanthum odoratum*	O
Common hogweed *Heracleum Sphondylium*	F	Yorkshire Fog *Holcus lanatus*	O
Common vetch *Vicia sativa*	O, LA	Creeping bent *Agrostis stolonifera*	R
Bramble (*Rubus fruticosus* agg. sp.)	O	Red fescue *Festuca rubra*	R

Table 3: Tall ruderal habitats within Compartment A

Tall Ruderal-Grassland Mosaic

2.19 This habitat was considered to be a mosaic habitat undergoing succession from grassland to tall ruderal and exhibited a mix of species from both the tall ruderal and grassland habitats already discussed above. The mix was approximately 60% tall ruderal to 40% grassland and contained a good mixture of nearly all species found within both habitat types discussed above (see Photograph 5, Appendix 3).

3.0 RESULTS: COMPARTMENT B

3.1 Compartment B was an extensive field that had been disturbed by ploughing in the past before being abandoned from further management. The field was dominated by species poor improved grassland that had grown coarse with occasional stands of tall ruderal habitat and scrub. Stands of common reed (*Phragmites australis*) were encroaching at some field margins. This area is highlighted in Figure 2, below:

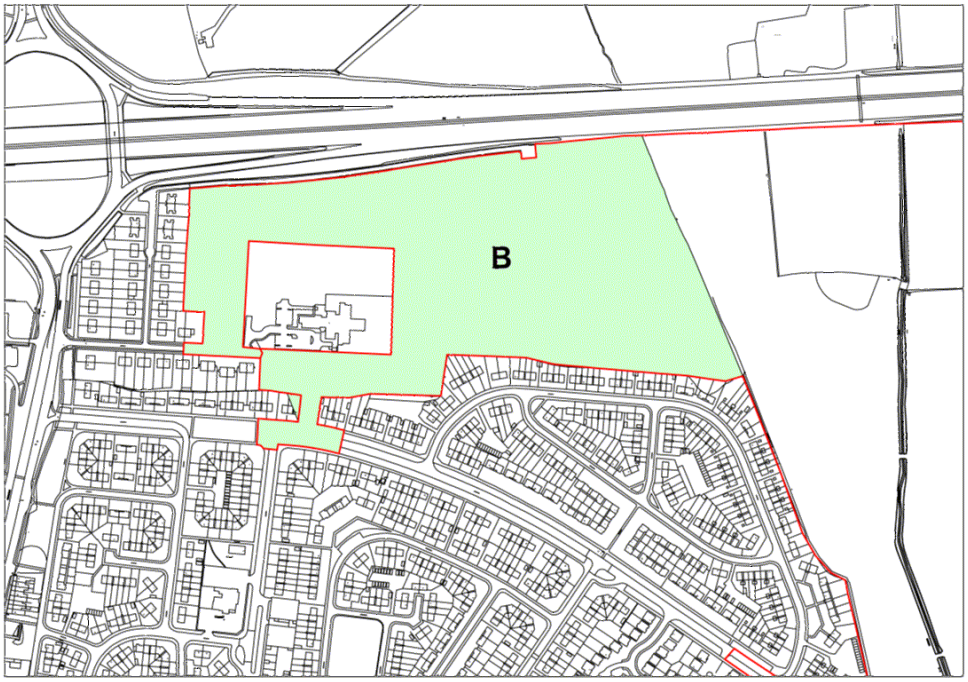

Figure 2: Compartment B, in light green, shown inside the site boundary in red

3.2 Compartment-level habitat data can be found within Drawing 1820-T1-B. Habitats found within Compartment B are listed in alphabetical order below, not in order of ecological importance.

- Amenity grassland (J1.2)
- Bare ground/Hard-standing (J4)
- Bracken (C1.1)
- Buildings (J3.6)
- Defunct native species poor hedgerow (J2.1.2)
- Dense scrub (A2.1)
- Dry ditch (J2.6)
- Marshy grassland (B5)
- Plantation broadleaved woodland (A1.1.2)
- Scattered scrub (A2.1)
- Scattered trees (A3.1)
- Species Poor Improved Grassland (B2)
- Swamp (F1)

- Tall ruderal herb (C3.1)
- Tall Ruderal-Scrub Mosaic (C3.1 & A2.1)
- Tall Ruderal-Scrub-Grassland Mosaic (C3.1, A2.1, and B2)

Amenity Grassland

3.3 Areas of amenity grassland were characterised by roadside verges or residential gardens. It is acknowledged that gardens frequently contained shrubs; these were present on a very fine scale within these gardens.

Bare ground/Hard-standing

3.4 Areas of bare ground/hard standing were characterised by roads and paths within residential areas to the south of this compartment.

Bracken

3.5 A dense and in parts impenetrable monoculture of bracken (*Pteridium aquilinum*) surrounded TN6, which is representative of an area of former infrastructure of concrete construction (see Photograph 6, Appendix 3). Occasional forbs and grasses were present around the infrastructure itself. The species composition is detailed in Table 4, below:

Species	Frequency of species within habitat
TN6, Compartment B	
Bracken *Pteridium aquilinum*	D
Field horsetail *Equisetum arvense*	F
Herb Robert *Geranium robertianum*	F
Dog rose *Rosa canina*	O
Yorkshire fog *Holcus lanatus*	O
Cock's foot *Dactylis glomerata*	O
Bramble *Rubus fruticosus* agg. sp.	O
Hairy tare *Vicia hirsuta*	O

Table 4: Species assemblage at TN6, Compartment B

Buildings

3.6 Buildings within this area relate to 458-464 Poplars avenue. For further information in relation to buildings, see the relevant bat survey report.

Defunct Native Species Poor Hedgerow

3.7 See section *Internal Boundary Features* for further information with respect to hedgerow H10.

Dense scrub

3.8 Dense scrub habitats were present to the boundaries of Compartment B. Several patches of bramble dominated scrub were present within this compartment (see Drawing 1820-T1-B) and this was the most frequent scrub type in this area, with occasional instances of honeysuckle (*Lonicera periclymenum*). Occasional instances of snowberry (*Symphorcarpos albus*) scrub were present adjacent to garden boundaries to the southeast, with dogwood also being occasional in this area.

3.9 NHS buildings to the southwest were bounded by patches of scrub characterised by abundances of goat willow, bramble, and common nettle, with occasional bracken to the eastern fenceline. Patches of scrub to the south of this fenceline were characterised by bramble scrub, cherry trees, dogwood and goat willow.

Dry ditch

3.10 See section *Internal Boundary Features* for further information with respect to ditch D1.

3.11 The northern part of the double hedgerow parted by approximately 5m. In this small 5m gap a cannabis (*Cannabis sativa*) 4x4 growing grid was found, which supported a number of plants throughout the year (see TN7, Photographs 7 and 8, Appendix 3). Tools for the cultivation of these plants had been left in this area with an amount of litter. It should be noted that the double hedgerow was only superficially assessed and evaluated due to safety concerns surrounding the presence of the marijuana growing operation.

Marshy Grassland

3.12 Areas of marshy grassland in Compartment B were characterised by local dominances of rushes, such as hard rush (*Juncus inflexus*) and dampness underfoot. Common species found in the species poor improved grassland sward were also present.

Plantation Broadleaved Woodland

3.13 A very small patch of plantation broadleaved woodland was present to the south-western corner of Compartment B. This was dominated by planted cherry trees with self-set pole trees also present. Dense flytipping was present throughout parts of the habitat, which included furniture, spent fireworks, umbrellas, bins, wood panelling, bottles and building materials (see Photographs 9 and 10, Appendix 3). Ground flora was low in diversity and was crushed down with abundant paths, likely from both deer and people (see Photograph 11, Appendix 3). Table 5, below, details the species composition for this habitat.

Species	Frequency of species within habitat
Plantation Broadleaved Woodland, Compartment B	
Cherry *Prunus* sp.	D
Goosegrass *Galium aparine*	A
Herb Robert *Geranium robertianum*	F
Perennial ryegrass *Lolium perenne*	F
Dandelion *Taraxacum officinale* agg. sp	O
Common nettle *Urtica dioica*	O
Creeping thistle *Cirsium arvensis*	O
Hawthorn (saplings) *Crataegus monogyna*	O
Common privet (saplings) *Ligustrum vulgare*	O
Shuttlecock fern *Matteuccia struthiopteris*	O

Table 5: Species assemblage within Plantation Broadleaved Woodland habitat, Compartment B

Scattered Scrub

3.14 Patches of scattered willow scrub characterised by goat and grey willow saplings were occasionally present within the main grassland habitat. One small hawthorn was also present.

3.15 TN8 relates to an area of scattered scrub in a particularly wet area. Jointed rush (*Juncus articulatus*) was very locally dominant, with goat willow saplings abundant. Tutsan (*Hypericum androsaemum*), compact rush (*Juncus conglomeratus*), and Yorkshire fog were occasionally present in this area. TN9 is representative of a similar habitat with tutsan replaced by greater willowherb (*Epilobium hirsutum)* and oilseed rape (*Brassica napus*).

Scattered Trees

3.16 Cherry (*Prunus* sp.) trees had been planted along the western boundary. TN10 is representative of a number of young planted cherry saplings to the rear of houses, where grasses have been cut and regularly maintained. As these trees were not reported in previous surveys, it is likely they were recently planted.

3.17 Street trees were present on amenity verges along Poplars Avenue to the south. These comprised young to early mature ash (*Fraxinus excelsior*) and lime (*Tilia* sp.).

Species Poor Improved Grassland

3.18 The primary habitat was a species poor improved grassland (see Photograph 12, Appendix 3). An extensive open field with occasional mammal paths and human trails running throughout. Previous surveys noted that the field had been disturbed by ploughing and abandoned from further management. Grasses and forbs at the field margins were progressively taller, but decreasing in size height across the sward at 1.5m from

boundaries. The field itself was a species poor improved grassland with occasional areas of scrub and occasional local dominances of hairy tare (*Vicia hirsuta*) throughout. The species composition is presented in Table 6, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Grassland, Compartment B			
Yorkshire fog *Holcus lanatus*	D	Sorrel *Rumex acetosa*	O
Meadow foxtail *Aolpecurus pratensis*	A, LA	Creeping soft grass *Holcus mollis*	R, LF
Creeping buttercup *Ranunculus repens*	A, LF	Field horsetail *Equesitum arvense*	R, LF
Cock's foot *Dactylis glomerata*	A	Smooth meadow grass *Poa pratensis*	R, LF
Rough meadow grass *Poa trivialis*	A	Bird's foot trefoil *Lotus corniculatus*	R
Common vetch *Vicia sativa*	F	Bramble *Rubus fruticosus* agg. sp.	R
Creeping thistle *Cirsium arvense*	F	Broadleaved dock *Rumex obtusifolius*	R
False oat grass *Arrhenatherum elatius*	F	Creeping soft grass *Holcus mollis*	R
Perennial ryegrass *Lolium perenne*	F	Common ragwort *Senecio jacobaea*	R
Scented mayweed *Matricaria chamomilla*	O, LA	Creeping bent *Agrostis stolonifera*	R
Hairy tare *Vicia hirsuta*	O, LD	Common nettle *Urtica dioica*	R
SIlverweed *Argentina anserina*	O, LF	Compact rush *Juncus conglomeratus*	R
Changing forget-me-not *Myosotis discolour*	O	Curly dock *Rumex crispus*	R
Chickweed *Stellaria media*	O	Goosegrass *Galium aparine*	R
Cut leaved cranesbill *Geranium dissectum*	O	Lesser stitchwort *Stellaria graminea*	R
Dandelion *Taraxacum officinale*	O	Meadow buttercup *Ranunculus acris*	R
Greater willowherb *Epilobium hirsutum*	O	Ribwort plantain *Plantago lanceolate*	R
Hedge bindweed *Calystegia sepium*	O	Slender speedwell *Veronica filiformis*	R
Oilseed rape *Brassica napus*	O	Smooth hawksbeard *Crepis capillaris*	R
Red fescue *Festuca rubra*	O	Soft brome *Bromus hordeaceus*	R
Rosebay willowherb *Chamaenerion angustifolium*	O	Square stalked willowherb *Epilobium tetragonum*	R
Smooth tare *Vicia tetrasperma*	O	White clover *Trifolium repens*	R

Table 6: Species assemblage within species poor neutral grassland habitat, Compartment B

3.19 Excluding injurious weeds, it was calculated that this habitat yielded 7.7 species per square metre.

3.20 TN11 represents areas of grassland entirely dominated by hairy tare (see Photograph 13, Appendix 3). TN12, adjacent to one of these areas, represents flytipped plastic coated MDF panels (see Photographs 14 and 15, Appendix 3).

3.21 TN13 represents burnt household rubbish and flytipping, inclusive of bits of sofa, a bicycle, a barbecue, a plastic Christmas tree, and parts of a swingset along with miscellaneous furniture (see Photograph 15, Appendix 3). Just south of this target note was an area of flytipped fence panels and furniture, including mattress materials and sofa parts (see Photographs 16 and 17, Appendix 3).

3.22 TN14 is representative of a small cleared area with a small hut adjacent, likely used by a frequent visitor for bird watching. Flytipped household waste was also present in this area.

Swamp

3.23 Dense dry stands of common reed were present within this compartment. TN15 relates to an area of flytipped rubbish with a path made of boards through a stand of common reed, leading to the trees behind (see Photograph 18, Appendix 3). Evidence was present of a person camping there at some point in the last year, which had vegetation of a lower than average height for the habitat.

Tall Ruderal

3.24 Tall ruderal habitat was found either to the edges of compartment or scattered throughout the grassland habitat where it was undergoing successional changes.

3.25 Tall ruderal habitats were usually characterised by dominances or abundances of common nettle, rosebay willowherb, or creeping thistle, and, when near southern or eastern boundaries, fringed by localised instances of common reed. In areas where tall ruderal habitats were undergoing succession, bramble was usually present.

Tall Ruderal-Scrub Mosaic

3.26 This is an area with dense stands of rosebay willowherb and competing bramble. Near to the fenceline stands of common reed were present, but in notably dry ground, with hedge bindweed growing throughout.

Tall Ruderal-Scrub-Grassland Mosaic

3.27 This was a tall ruderal-scrub-grassland habitat which was undergoing succession from a former grassland. Approximately 55%/30%/15% split of tall ruderal to scrub to grassland. Scrub species almost entirely comprised scattered goat willow. Most stands of tall ruderal in this area were dense and impenetrable. Table 7, below, indicates the species composition of this area:

Species	Frequency of species within habitat
Tall Ruderal-Scrub-Grassland Mosaic	
Common nettle *Urtica dioica*	A, VLD
Creeping thistle *Cirsium arvense*	A, LD
Rosebay willowherb *Chamaenerion angustifolium*	A, LD
Soft rush *Juncus effusus*	A, LD
Field horsetail *Equesitum arvense*	F
Bramble *Rubus fruticosus* agg. sp.	F
Yorkshire fog *Holcus lanatus*	F
False oat grass *Arrhenatherum elatius*	O
Broadleaved dock *Rumex obtusifolius*	O

Table 7: Species assemblage within tall ruderal-scrub-grassland mosaic habitat, Compartment B

3.28 TN16 is representative of a small "garden" area within this habitat that had been cleared with a paved path leading from a back gate in the fenceline (see Photograph 17, Appendix 3). A planted apple (*Malus* sp.) tree and a tractor tyre were present in the area, which was obviously well used by people and dogs and kept short and was well-maintained.

Invasive Species

3.29 Whilst no invasive species were present within this compartment, cotoneaster was present on the boundary with the motorway to the north. Virginia creeper (*Parthenocissus quinquefolia*) was present on residential boundary fencing approximately 2m outside of the site, within the north-western corner.

4.0 RESULTS: COMPARTMENT C

4.1 Compartment C comprised a large and well-maintained playing field dominated by amenity grassland with boundary planting of trees and shrubs. This area is highlighted in Figure 3, below:

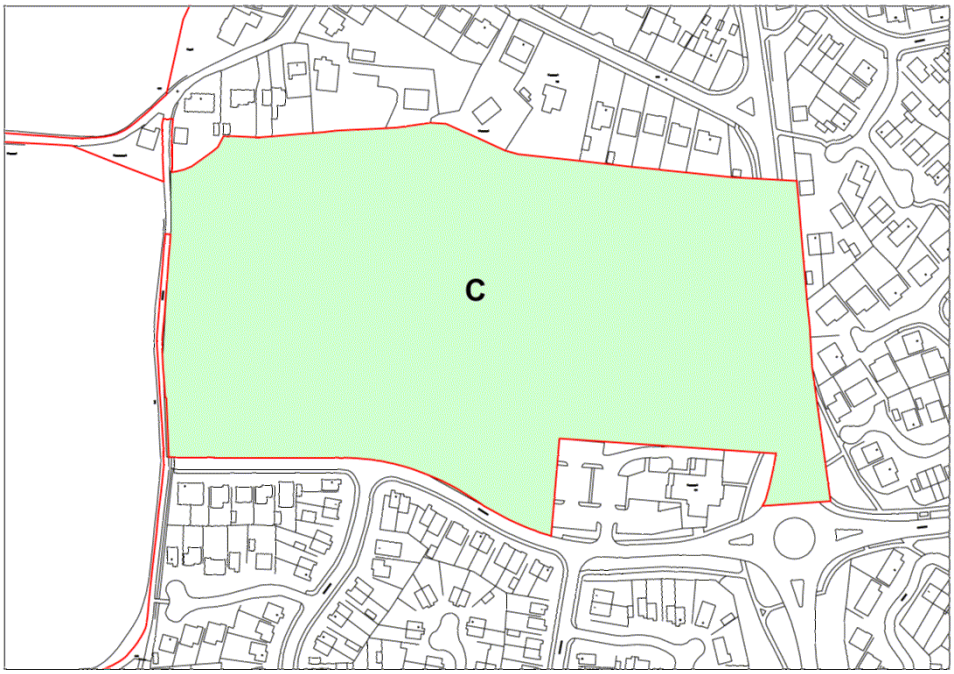

Figure 3: Compartment C, in light green, shown inside the site boundary in red

4.2 Compartment-level habitat data can be found within Drawing 1820-T1-C. Habitats found within Compartment C are listed in alphabetical order below, not in order of ecological importance.

- Amenity grassland (J1.2)
- Bare ground/hard standing (J4)
- Defunct native species poor hedgerow (J2.1.2)
- Dense Scrub (A2.1)
- Dry ditch (J2.6)
- Plantation broadleaved woodland (A1.1.2)
- Scattered trees (A3.1)
- Tall ruderal herb (C3.1)

Amenity Grassland

4.3 Amenity grassland (see Photograph 20, Appendix 3) in this area was frequently cut and often used by dog walkers with dog excrement found within the sward in low amounts. The species composition is presented in Table 8, below:

Species	Frequency of species within habitat
Amenity Grassland	
Perennial ryegrass *Lolium perenne*	D
White clover *Trifolium repens*	VLF
Chickweed *Stellaria media*	LF
Meadow foxtail *Alopecurus pratensis*	LF, at boundaries only
Greater plantain *Plantago major*	F
Creeping buttercup *Ranunculus repens*	O
Daisy *Bellis perennis*	O
Dandelion *Taraxacum officinale* ag. sp.	O
Selfheal *Prunella vulgaris*	O
Ragwort *Senecio jacobaea*	R

Table 8: Compartment C, amenity grassland species

Bare ground/hardstanding

4.4 A small car park (see Photograph 21, Appendix 3) was present to the south of the compartment, which was gravel covered with occasional litter bins present.

4.5 Other areas of bare ground comprised roads and paths.

Defunct native species poor hedgerow

4.6 A mature hedgerow (H6) was present along the western boundary, adjacent to Radley Lane (see Photograph 24, Appendix 3). A wren's (*Troglodytes troglodytes*) nest was found within the hedgerow at the time of survey. Table 9 below lists the species composition for this hedgerow.

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Hedgerow			
Woody Species and Trees		Ground Flora and Scrub/Climbers	
Hawthorn *Crataegus monogyna*	LD, A	Honeysuckle *Lonicera periclymenum*	VLA
Dogwood *Cornus sanguinea*	LA	Common nettle *Urtica dioica*	A
Blackthorn *Prunus spinosa*	LA	Bramble (*Rubus fruticosus* agg. sp)	F
WIllow species *Salix* sp.	LF	Goosegrass *Gallium aparine*	F
Elder *Sambucus nigra*	O	Field bindweed *Convulvus arvensis*	LF
Alder *Alnus glutinosa*	O	Greater willowherb *Epilobium hirsutum*	LF
Oak *Quercus robur*	O (saplings)		

Table 9: Compartment C, Hedgerow species

Dense Scrub

4.7 An area of planted scrub species was present within the car park at TN17 (see Photograph 22, Appendix 3). This particular habitat comprised native low-maintenance scrub species with scattered trees planted throughout as per Table 10, below. Hawthorns in this area were notably young and ground flora was a monoculture. TN18 was a patch of scrub with planted horse chestnut trees to the west of the car park area, with species assemblage as per Table 10, below.

Species	**Frequency of species within habitat**	**Species**	**Frequency of species within habitat**
Scrub (TN17) (Car park)		**Scrub (Western boundary)**	
Dogwood *Cornus sanguinea*	D	Dog rose *Rosa canina*	VLA
Cherry *Prunus sp.*	F	Smooth meadow grass *Poa pratensis*	VLA
Hawthorn *Crataegus monogyna*	O	Cherry *Prunus* sp.	LA
Dog rose *Rosa canina*	O	Dogwood *Cornus sanguinea*	LA
Common nettle *Urtica dioica*	*O*	Blackthorn *Prunus spinosa*	LA
		Goosegrass *Galium aparine*	LF
Species	**Frequency of species within habitat**	Yorkshire fog *Holcus lanatus*	LF
Scrub (TN18) (West of car park)		Silver birch *Betula pendula*	F
Horse chestnut *Aesculus hippocastanum*	A	Hawthorn *Crataegus monogyna*	F
Holly *Ilex aquifolium*	F	Hazel *Corylus avellana*	F
Red currant *Ribes rubrum*	F	Goat willow *Salix caprea*	O
Dog rose *Rosa canina*	F	Oak saplings *Quercus* sp.	O
Willow *Salix sp*	O	Guelder rose *Viburnum opulus*	O
Dogwood *Cornus sanguinea*	O	Bramble *Rubus fruticosus* agg. sp.	O
Cherry *Prunus* sp.	O	Creeping thistle *Cirsium arvense*	O
Hawthorn *Crataegus monogyna*	O	Common hogweed *Heracleum sphondylium*	O
Bramble (*Rubus fruticosus* agg. sp.)	O	Ribwort plantain *Plantago lanceolata*	O
		Poplar *Populus* sp.	O
		White willow *Salix alba*	O
		Dog rose *Rosa canina*	VLA

Table 10: Compartment C, scrub species

4.8 An area of scrub had also been planted in along the majority of the western boundary, adjacent to a ditch and a hedgerow. Scattered trees were also found throughout this habitat. Habitat composition is described in Table 10 above. Ground flora comprised a mix of tall ruderal and grassland forbs.

4.9 Additional areas of scrub within Compartment C broadly align with species and frequency as per the scrub along the western boundary. Scrub to boundary areas frequently were littered with bags of dog waste (see Photograph 23, Appendix 3).

Dry ditch

4.10 A dry ditch (D2) was present along the western boundary of the compartment, adjacent to the hedgerow. No direct access was possible to the ditch due to the presence of dense and impassable vegetation.

Plantation Broadleaved Woodland

4.11 A semi-mature amenity broadleaved plantation woodland was present on the northern boundary of the amenity grassland. The woodland was co-dominated by ash and silver birch, with a well-developed, planted, mixed understorey of common broadleaved trees and shrubs. Ground flora was sparse. Parts of this northern woodland were damaged due to the burning of household and garden waste by neighbouring homeowners, with a small garden incinerator being present in this area, along with fire damaged trees and heaped piles of brashing (see Photographs 25 and 26, Appendix 3). These heaped piles of brashing made parts of the habitat impassable. Where habitat was close to the playing field, large numbers of dog excrement in bags were present, along with low levels of general rubbish. An open manhole was also present near the path. Twiggy nests were present within the woodland, likely belonging to magpie (*Pica pica*) or wood pigeon (*Columba palumbus*). Species composition is listed in Table 11 below:

Species	**Frequency of species within habitat**	**Species**	**Frequency of species within habitat**
Plantation Broadleaved Woodland (North)			
Canopy		Understorey	
Ash *Fraxinus excelsior*	LD	Blackthorn *Prunus spinosa*	LD
Silver birch *Betula pendula*	LD	Dogwood *Cornus sanguinea*	A
Ground Flora		Dog rose *Rosa canina*	A
Ivy *Hedera helix*	LA	Hazel *Corylus avellana*	A
Herb bennet *Geum urbanum*	LA	Elder *Sambucus nigra*	LF
Common nettle *Urtica dioica*	LF at habitat edges	Guelder rose *Viburnum opulus*	LF
Goosegrass *Gallium aparine*	LF at habitat edges	Rowan *Sorbus aucuparia*	LF
Pale willowherb *Epilobium roseum*	O	Grey willow *Salix caprea*	LF
Spear thistle *Cirsium vulgare*	O at habitat edges	bramble (*Rubus fruticosus* agg. sp.)	LF
		Hawthorn *Crataegus monogyna*	F
		Oak *Quercus sp.*	O
		Alder buckthorn *Rhamnus frangula*	O
		Osier *Salix viminalis*	O

Table 11: Compartment C, Plantation Broadleaved Woodland species

4.12 A small patch of plantation broadleaved woodland was present at the south-western corner of the compartment. Whilst it was less mature than the northern plantation woodland, the species composition was the same. Mammal paths were present throughout, which were thought in this area to be caused by foxes (*Vulpes vulpes*), hedgehog (*Erinaceus europaeus*), and pets such as house cat.

4.13 An immature amenity broadleaved plantation woodland was also present on the southern edge of Compartment C (see Photograph 27, Appendix 3). The woodland was locally dominated by silver birch and structurally resembled a scrub community, but functioned as a woodland. Very little ground flora was present and bags of dog excrement and low levels of litter were present throughout. Due to the structure of the woodland, canopy, understorey and ground flora have not been separated within Table 12, below, which provides the species data for this particular area.

Species	Frequency of species within habitat
Plantation Broadleaved Woodland (South)	
Blackthorn *Prunus spinosa*	VLD
Silver birch *Betula pendula*	LD
Cherry sp. *Prunus* sp.	VLA
Dogwood *Cornus sanguinea*	VLA
Common nettle *Urtica dioica*	LA
Ivy *Hedera helix*	A
Ash *Fraxinus excelsior*	A
Dog rose *Rosa canina*	A
Hazel *Corylus avellana*	A
Holly *Ilex aquifolium*	A
Elder *Sambucus nigra*	VLF
Hawthorn *Crataegus monogyna*	VLF
Field maple *Acer campestre*	VO
Guelder rose *Viburnum opulus*	O
Rowan *Sorbus aucuparia*	O
Sycamore *Acer pseudoplantanus*	O

Table 12: Compartment C, Southern Plantation Broadleaved Woodland

Scattered Trees

4.14 A row of horse chestnut (*Aesculus hippocastanum*) trees was present to the south-western edge of the compartment.

4.15 A row of young to mature street trees was present to the far east of the compartment, adjacent to the road. These comprised birch, ash and sessile oak, a number of which were ivy clad.

Tall Ruderal

4.16 Tall ruderal habitat was present to the north-western corner of the compartment, as part of a woodland fringe. This stand comprised dense nettles with frequent creeping thistle and goosegrass. A path led through this stand from the amenity grassland to the houses to the north. Brashing was found occasionally within the stand (see Photograph 28, Appendix 3).

5.0 RESULTS: COMPARTMENT D

5.1 Compartment level habitat data can be found within Drawing 1820-T1-D. Compartment D comprised a former arable field which had been ploughed in the past and left fallow to regenerate with course vegetation (see Photograph 29, Appendix 3). Succession towards tall ruderal herb communities was present with scrub to boundaries. Ponds were present to the south and west of this compartment. Compartment D is highlighted in Figure 4, below:

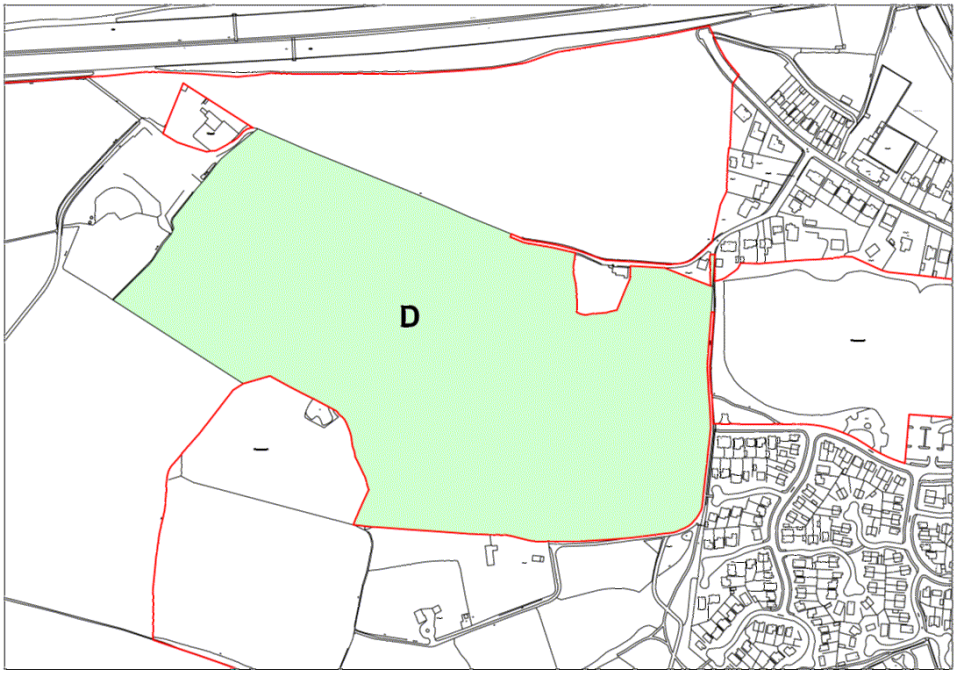

Figure 4: Compartment D, in light green, shown inside the site boundary in red

5.2 Habitats found within Compartment D are listed in alphabetical order below, not in order of ecological importance.

- Bracken (C1.1)
- Defunct native species poor hedgerow (J2.1.2)
- Dense scrub (A2.1)
- Dry ditch (J2.6)
- Marshy grassland (B5)
- Plantation broadleaved woodland (A1.1.2)
- Pond (G1) (see Section: *Ponds*, below)
- Scattered scrub (A2.2)
- Scattered trees (A3.1)
- Species poor improved grassland (B2)
- Tall ruderal herb (C3.1)
- Tall ruderal-grassland mosaic (C3.1 and B2)
- Tall ruderal-scrub mosaic (C3.1 and A2.1)

- Swamp (F1)
- Wet ditch (G1) (see Section *Internal Boundary Features: Ditches* below)

Bracken

5.3 A small strip dominated by bracken was present adjacent to a dry ditch (D3) which was vegetated by bracken, tall ruderal species, and bramble. A broken toy goalpost was present within the stand of bracken (see Photograph 31, Appendix 3). See *Dry Ditch*, below, for further description.

Defunct native species poor hedgerow

5.4 A hedgerow (H7) associated with the boundary of a residence was present to the north-eastern corner of Compartment D. This hedgerow was dominated by hawthorn with occasional hazel (*Corylus avellana*), young oak trees, and sycamore, with a cherry laurel (*Prunus laurocerasus*) adjacent. Ground flora consisted of rosebay willowherb.

Dense Scrub

5.5 Dense scrub habitats were present both to the boundaries and within a large pocket of scrub to the north-west. Individual dense scrub habitats were characterised by dominances of goat and grey willow, and occasional bramble understory with a young mix of saplings, such as oak (*Quercus robur*) and ash. Tall ruderal species found within the tall ruderal habitats of this compartment were also present.

5.6 TN19 represents an area of planted scrub which was waterlogged at the time of survey due to heavy rains during the previous week. The ground was bumpy in this area which created natural ephemeral pools with clearings where tall ruderal and wetland species were present; this area was scrub dominated but with ground flora indicative of succession from tall ruderal and grassland habitats (see Photograph 32, Appendix 3). Rabbit burrows were present in the drier, more raised areas in this habitat. Table 13, below, details the species composition of this area.

Species	**Frequency of species within habitat**	**Species**	**Frequency of species within habitat**
Scrub TN19			
Grey willow *Salix cinerea*	A	Reed canary grass *Phalaris arundinacea*	O, VLF
Polytrichum moss *Polytrichum* sp.	O	Bramble *Rubus fruticosus* agg. sp.	O
Alder *Alnus glutinosa*	O	Common ragwort *Senecio jacobaea*	O
Silver birch *Betula pendula*	O	Crack willow (young) *Salix fragilis*	O
Perennial ryegrass *Lolium Perenne*	O, LD	Fleabane *Pulicaria dysenterica*	O
Silverweed *Argentina anserine*	O, LA	Himalayan balsam *Impatiens glandulifera*	O
Soft rush *Juncus effuses*	O, LA	Marsh thistle *Cirsium palustre*	O
Common nettle *Urtica dioica*	O, LF	Cherry *Prunus sp.*	R

Table 13: Species composition of TN19

5.7 A broken tent with heaps of drinks cans and a damaged sleeping bag was found in this patch of dense scrub at TN20, adjacent to D5 (see Wet Ditch, below). A camp fire had been lit here in the past and it appeared likely from the amount of rubbish in this area that a rough sleeper was present in this location for some time (see Photograph 31, Appendix 3).

Dry Ditch

5.8 A dry ditch (D3) was present adjacent to Radley Lane. The channel was approximate 30-60cm deep and complexly and densely vegetated with a mixture of bracken, tall ruderal, and scrub species typical of the site, including bramble, greater willowherb, common hogweed, false oat grass (*Arrhenatherum elatius*), common nettle, hedge bindweed (*Calystegia sepium*), and rosebay willowherb.

5.9 A dry ditch (D4) was present as part of a wider network of ditches, adjoining P2. This ditch was heavily shaded by grey and goat willow as well as alder. Himalayan balsam and bramble scrub were also occasionally present (see Photograph 31, Appendix 3).

Marshy Grassland

5.10 A small patch of marshy grassland was present to the north-western corner, surrounded by tall ruderal and scrub habitats. This area was characterised by a local abundance of jointed rush (*Juncus articulatus*), common reed, marsh thistle and common hogweed.

Plantation Broadleaved Woodland

5.11 This habitat was considered to be an immature broadleaved plantation woodland (see Photograph 32, Appendix 3), the northern part of which (TN21) was characterised by large planted scrub species such as grey and goat willow with occasional silver birch that functioned as a woodland. Table 14, below, details the species assemblage of the remaining plantation broadleaved woodland habitat.

5.12 The woodland exhibited a range of ages in tree species and was of good general structure despite being species poor. Dense vegetation prevented access to parts of the woodland, particularly to the south where it was noted that a row of trees and shrubs had been planted as a boundary to the woodland with the adjacent property. This row comprised hawthorn and silver birch.

5.13 Litter was occasionally present in very low densities only, likely due to the lack of footfall in this area. It was also noted that the dense row of boundary trees and hawthorn to the south of the woodland likely protected it from any litter from the adjacent property.

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Plantation Broadleaved Woodland, Compartment D			
Canopy		Ground Flora	
Alder *Alnus glutinosa*	F, LA	Herb bennet *Geum urbanum*	A, LD
Sycamore *Acer pseudoplatanus*	F	Common nettle *Urtica dioica*	A, LD
Ash *Fraxinus excelsior*	O	Ivy *Hedera helix*	O, LA
Oak *Quercus robur*	O	Herb Robert *Geranium robertianum*	O, LF
Horse chestnut *Aesculus hippocastanum*	R	Common reed *Phragmites australis*	O
Understorey		Common hogweed *Heracleum sphondyleum*	O
Bramble *Rubus fruticosus* agg. sp.	F, LD	Himalayan balsam *Impatiens glandulifera*	O
Grey willow *Salix cinerea*	F, LA	Male fern *Dryopteris filix-mas*	O
Goat willow *Salix caprea*	F, LA	Compact rush *Juncus conglomeratus*	R
Hawthorn *Crataegus monogyna*	F	Marsh thistle *Cirsium palustre*	R
Hazel *Corylus avellana*	O	Spear thistle *Cirsium vulgare*	R
Silver birch *Betula pendula*	O	Wood meadow-grass *Poa nemoralis*	R
Wild raspberry *Rubus idaeus*	R		

Table 14: Species composition of Plantation Broadleaved Woodland within Compartment D

5.14 Mammal paths were present throughout and deer hairs were found on a branch. Additionally, some bark stripping was present on trees within this woodland, indicating damage caused by grey squirrels (*Sciurus carolinensis*).

Ponds

5.15 Whilst ponds are present in this area, ponds are discussed separately within the *Ponds* section, below.

Scattered Scrub

5.16 Patches of scattered willow scrub were largely characterised by goat and grey willow saplings which were occasionally present within the main grassland habitat. Scattered scrub habitats also comprised dense patches of bramble.

Scattered Trees

5.17 Scattered alder (*Alnus glutinosa*) trees were present at the eastern field entrance to Radley Lane along with large goat willows. The understorey in this area was characterised by a mix of scrub and tall ruderal species including abundant bramble and common nettle, frequent hazel and occasional greater willowherb, common hogweed, hedge bindweed and a small patch of Himalayan balsam (*Impatiens glandulifera*).

Species Poor Improved Grassland

5.18 The primary habitat in Compartment D was a species poor improved grassland (see Photograph 33, Appendix 3) that had been ploughed in the past but left fallow to regenerate. Grasses and grassland forbs were a constant presence in samples taken of the sward, although it should be noted that tall ruderal species such as creeping thistle were present throughout the sward in low to moderate densities. The species composition is presented in Table 15, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Grassland, Compartment D			
Yorkshire fog *Holcus lanatus*	D	Common centaury *Centaurium erythraea*	R
Silverweed *Argentina anserina*	D	Common hogweed *Heracleum sphondyleum*	R
Creeping buttercup *Ranunculus repens*	F	Cut leaved cranesbill *Geranium dissectum*	R
Ribwort plantain *Plantago lanceolate*	F	Fleabane *Pulicaria dysenterica*	R
Hairy tare *Vicia hirsuta*	A	Fox and Cubs *Pilosella auantiaca*	R
Smooth meadow grass *Poa pratensis*	F	False oat grass *Arrhenatherum elatius*	R
Cock's foot *Dactylis glomerata*	O	Greater birdsfoot trefoil *Lotus pedunculatus*	R
Field woundwort *Stachys arvensis*	O	Lesser trefoil *Trifolium dubium*	R
Red fescue *Festuca rubra*	O	Nipplewort *Lapsana communis*	R
Rosebay willowherb *Chamaenerion angustifolium*	O	Perennial ryegrass *Lolium perenne*	R
Smooth hawksbeard *Crepis capillaris*	O	Red bartsia *Odontites vernus*	R
White clover *Trifolium repens*	O	Red clover *Trifolium pratense*	R
Broadleaved dock *Rumex obtusifolius*	R	Scented mayweed *Matricaria chamomilla*	R
Chickweed *Stellaria media*	R	Selfheal *Prunella vulgaris*	R
Common vetch *Vicia sativa*	R	Soft rush *Juncus effusus*	R
Creeping bent *Agrostis stolonifera*	R	Sorrel *Rumex acetosa*	R
Creeping thistle *Cirsium arvense*	R	Square stalked willowherb *Epilobium tetragonum*	R

Table 15: Species assemblage within species poor neutral grassland habitat, Compartment D

5.19 Excluding injurious weeds, it was calculated that this habitat yielded 7.9 species per square metre.

Swamp

5.20 Swamp habitats were in a high degree of association with P3; therefore for more information on this habitat, see section *Ponds*, below.

Tall Ruderal

5.21 Tall ruderal habitats were present throughout this Compartment. Smaller areas of tall ruderal were normally characterised by dominances of one species, such as rosebay willowherb, creeping thistle, common nettle, or a combination of these three species. TN22 is representative of a large area of tall ruderal habitat which

dominated the east of the Compartment. This area was characterised by species as detailed in Table 16, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Tall Ruderal Habitats, TN22			
Creeping thistle *Cirsium arvense*	A, LD	Scented mayweed *Matricaria chamomilla*	O
Hairy tare *Vicia hirsutum*	A, LD	Smooth hawksbeard *Crepis capillaris*	O
Rosebay willowherb *Chamaenerion angustifolium*	A, LD	Sorrel *Rumex acetosa*	O
Hedge bindweed *Calystegia sepium*	F, LA	Common hemp nettle *Galeopsis tatrahit*	R
Common hogweed *Heracleum Sphondylium*	F	Fox and Cubs *Pilosella aurantiaca*	R
Common nettle *Urtica dioica*	F	Large flowered hemp nettle *Galeopsis speciosa*	R
Mugwort *Artemesia vulgare*	F	Wild yellow archangel *Lamium galeobdolon*	R

Table 16: Tall ruderal species composition at TN22, Compartment D

5.22 Tall ruderal habitats within the western half of Compartment D were characterised by co-dominances of creeping thistle and rosebay willowherb, with an occasional mix of sorrel (*Rumex acetosa*), hairy tare and common ragwort (*Senecio jacobaea*). Rarely found species included common hogweed, mugwort (*Artemesia vulgare*), large bindweed (*Calystegia sylvatica)*, cut leaved cranesbill (*Geranium dissectum*), and selfheal (*Prunella vulgaris*).

5.23 TN23 is representative of an edge of tall ruderal herb habitat which was characterised by abundant but very locally dominant fleabane, abundant hedge bindweed, frequent common hogweed and hairy tare, with occasional creeping thistle, common ragwort, rosebay willowherb, common nettle and bramble.

Tall Ruderal-Grassland Mosaic

5.24 Tall ruderal species composed between 65-75% of this habitat type within this compartment, with grassland species comprising between 35-25% of these habitats. The tall ruderal habitats in this area, however, were notably mixed with grassland species throughout. Species composition in this mosaic habitat type included abundances of rosebay willowherb, broadleaved dock (*Rumex obtusifolius)* and creeping thistle, frequent hairy tare, false oat grass, Yorkshire fog, smooth meadow grass and fleabane, with occasional perennial sow thistle, common hogweed, common vetch, sorrel, and silverweed. Imperforate St. John's wort (*Hypericum maculatum*), marsh thistle and cut-leaved cranesbill featured only rarely. TN24 is representative of a tall ruderal-grassland mosaic habitat that was dominated by areas of tall ruderal (75%) with occasional patches of grassland (25%) throughout (see Photograph 34, Appendix 3).

5.25 TN25 is representative of a tall ruderal-grassland mosaic habitat in a 35-65% mix of tall ruderal to grassland habitat (see Photograph 35, Appendix 3). Grassland species were as per those found in the rest of the grassland sward, such as Yorkshire fog and false oat grass. Abundant tall ruderal species included greater

willowherb, creeping thistle and sorrel, with occasional common ragwort, common nettle, and field bindweed. Himalayan balsam and bristly ox-tongue (*Helminthotheca echioides*) were rarely present.

Wet Ditch

5.26 A wet ditch (D5) was present adjacent to the discarded tent left by a rough sleeper (TN20); a small walkway had been put in the ditch near the tent. It should be noted that the survey was undertaken after heavy rains and the ditch had been dry on previous visits; therefore it is considered that the ditch only fills during periods of heavy rain. The ditch was approximately 20cm deep at the northern end, to approximately 1m deep at the southern end and contained approximately 2cm of water at the time of survey (see Photograph 36, Appendix 3).

5.27 A wet ditch (D6) was present to the south of P2 which had been seen to be dry at different times of the year; the survey of this area was undertaken after a period of significant rainfall. This ditch forked to the south (see Photograph 37, Appendix 3). The southernmost fork ended in a dead end, which appeared to be an issue point for water due to a very small flow present in this area. The southwestern fork led to the swamp habitats associated with P3 (see section *Ponds,* below). The channel ranged from approximately 25cm deep to approximately 50cm deep and was approximately 1m wide. Water was measured most often at approximately 10cm deep or dry, although at the southernmost point it was approximately 20cm deep. The channel was clay lined but with little sediment. Vegetation in the channel was sparse and consisted of either Himalayan balsam or soft rush; this ditch was also densely shaded by the surrounding scrub. Rabbit burrows were occasionally present in this area.

Invasive Species

5.28 Cotoneaster was found within the plantation broadleaved woodland habitat to the far east. Himalayan balsam was present within the plantation broadleaved woodland habitat, at the entrance to the compartment, and in low densities within scrub to the north-western corner.

5.29 Himalayan balsam was mapped separately and most prevalently and densely found adjacent to Radley Wood Plantation and Pond LWS and Ponds 2, 3 and 5. Himalayan balsam was also found in low densities at the field entrance to the far east and within the far west of the site.

6.0 RESULTS: COMPARTMENT E

6.1 Compartment E comprised a former arable field which had been ploughed in the past and left fallow to regenerate with course vegetation. Succession towards tall ruderal herb communities was present with scrub to boundaries. This area is highlighted in Figure 5, below:

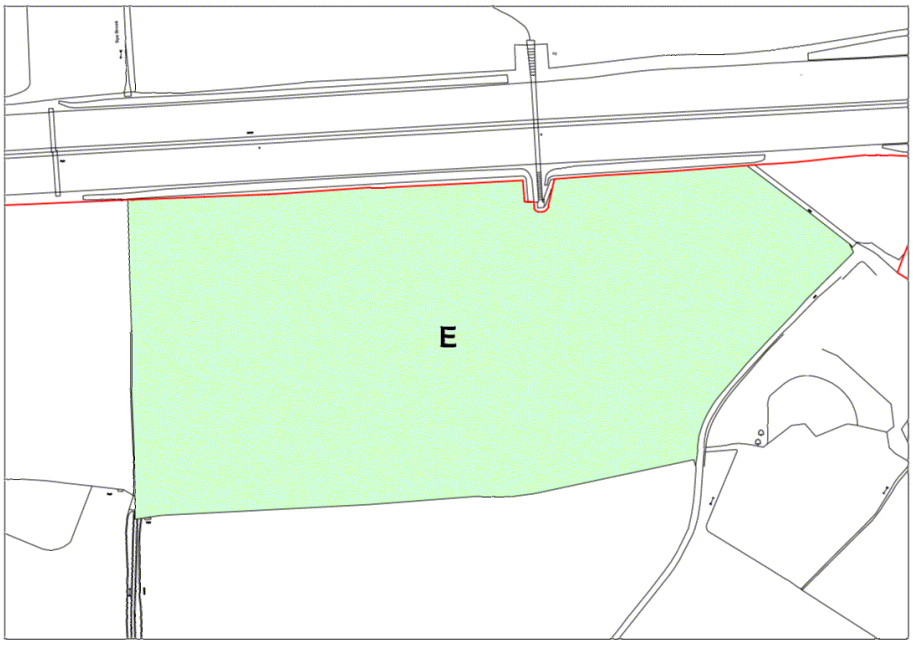

Figure 5: Compartment F, in light green, shown inside the site boundary in red

6.2 Compartment level habitat data can be found within Drawing 1820-T1-E. Habitats found within Compartment E are listed in alphabetical order below, not in order of ecological importance.

- Defunct native species poor hedgerow (J2.2.2)
- Dense scrub (A2.1)
- Dry ditch (J2.6)
- Scattered Scrub (A2.2)
- Tall ruderal (C3.1)
- Tall ruderal-grassland mosaic (C3.1 and B2)

6.3 Note that the northern segment of Spa Brook was present as the internal boundary between Compartment E and Compartment F to west of this compartment. See *Internal Boundary Features* for details.

Defunct native species poor hedgerow & Dry Ditch

6.4 For further information on H5, H8, H9 and D7 and D8, see section *Internal Boundary Features: Hedgerows* and *Internal Boundary Features: Ditches.*

Dense Scrub

6.5 Dense scrub habitats were present to the boundaries of Compartment E. Scrub on the northern motorway boundary edge comprised either bramble monoculture or goat and grey willow, with occasional elder. A dense patch of scrub with tall ruderal species to the edges was present in the far eastern corner of the compartment at a field entry. Table 17 below details the species assemblage:

Species	Frequency of species within habitat
Scrub (Eastern corner)	
Bramble (*Rubus fruticosus* agg. sp.)	D
Common nettle *Urtica dioica*	F
Rosebay willowherb (*Chamaenerion angustifolium*)	F
Common hogweed *Heracleum Sphondylium*	F
Common reed *Phragmites australis*	O
Fleabane *Pulicaria dysenterica*	O
Creeping thistle *Cirsium arvensis*	O
Common vetch *Vicia sativa*	O
Perennial sow thistle *Sonchus arvensis*	O
Wild raspberry *Rubus idaeus*	R

Table 17: Compartment E, Dense scrub

Scattered Scrub

6.6 Patches of scattered willow scrub characterised by goat and grey willow saplings were occasionally present within the main grassland habitat.

Tall Ruderal-Grassland Mosaic

6.7 The primary habitat was a highly complex tall ruderal-grassland mosaic (see Photographs 38 and 39, Appendix 3). Grasses and grassland forbs were a constant presence in samples taken of this habitat, but species such as creeping thistle were constantly present, occasionally in locally dominant densities. The mosaic split was approximately 40%-60% tall ruderal to grassland species. The species composition is presented in Table 18, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Grassland, Compartment E			
Yorkshire fog *Holcus lanatus*	D	Creeping cinquefoil *Potentilla reptans*	R
Creeping buttercup *Ranunculus repens*	A	Curly dock *Rumex crispus*	R
Creeping thistle *Cirsium arvense*	A, LD	Dandelion *Taraxacum officinale*	R
False oat grass *Arrhenatherum elatius*	A	Field speedwell *Veronica persica*	R

Hairy tare *Vicia hirsuta*	A	Figwort *Scrophularia nodosa*	R
Scented mayweed *Matricaria chamomilla*	A	Goat willow *Salix caprea*	R
Smooth meadow grass *Poa pratensis*	F	Greater birds foot trefoil *Lotus pedunculatus*	R
Chickweed *Stellaria media*	O	Herb Robert *Geranium robertianum*	R
Creeping soft grass *Holcus mollis*	O	Lesser trefoil *Trifolium dubium*	R
Cut leaved cranesbill *Geranium dissectum*	O	Mugwort *Artemesia vulgaris*	R
Fleabane *Pulicaria dysenterica*	O	Red clover *Trifolium pratense*	R
Ribwort plantain *Plantago lanceolate*	O	Redshank *Persicaria maculosa*	R
Rosebay willowherb *Chamaenerion angustifolium*	O	Rough meadow grass *Poa trivialis*	R
Red fescue *Festuca rubra*	O	Smooth hawksbeard *Crepis capillaris*	R
Bristly oxtongue *Helminthotheca echioides*	R	Soft rush *Juncus effusus*	R
Broadleaved dock *Rumex obtusifolius*	R	Sorrel *Rumex acetosa*	R
Butterbur *Petasites hybridus*	R	Square stalked willowherb *Epilobium tetragonum*	R
Cock's foot *Dactylis glomerata*	R	Timothy *Phleum pratense*	R
Common centaury *Centaurium erythraea*	R	White clover *Trifolium repens*	R
Common hogweed *Heracleum sphyondylium*	R	Yarrow *Achillea millefolium*	R
Common ragwort *Senecio jacobaea*	R		

Table 18: Species assemblage within species poor neutral grassland habitat, Compartment E

Tall Ruderal

6.8 Tall ruderal habitat was present to the south and east of this compartment. Tall ruderal habitats within this compartment were characterised by abundant and locally dominant creeping thistle, rosebay willowherb, common nettle and field bindweed. Occasional species within this habitat were broadleaved dock, perennial sowthistle (*Sonchus arvensis*), and common ragwort.

7.0 RESULTS: COMPARTMENT F

7.1 Compartment level habitat data can be found within Drawing 1820-T1-F. Compartment F comprised a former arable field which had been ploughed in the past and left fallow to regenerate with course vegetation. Succession towards tall ruderal herb communities was present with scrub to and dry reedbeds to boundaries, with Spa Brook (see *Internal Boundary Features*) forming the eastern boundary of the compartment with Compartment E and H. This compartment is highlighted in Figure 6, below:

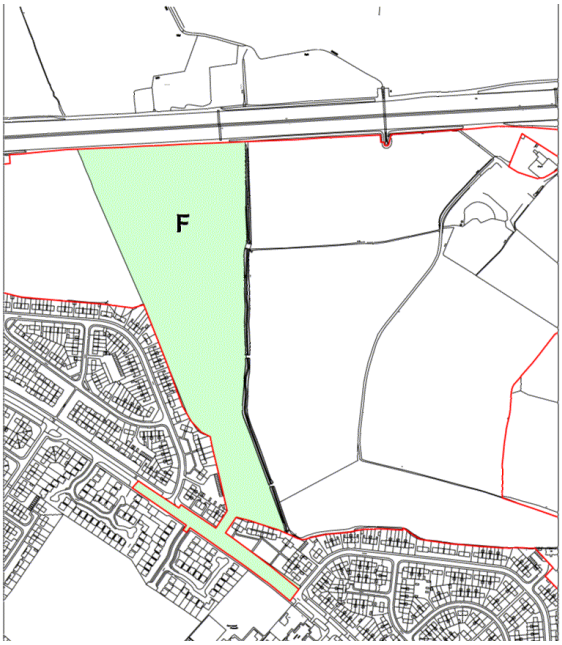

Figure 6: Compartment F, in light green, shown inside the site boundary in red

7.2 Habitats found within Compartment F are listed in alphabetical order below, not in order of ecological importance.

- Amenity grassland (J1.2)
- Bare ground/Hard-standing (J4)
- Buildings (J3.6)
- Defunct native species poor hedgerow (J2.1.2)
- Dense scrub (A2.1)
- Dry ditch (J2.6)
- Scattered Scrub (A2.2)
- Scattered Trees (A3.1)
- Species Poor Improved Grassland (B2)
- Swamp (F1)
- Tall Ruderal herb (C3.1)

Amenity Grassland

7.3 Areas of amenity grassland were characterised by roadside verges or residential gardens. It is acknowledged that gardens frequently contained shrubs; these were present on a very fine scale within these gardens.

Bare ground/Hard-standing

7.4 Areas of bare ground/hard standing were characterised by roads and paths within residential areas to the south of this compartment.

Buildings

7.5 Buildings within this area relate to 344-348 Poplars avenue. For further information in relation to buildings, see the relevant bat survey report.

Defunct Natives Species Poor Hedgerow

7.6 See section *Internal Boundary Features* for further information with respect to hedgerow H10.

Dense Scrub

7.7 Dense scrub habitats were generally present to the boundaries. Individual small dense scrub habitats were generally characterised by dominances bramble or grey willow and are coded as such within the habitat plans, Appendix 1.

7.8 TN26 represents an area of shrubs breaking a reedbed habitat on the western boundary. Species in this area are characterised by abundant dogwood and hawthorn, frequent young ash and oak trees, and occasional cherry and goat willow.

7.9 TN27 represents a series of shaded glades of planted and wild scrub with occasional areas that were impassable due to the extent of bramble scrub and general vegetation in the area (see Photographs 41, 42 and 43. This area was a complex mix of scrub with planted and naturally seeded species, as well as a variety of ages and glades. Species composition of the area is detailed in Table 19, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Scrub TN27			
Goat willow *Salix capraea*	A	Silver birch *Betula pendula*	O
Grey willow *Salix cinerea*	A	Sycamore *Acer pseudoplatanus*	O
Bramble *Rubus fruticosus* agg. sp.	F, LD	Broadleaved helleborine *Epipactis helleborine*	R
Changing forget-me-not *Myosotis discolor*	O, LA	Common hogweed *Heracleum sphondylium*	R
Common reed *Phragmites australis*	O, LA	Himalayan balsam *Impatiens glandulifera*	R
Common nettle *Urtica dioica*	O, LD	Male fern *Dryopsis felix-mas*	R
Ash saplings *Fraxinus excelsior*	O	Oak saplings *Quercus robur*	R
Cherry *Prunus* sp.	O	Rowan *Sorbus aucuparia*	R
Herb bennet *Geum urbanum*	O	Tutsan *Hypericum androsaemum*	R
Ivy *Hedera helix*	O		

Table 19: Species composition of TN27

7.10 A generally low level of litter was found throughout much of this area, although concentrations of children's toys and household rubbish were present within the more hidden and sheltered parts. A mattress and fence panels had been flytipped near a hole in the fence to the south-west, where the compartment backed onto garages (see Photographs 44 and 45, Appendix 3).

7.11 TN28 relates to a linear patch of scrub adjacent and associated with Spa Brook. Species included abundant grey and goat willow with occasional young oak trees. Ground flora comprised abundant common nettle with occasional male fern (*Dryopteris felix-mas*), herb bennet (*Geum urbanum*), and red campion (*Silene dioica*). Bramble scrub dominated the scrub area closest to Spa Brook. For more information with respect to Spa Brook, see Section *Internal Boundary Features: Spa Brook.*

Dry Ditch

7.12 See section *Internal Boundary Features* for further information with respect to ditch D1.

Scattered Scrub

7.13 Patches of scattered scrub were largely characterised by goat and grey willow saplings which were occasionally present within the main grassland habitat. Scattered scrub habitats also occasionally comprised silver birch.

Scattered Trees

7.14 Scattered tree species were present within this area and are coded for within the habitats plans, Appendix 1. Species included ash, sycamore and oak. Ash, lime *Tilia* sp. and London plane *Platanus* × *acerifolia* are present along Poplars Avenue at the south of this area.

Species Poor Improved Grassland

7.15 The primary habitat in Compartment F was a species poor improved grassland (see Photograph 46, Appendix 3) that had been ploughed in the past but left fallow to regenerate. Grasses and grassland forbs were a constant presence in samples taken of the sward, although it should be noted that tall ruderal species such as creeping thistle were present throughout the sward in low to moderate densities. The species composition is presented in Table 20, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Grassland, Compartment F			
Yorkshire fog *Holcus lanatus*	D	Curly dock *Rumex crispus*	R
Fleabane *Pulicaria dysenterica*	D	Cut leaved cranesbill *Geranium dissectum*	R
Creeping bent *Agrostis stolonifera*	A	Dandelion *Taraxacum officinale*	R
Compact rush *Juncus conglomeratus*	F	False oat grass *Arrhenatherum elatius*	R
Bird's foot trefoil *Lotus corniculatus*	O	Field horsetail *Equesetum arvense*	R
Creeping buttercup *Ranunculus repens*	O	Grey willow *Salix cinerea*	R
Rosebay willowherb *Chamaenerion angustifolium*	O	Hairy tare *Vicia hirsuta*	R
Smooth meadow grass *Poa pratensis*	O	Meadow vetchling *Lathyrus pratensis*	R
Sorrel *Rumex acetosa*	O	Perennial ryegrass *Lolium perenne*	R
Bramble *Rubus fruticosus* agg. sp.	R	Red fescue *Festuca rubra*	R
Common ragwort *Senecio jacobaea*	R	Ribwort plantain *Plantago lanceolate*	R
Common vetch *Vicia sativa*	R	Silverweed *Argentina anserina*	R
Creeping soft grass *Holcus mollis*	R	Soft rush *Juncus effusus*	R
Creeping thistle *Cirsium arvense*	R	Timothy *Phleum pratense*	R

Table 20: Species assemblage within species poor neutral grassland habitat, Compartment F

7.16 Excluding injurious weeds, it was calculated that this habitat yielded 7.1 species per square metre.

Swamp

7.17 This habitat was present to the western and eastern boundaries of the compartment, as well as occasionally present in standalone patches in the central area. The largest habitat of this type comprised an extensive linear stand of common reed that followed the western boundary of Compartment F. At the transitional edges of this dry reedbed grasses and wildflowers typical of the surrounding grassland were present. A similar feature was present in the centre of the site and is listed without target number.

7.18 TN29 represents a reedbed-tall ruderal mosaic. Common reed dominated the area, however very local abundances of fleabane were present with occasional marsh thistle, timothy, compact rush, rosebay willowherb, bramble, red bartsia (*Odontites vernus*), common nettle and common vetch (see Photograph 47, Appendix 3).

7.19 TN30 is representative of a dry reedbed-tall ruderal mosaic. Whilst common reed was the most abundant species, other species frequently found were local abundances of common nettle and creeping thistle. Grey willow was also present occasionally, along with a flytipped wendy house (Photograph 48, Appendix 3).

7.20 TN31 was linear in nature a likely followed the remnants of an old linear site feature such as a ditch, although vegetation was too dense to identify if this feature was still present. Whilst common reed was the most abundantly found species in this area, trees and shrubs were present to the centre. These trees and shrubs were young and scattered; see *Scattered Trees*. Fleabane was frequent and locally abundant, with hemp agrimony (*Eupatorium cannabinum*) and bramble occasionally found throughout.

7.21 A small patch of mosaic common reed and species poor improved grassland (TN32) was present within the sward to the north of Compartment F. This had an approximate 50%-50% divide between the two habitat types.

Tall Ruderal

7.22 Tall ruderal habitats were present throughout this Compartment. Smaller areas of tall ruderal were normally characterised by dominances of one species, such as rosebay willowherb, creeping thistle, common nettle, or a combination of these three species, occasionally with hedge bindweed. TN33 was a large tall ruderal habitat, characterised by the species assemblage detailed in Table 21, below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Tall Ruderal Habitats, TN33			
Fleabane *Pulicaria dysenterica*	A	Creeping bent *Agrostis stolonifera*	O
Broadleaved dock *Rumex obtusifolius*	A	Creeping thistle *Cirsium arvense*	O
Common reed *Phragmites australis*	F	Yorkshire fog *Holcus lanatus*	O
Greater willowherb *Epilobium hirsutum*	F	Jointed rush *Juncus articulatus*	R
Silverweed *Argentina anserina*	F		

Table 21: Tall ruderal species composition at TN33, Compartment F

7.23 TN34 represents a pathway leading from a set of garages through a broken fence. In this area was flytipped rubbish, including a mattress (see Photograph 49, Appendix 3). Polecat scat was found upon a discarded fence panel in this area.

Invasive Species

7.24 Himalayan balsam was present in very low densities within the scrub to the south of the Compartment (TN27).

7.25 Virginia creeper was present at an entrance point to the compartment. Whilst it was growing just outside the site, conditions within the site and adjacent to this patch were conducive to colonisation by Virginia creeper.

8.0 RESULTS: COMPARTMENT G

8.1 Compartment G comprised an area of woodland, tall ruderal and scrub habitats at the centre of the site, south of a residence not associated with the development. Compartment level habitat data can be found within Drawing 1820-T1-G; Compartment G is highlighted in Figure 7, below:

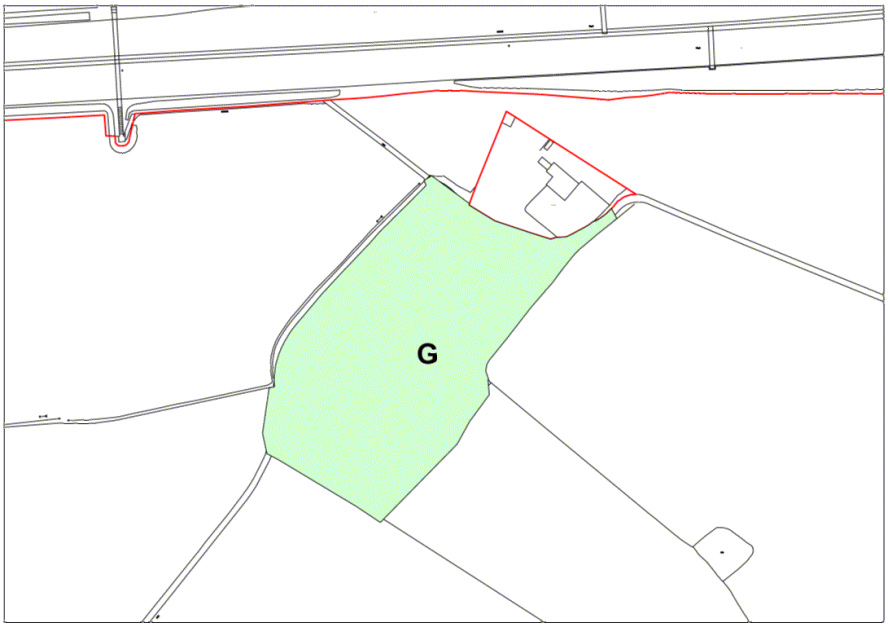

Figure 7: Compartment G, in light green, shown inside the site boundary in red

8.2 Compartment level habitat data can be found within Drawing 1820-T1-G. Habitats found within Compartment G are listed in alphabetical order below, not in order of ecological importance.

- Dense scrub (A2.1)
- Plantation broadleaved woodland (A1.1.2)
- Pond (G1) (see Section *Internal Boundary Features: Ponds*, below)
- Tall ruderal herb (C3.1)
- Wet ditch (G1) (see Section *Internal Boundary Features: Ditches* below)

Dense Scrub

8.3 A large dense swathe of monoculture bramble scrub was present to the centre of this compartment.

Plantation Broadleaved Woodland

8.4 The northern plantation broadleaved woodland habitat in Compartment G comprised a mix of majority planted tree and scrub species, with several self-set individuals. Frequent species included ash, elder, hawthorn, and sycamore with occasional willow species. Bramble and common nettle were also occasional species, with rare cherry trees (see Photograph 50, Appendix 3). The remains of an old farmhouse outbuilding were present in the ground and in large piles here, much of which was asbestos concrete roofing material (see Photographs 51, 52, and 53, Appendix 3). Piles of litter and rubbish were also present along with signs of airsoft gun target practice (TN35) being shot towards the residence to the north (see

Photographs 54 and 55, Appendix 3). This area was described in previous surveys to be a "complex and inseparable mosaic of dense scrub and tall ruderal communities containing numerous scattered juvenile trees and shrubs" undergoing advanced successional changes.

8.5 The southern plantation broadleaved woodland habitat comprised a mature plantation with a well-developed and diverse understory that had probably been supplemented by additional planting in the past (see Photograph 56, Appendix 3). However this woodland habitat was severely degraded by campfires, tree damage, and heaps of bottles and rubbish. Evidence was also present of drug use in the area. As such, ground flora was poor in this habitat and few saplings were present. Table 22 below provides the species assemblage for this area.

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Plantation Broadleaved Woodland (Compartment G)			
Canopy		Understorey	
Sycamore *Acer pseudoplatanus*	D	Hawthorn *Crataegus monogyna*	A
Beech *Fagus sylvatica*	A	Hazel *Corylus avellana*	F, LA
Horse chestnut *Aesculus hippocastanum*	O	Elder *Sambucus nigra*	F
Maple *Acer campestre*	O	Rowan *Sorbus aucuparia*	O, LF
Pedunculate oak *Quercus robur*	O	Ash *Fraxinus excelsior*	O
Downy birch *Betula pubescens*	R	Yew *Taxus baccata*	R
Ground Flora		Fungus	
Ivy *Hedera helix*	F, VLD	Common earthball *Scleroderma citrinum*	A
Comfrey *Symphytum officinale*	O, LF	Common puffball *Lycoperdon perlatum*	F, LA
Common nettle *Urtica dioica*	O, LF	Elder whitewash *Hyphodontia sambuci*	R
Bramble *Rubus fruticosus* agg. sp.	O	Jelly ear *Auricularia auricula-judae*	R
		Wood Blewit *Clitocybe nuda*	R

Table 22: Compartment G, Plantation Broadleaved Woodland species

8.6 TN36 relates to areas of extreme degradation in the woodland where tree damage, evidence of campfires, evidence of drug use and piles of bottles, cans, and general litter were at their most dense (see Photographs 57, 58 and 59, Appendix 3).

Ponds

8.7 Whilst Pond 1 (P1) is present in this area, ponds are discussed separately within the *Ponds* section, below.

Tall Ruderal

8.8 A small pocket of tall ruderal habitat was present within Compartment G. Previous surveys had identified this area as an improved grassland habitat undergoing succession. Species present at the time of survey in 2019 included a dominance of common nettle, local abundances of rosebay willowherb and frequent bramble and creeping thistle. Occasional species included male fern, greater willowherb, common hogweed and goosegrass (see Photograph 60, Appendix 3).

Wet Ditch

8.9 See section *Internal Boundary Features* for information with respect to dry and wet ditches. Whilst this compartment featured a network of dry and wet ditches, these were all considered to be internal boundary features with other compartments. Ditches in this area are D9, D10, D11, and D12.

Invasive Species

8.10 One small stand of montbretia (*Crocosmia x crocosmiiflora*) was present within the northern plantation woodland.

9.0 RESULTS: COMPARTMENT H

9.1 Compartment H comprised a former arable field which had been ploughed in the past and left fallow; as a result the compartment was coarsely vegetated. Tall ruderal herb communities almost entirely dominated this compartment, with scrub to boundaries and occasional scattered scrub throughout. Succession towards tall ruderal herb communities was present with scrub to and dry reedbeds to boundaries, with Spa Brook (see *Internal Boundary Features*) forming the eastern boundary of the compartment with Compartment E and H. This compartment is highlighted in Figure 8, below:

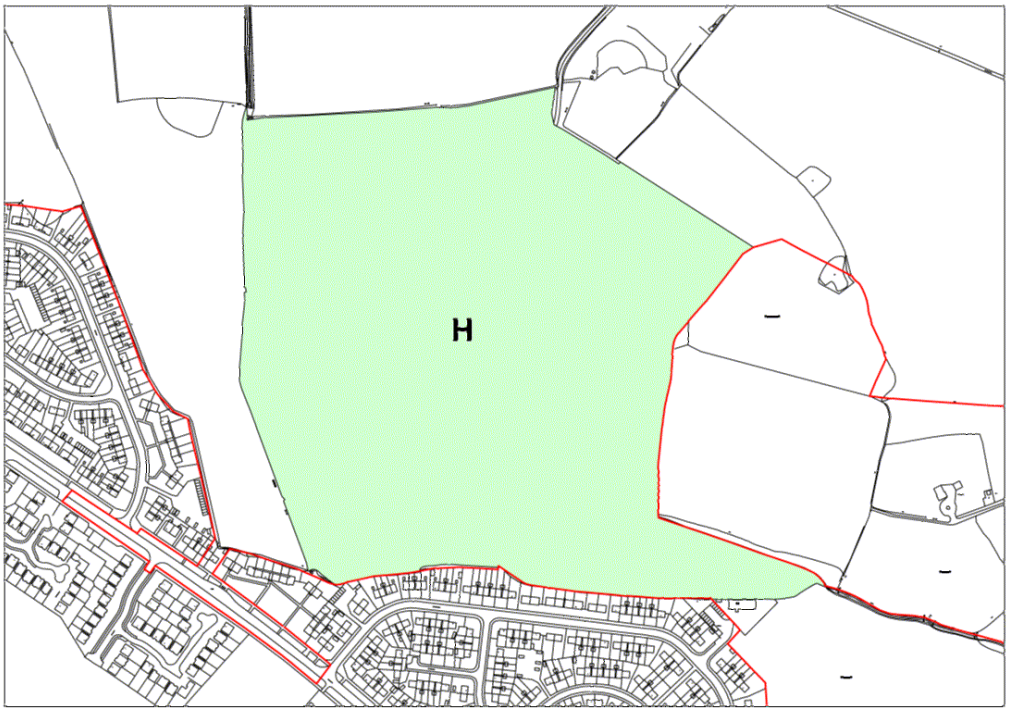

Figure 8: Compartment H, in light green, shown inside the site boundary in red

9.2 Compartment level habitat data can be found within Drawing 1820-T1-H. Habitats found within Compartment H are listed in alphabetical order below, not in order of ecological importance.

- Defunct native species poor hedgerow (J2.1.2)
- Dense scrub (A2.1)
- Dry ditch (J2.6)
- Marshy grassland (B5)
- Plantation broadleaved woodland (A1.1.2)
- Scattered Scrub (A2.2)
- Swamp (F1)
- Tall ruderal herb (C3.1)
- Tall ruderal grassland mosaic (C3.1 and B2)
- Wet ditch (G1) (see Section *Internal Boundary Features: Ditches* below)

9.3 Note that Himalayan balsam is discussed and mapped as a stand outside of habitat. Himalayan balsam should technically be mapped as tall ruderal, however, as the stand is substantial and found within a larger tall ruderal habitat, it was felt necessary to make the differentiation.

Defunct native species poor hedgerow & Dry Ditch

9.4 For further information on H8, see section *Internal Boundary Features: Hedgerow.*

Dense scrub

9.5 Dense scrub habitats were present to the boundaries of Compartment H, as well as occasionally present within the centre of the grassland and tall ruderal habitats where succession was taking place. Dense scrub habitat was generally characterised by plantations or self-seeded goat and grey willow with an understorey of tall ruderal plants. These generally comprised abundant (and very locally dominant) instances of common nettle, with frequent common hogweed, rosebay willowherb, and rare, but locally abundant Canadian goldenrod (*Solidago Canadensis).*

9.6 TN37 relates to a bramble-covered mound with frequent rosebay willowherb and occasional creeping thistle.

9.7 TN38 relates to a dense stand of planted hawthorn with a dense undergrowth of bramble; this area could only be surveyed at distance due the denseness of the vegetation in this area.

Dry Ditch

9.8 The dry ditch (D13) in this compartment was a terminal end of a wider network of leading off the junction of D9 and D10 (see Section *Internal Boundary Features: Ditches)*. This ditch was dry at the time of survey. Numerous rabbit burrows and a fox earth were found within the ditch, low down in the channel; the number and extent of these mammal excavations suggested that this ditch had remained dry for a long period of time. Scrub species typical of the site had been planted on both sides of the ditch, although this was not in a hedgerow configuration. Species included grey and goat willow with a ground flora characterised by frequent common nettle and sorrel. Common reed was rarely present (see Photographs 61 and 62, Appendix 3).

9.9 D8 formed the northern boundary with Compartment E. For further information, see Section *Internal Boundary Features: Ditches.*

Marshy Grassland

9.10 A small pocket of marshy grassland was present towards the south-western corner of Compartment H. This area was characterised by grassland typical of the species poor improved grassland habitat, but with a localised dominance of soft rush with abundant creeping buttercup (*Ranunculus repens*).

Plantation Broadleaved Woodland

9.11 This habitat was a substantial block of planted scrub species with the functionality of a woodland due to the height and morphology of the species present, hence the categorisation as a plantation broadleaved woodland. The canopy was dominated by a mixture of goat willow and silver birch with a local abundances of hawthorn, frequent dogwood and occasional hazel and rowan. Cherry species and holly were rarely found along with sycamore and oak saplings (see Photograph 63, Appendix 3). Ground flora was characterised by abundant and locally dominant bramble, wood avens, and common nettle. Wood meadow grass (*Poa nemoralis)* was frequent, with ivy, dog rose, common hogweed, male fern, and common earthballs (*Scleroderma citrinum*) found occasionally. Rare ground flora species included red campion, broadleaved helleborine (*Epipactis helleborine*) and honeysuckle. Blushing bracket (*Daedaleopsis confragosa*) was rarely present on deadwood in this area.

9.12 This habitat was severely degraded due to the presence of invasive species and high density rubbish/flytipping. Giant hogweed (*Heracleum mantegazzianum*) was densely present in parts of the woodland. Some individuals were in notably poor health at the time of survey, indicating past management attempts in areas near to gardens at the south of the compartment; however several fully grown individuals in clear good health were also present (see Photograph 64, 65, and 66, Appendix 3). Himalayan balsam was also present (see *Himalayan balsam* and Photograph 67, Appendix 3) along with low densities of montbretia (see Photograph 68, Appendix 3).

9.13 Rubbish was found throughout the woodland. This ranged from a variety of food and drinks packaging to household goods such as recycling bins, general household waste, children's toys and furniture. A particularly large heap of household waste was present in the south-western corner of this habitat (TN39). A path led from the houses to the heap, which comprised items from house renovation. These items included sofas, doors, mattresses, petrol cans, toys, a kitchen sink, white goods, paint cans, plastic sheeting, a paddling pool and a snooker table (see Photographs 69-72, Appendix 3).

9.14 One garden had no back fence and had installed waterbutts within the woodland. General household waste was also present in this area. This waste included toys, disused tools, garden furniture, buckets, and paint tins. Brashing from garden waste was also present (see Photographs 73 and 74, Appendix 3).

Species Poor Improved Grassland

9.15 Grassland within this compartment was patchy and largely restricted to the south-west. Survey of this area was undertaken after a period of heavy rain and localised flooding was evident, especially where floral species indicated this may be the case. Areas of localised flooding had a notably lower level of biodiversity in comparison to the already low levels in this compartment and were usually characterised by the presence of only grass species with very occasional broadleaved dock (TN40).

9.16 The ground in this compartment had been ploughed at some point in the past and left fallow. The grassland habitat was rank and supported a range of grasses and tall herbs indicative of the successional processes

that had occurred since previous surveys were undertaken (see Photograph 75, Appendix 3). Table 23, below, details the species composition of the grassland area in Compartment H.

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Grassland, Compartment H			
Fleabane *Pulicaria dysenterica*	D	Creeping buttercup *Ranunculus repens*	R
Yorkshire fog *Holcus lanatus*	D	Creeping soft grass *Holcus mollis*	R
False oat grass *Arrhenatherum elatius*	A	Cut leaved cranesbill *Geranium dissectum*	R
Perennial ryegrass *Lolium perenne*	A	Goat willow sapling *Salix caprea*	R
Smooth meadow grass *Poa pratensis*	A	Grey willow sapling *Salix cinerea*	R
Hairy tare *Vicia hirsuta*	O	Oak sapling *Quercus sp.*	R
Ribwort plantain *Plantago lanceolate*	O	Red clover *Trifolium pratense*	R
Rosebay willowherb *Chamaenerion angustifolium*	O	Rough meadow grass *Poa trivialis*	R
Soft rush *Juncus effusus*	O	Scented mayweed *Matricaria chamomilla*	R
Bramble *Rubus fruticosus* agg. sp.	R	Silver birch sapling *Betula pendula*	R
Broadleaved dock *Rumex obtusifolius*	R	Silverweed *Argentina anserina*	R
Chickweed *Stellaria media*	R	Sorrel *Rumex acetosa*	R
Cock's foot *Dactylis glomerata*	R	Square stalked willowherb *Epilobium tetragonum*	R
Common ragwort *Senecio jacobaea*	R	Timothy *Phleum pratense*	R
Common reed *Phragmites australis*	R	White clover *Trifolium repens*	R
Creeping bent *Agrostis stolonifera*	R		

Table 23: Species composition of Grassland, Compartment H

Scattered Scrub

9.17 Patches of scattered willow scrub characterised by goat and grey willow saplings were occasionally present within grassland and tall ruderal habitats.

Swamp

9.18 Swamp in this compartment was characterised by roughly linear stands of common reed following boundary features.

9.19 TN41 relates to a common reed dominated stand of vegetation to the south-west of this compartment, which was adjacent to Spa Brook (see *Internal Boundary Features: Spa Brook*). This reedbed was dry despite the survey being undertaken after a period of heavy rain. Whilst common reed dominated the central core of this habitat, the extremities southern third of this habitat was transitional between common reed and tall ruderal species (see Photograph 76, Appendix 3). Species found in these transitional areas comprised occasional fleabane, creeping thistle, marsh thistle and rosebay willowherb. To the south of this habitat

common nettle and large bindweed was abundant with occasional rosebay willowherb, goosegrass, common hogweed and creeping thistle.

9.20 TN42 relates to a stand of common reed with tall ruderal species to the edges and occasional scattered scrub that extended along the western edge of Radley Plantation and Pond LWS. This area was dense and impenetrable. Where common reed transitioned to tall ruderal species, common nettle and large bindweed were abundant. Frequently found species included mugwort, Canadian goldenrod, hemp agrimony with occasional bristle-stemmed hemp nettle (*Galeopsis tetrahit*).

Tall Ruderal

9.21 Tall ruderal habitat was dense and course and near impassable in areas due to the height, density, and species in the sward. Densely vegetated areas dominated and where vegetation was undisturbed, it was characterised by an abundance of rosebay willowherb and creeping thistle. Creeping thistle was occasionally locally dominant throughout the habitat. Common nettle and hedge bindweed were frequent throughout (see Photograph 77, Appendix 3).

9.22 Parts of the habitat were disturbed either by human activity (comprising paths) or by mammal and rabbit activity, These shorter patches were notably dug up and nibbled by rabbits, with occasional burrows present. These areas were close to the paths and exhibited a higher level of biodiversity due to the disturbance by humans and animals (TN43) (see Photographs 78 and 79, Appendix 3). Species composition relating to TN43 is presented in Table 24 below:

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Disturbed Tall Ruderal Habitat, Compartment H (TN43)			
Bristly oxtongue *Helminthotheca echioides*	A	False oat grass *Arrhenatherum elatius*	O
Common nettle *Urtica dioica*	A	Greater plantain *Plantago major*	O
Rosebay willowherb *Chamaenerion angustifolium*	A	Greater stitchwort *Stellaria holostea*	O
Redshank *Persicaria maculosa*	F	Greater willowherb *Epilobium hirsutum*	O
Butterbur *Petasites hybridus*	O	Oilseed rape *Brassica rapa*	O
Changing forget-me-not *Myosotis discolor*	O	Perennial sow thistle *Sonchus arvensis*	O
Chickweed *Stellaria media*	O	*Scented mayweed Matricaria chamomilla*	O
Cock's foot *Dactylis glomerata*	O	Smooth hawksbeard *Crepis capillaris*	O
Common hogweed *Heracleum sphyondylium*	O	Spear thistle *Cirsium vulgare*	O
Common knotgrass *Polygonum aviculare*	O	White dead nettle *Lamium album*	O
Common ragwort *Senecio jacobaea*	O	Yarrow *Achillea millefolium*	O
Common Vetch *Vicia sativa*	O	Yorkshire Fog *Holcus lanatus*	O
European field pansy *Viola arvensis*	O		

Table 24: Species composition of disturbed tall ruderal habitat

Tall Ruderal-Grassland Mosaic

9.23 Stands of tall ruderal-grassland mosaic habitat were prevalent in the north-western corner of Compartment H. These areas were characterised by a 70%-30% ratio of tall ruderal to grassland habitat. Tall ruderal species in this area comprised an abundance of rosebay willowherb and broadleaved dock, with frequent creeping thistle, common nettle, and sorrel. Fleabane, common hogweed and perennial sow thistle were all occasional with rare occurrences of common ragwort. Grasses typical of those found within the species poor improved grassland habitat, such as Yorkshire fog and false oat grass were found throughout this habitat, sometimes in local abundances (see Photograph 80, Appendix 3).

Invasive Species

9.24 A large and broadly linear stand of Himalayan balsam (*Impatiens glandulifera*) was present on the eastern boundary, adjacent to Radley Plantation and Pond LWS, with extensions into the surrounding tall ruderal habitat. This area was almost entirely dominated by dense Himalayan balsam growth, although occasional creeping thistle and common nettle individuals were present, especially to the edges of the stands (see Photograph 81, Appendix 3).

9.25 Himalayan balsam was also present within the plantation broadleaved woodland to the south of this compartment in low to moderate densities.

9.26 A dense stand of giant hogweed was present within the plantation woodland to the south of Compartment H.

9.27 Small stands of montbretia were present within the plantation woodland to the south of Compartment H.

9.28 Small stands of cotoneaster were present within the plantation woodland to the south of Compartment H.

Wet Ditch

9.29 D14 was a ditch that was wet due to heavy rainfall prior to the survey. The channel was approximately 45m long, 2.5m wide, and 30cm deep. At the time of survey, water within the ditch was close to overflowing. Grey and goat willow had been planted throughout the channel itself; the only emergent vegetation present was the occasional tips of soft rush. The field in which this ditch was present was waterlogged in parts which suggested that this ditch may have been part of an old field drainage system.

9.30 D15 relates to a similarly arranged channel to that found at D14, although water was only present to a depth of 10cm within the channel (see Photograph 82, Appendix 3).

10.0 RESULTS: COMPARTMENT I

10.1 Compartment I is a large, roughly triangular area of recreational land dominated by amenity grassland. A formal children's play area, ball court and community centre with a car park was associated with this area. A ditch which was dry at the time of the survey formed part of the northern boundary, alongside a hedgerow and an immature plantation woodland. It should also be noted that Japanese knotweed was present to the far north-eastern corner of the compartment. Compartment I is highlighted in Figure 10, below:

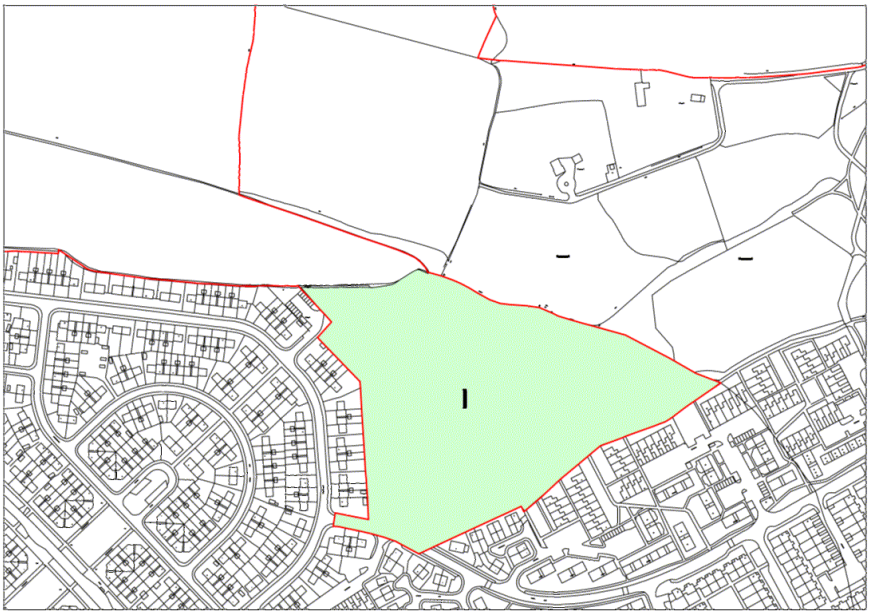

Figure 10: Compartment I, in light green, shown inside the site boundary in red

10.2 Compartment level habitat data can be found within Drawing 1820-T1-I. Habitats found within Compartment I are listed in alphabetical order below, not in order of ecological importance.

- Amenity grassland (J1.2)
- Bare ground/hard standing (J4)
- Building/Structure (J3.6)
- Defunct native species poor hedgerow (J2.1.2)
- Dense Scrub (A2.1)
- Dry ditch (J2.6)
- Introduced shrub (J1.4)
- Plantation broadleaved woodland (A1.1.2)
- Scattered trees (A3.1)
- Tall ruderal (C3.1)

Amenity Grassland

10.3 Amenity grassland (see Photograph 82, Appendix 3) in this area was infrequently cut but often used by dog walkers with dog excrement found within the sward in moderate amounts. The species composition is presented in Table 25, below:

Species	Frequency of species within habitat
Amenity Grassland	
Perennial ryegrass *Lolium perenne*	D
White clover *Trifolium repens*	VLF
Smooth hawksbeard *Crepis capillaris*	F
broadleaved dock *Rumex obtusifolius*	O
Cock's foot *Dactylis glomerata*	O
Creeping buttercup *Ranunculus repens*	O
Daisy *Bellis perennis*	O
Dandelion *Taraxacum officinale* ag. sp.	O
Yarrow *Achillea millefolium*	O
Ragwort *Senecio jacobaea*	R
Red fescue *Festuca rubra*	
Silverweed *Argentina anserine*	R

Table 25: Compartment I, amenity grassland species

Bare ground/hardstanding

10.4 Areas of bare ground/hardstanding were associated roads, paths, and with the community centre in the form of play spaces and car parks (see Photograph 83, Appendix 3).

Building/Structure

10.5 A community centre was present to the south of the compartment with a porta-cabin style building to the north-west corner. Bins were present within the grassland area, along with two rain shelters.

Defunct Native Species Poor Hedgerow

10.6 An immature and very gappy hedgerow (H11) (<30 years, approximately) was present along the northern edge of Compartment I. Hawthorn was dominant throughout, with occasional immature ash and rarely guelder rose. No significant ground flora was present due to the dominance of adjacent course scrub habitat.

Dense Scrub

10.7 Scrub was present along boundary areas of the compartment, usually along fences associated with houses or the community centre, although patches of scrub were also present to the north-west and north of Compartment I. Ground flora, where present, has been recorded in Table 26 below, alongside scrub data.

Species	Frequency of species within habitat	Species	Frequency of species within habitat
Scrub (Associated with Community Centre Fences)		**Scrub (North-Eastern boundary)**	
Bramble *Rubus fruticosus* agg. sp.	A	Bramble *Rubus fruticosus* agg. sp.	A
Yorkshire Fog *Holcus lanatus*	A	Cock's foot *Dactylis glomerata*	A
Elder *Sambucus nigra*	F	Hawthorn *Crataegus monogyna*	A
Field rose *Rosa arvensis*	O	Dog rose *Rosa canina*	F
Creeping thistle *Cirsium arvensis*	O	Goat willow *Salix caprea*	F
Dogwood *Cornus sanguinea*	O	Blackthorn *Prunus spinosa*	F
Common nettle *Urtica dioica*	O	Ash (saplings) *Fraxinus excelsior*	O
Common vetch *Vicia sativa*	O	Common ragwort *Senecio jacobaea*	O
Species	**Frequency of species within habitat**	Herb Robert *Geranium robertianum*	O
Scrub (Housing fenceline)		Ivy *Hedera helix*	O
French crane's-bill *Geranium endressii*	LA	Mugwort *Artemisia vulgaris*	O
Privet *Ligustrum ovalifolium*	A	Oak *Quercus robur*	O
Ivy *Hedera helix*	F	Oil-seed rape *Brassica napus*	O
Ash (saplings) *Fraxinus excelsior*	O	Ribwort plantain *Plantago lanceolata*	O
Bramble (*Rubus fruticosus* agg. sp.)	O	Silver birch *Betula pendula*	O
Elder *Sambucus nigra*	O	Smooth hawksbeard *Crepis capillaris*	O
Hedge bindweed *Calystegia sepium*	O	Square stemmed willowherb *Epilobium tetragonum*	O
Goosegrass *Galium aparine*	O		
Large bindweed *Calystegia silvatica*	O		
Soft rush *Juncus effusus*	R		

Table 26: Compartment I, scrub species

10.8 An area of scrub was found on the fenceline of the adjacent houses. This area had originally likely been a privet monoculture, however neglect had seen the encroachment of native scrub species onto the privet. Species assemblages are detailed in Table 26, above, and includes the ground flora. Occasional piles of brashing from garden waste was tipped over the fence in this area.

10.9 Scrub to the north-east of Compartment I comprised dense and unmanaged stands of bramble to the playing field edge, with shrub species and saplings to the edge of the site boundary. A hedgerow and dry ditch was present north of the scrub. This habitat was bounded by a path between the scrub habitat and the amenity grassland. Plastic bags filled with dog excrement and general litter was frequent in low densities throughout this habitat. The species assemblage is provided in Table 26, above, inclusive of ground flora.

Dry ditch

10.10 A dry ditch (D16) was present along the northern boundary of the compartment, adjacent to the hedgerow. No direct access was possible to the ditch due to the presence of dense and impassable vegetation. Note that in 2015 the channel was recorded as being a shallow stream which was "impounded slightly due to leaf litter and rubbish…"

Introduced Shrub

10.11 A small area of ornamental planting was present along the northern community centre fenceline. This area was not well managed and native scrub species were encroaching on the introduced scrub species. Barberry (*Berberis* sp.) was locally dominant with occasional bramble, dog rose, dogwood and variegated holly (*Ilex aquifolium 'argentea marginata'*) throughout. A large cherry laurel was also present.

Plantation Broadleaved Woodland

10.12 The edge of an immature plantation broadleaved woodland was present to the eastern corner of Compartment I. This woodland was characterised by an abundance of silver birch, with occasional oak species, field maple (*Acer campestre*), ash and poplar species. The understory was characterised by an abundance of hawthorn, with frequent dog rose and occasional wild raspberry with patches of dense bramble.

Scattered Trees

10.13 Scattered trees were found in association with the fenced off area of the community centre. Several immature to mature trees were present in this area. Species included ash, hornbeam (*Carpinus betulus*), oak (*Quercus* sp.), whitebeam (*Sorbus aria*), hawthorn and a treeform cotoneaster (*Cotoneaster* sp.) species.

Tall Ruderal

10.14 Tall ruderal adjacent to the housing to the east was characterised by co-dominant common nettle and rosebay willowherb, with occasional creeping thistle.

10.15 Tall ruderal to the north-west corner of Compartment I similar in structure but also included occasional common ragwort, common hogweed, cock's foot, smooth hawksbeard and spotted dead nettle (*Lamium maculatum*).

Invasive Species

10.16 A dense and mature patch of Japanese knotweed (*Fallopia japonica*) approximately 20m long was present to the far eastern corner of the site (see Photograph 84).

11.0 RESULTS: INTERNAL BOUNDARY FEATURES

11.1 Internal boundary features between compartments are discussed below. These boundary features comprise Spa Brook, wet and dry ditches, and hedgerows. These boundary features are numbered as per the habitat plans presented within Appendix 1 and discussed below. Note that where boundary features are adjacent to habitats external to the site, they are discussed as part of the compartment above.

Spa Brook (North, Compartments E & F)

11.2 At the time of the survey of this segment of Spa Brook, the northern part of Spa Brook was dry, and the bottom of the watercourse difficult to see due to dense vegetation. The banks were broadly characterised as a dense scrub tall ruderal mosaic, with a species assemblage as described in Table 27 below:

Species	**Frequency of species within habitat**
Scrub (Spa Brook North, eastern bank)	
Bramble (*Rubus fruticosus* agg. sp.)	D
Common nettle *Urtica dioica*	LD
Fleabane *Pulicaria dysenterica*	LD
Rosebay willowherb (*Chamaenerion angustifolium*)	LD
Common reed *Phragmites australis*	F, LD
Common hogweed *Heracleum Sphondylium*	F
Common vetch *Vicia sativa*	F
Common ragwort *Senecio jacobaea*	O
Grey willow *Salix cinerea*	O
Teasel *Dipsacus fullonum*	O
Woody nightshade *Solanum dulcamara*	O
Figwort *Scrophularia nodosa*	R

Table 27: Spa Brook North, Eastern bank Compartment E, Dense scrub

Spa Brook (South, Compartments F and H)

11.3 The survey of the southern segment of Spa Brook was undertaken after heavy rainfall. The majority of the channel was inaccessible due to high vegetation levels, where it appeared that species such as common reed and bramble scrub were growing in the channel itself. In this area the bank vegetation included abundant goat and grey willow, frequent hawthorn and occasionally silver birch. Where bramble was present it was locally dominant.

11.4 The very southern stretch of Spa Brook channel was surveyed. The survey area started at the southernmost culvert and stretched approximately 15m south. In this area the banks were approximately 2m high and steeply angled. Approximately 10cm of water was present in the bottom of the channel. The water was notably turbid and muddy with occasional foam, with a very slow flow. The culvert channel was somewhat

narrow (~60cm) and dense, impassable bramble scrub was present above (see Photographs 85 and 86, Appendix 3).

11.5 Bank vegetation in this area featured abundant hawthorn, herb Bennet and elder, with local dominances in the ground flora of ivy. Dog rose featured occasionally along with male fern. The western bank was largely bare earth backed by tall scrub species already detailed. Tutsan featured rarely.

Hedgerows

11.6 H5 represents a defunct 3-4m high gappy hedgerow against a barbed wire fence, dominated by hawthorn but degrades into a bramble dominated near monoculture. Rabbit burrows and molehills were present in this area. The lichen *Xanthoria parietina* was abundant on the branches of the hawthorns, which indicated high nutrient levels (see Photograph 85, Appendix 3).

11.7 A defunct hedgerow (H8) was present to the south of Compartment E/north of compartment H, which had a ditch that was wet at the time of survey. The ditch had no vegetation. The hedgerow was dominated by overgrown hawthorn with occasional elder; a mixture of common nettle and goosegrass comprised the ground flora. The hedgerow gave way to a line of scattered grey willow and goat willow (see Photograph 88, Appendix 3).

11.8 To the southeast of Compartment E/west of compartment G was hedgerow (H9) which was a tall overgrown hedgerow dominated by hawthorn with locally frequent grey willow, goat willow and mature sycamore.

11.9 H10 is a double defunct hedgerow against a fence. The western part of the double hedgerow shows signs of maintenance, although the eastern side did not. The hedge was leggy and gappy, approximately 2.5m high with a shallow ditch (see D1 within *Ditches*, below) in the middle which was usually dry, although it was noted to have 3-6cm of water in the channel during a site visit in March. The hedgerow itself was dominated by hawthorn, with a solitary holly bush and very rarely ivy (see Photograph 90, Appendix 3).

11.10 The northern part of the double hedgerow parted by approximately 5m and was surrounded by dense scrub. In this small 5m gap a marijuana (*Cannabis sativa*) 4x4 growing grid was found, which supported a number of plants throughout the year (see TN7, Photographs 7 and 8, Appendix 3). Tools for the cultivation of these plants had been left in this area with an amount of litter. It should be noted that the double hedgerow was only superficially assessed and evaluated due to safety concerns surrounding the presence of the marijuana growing operation.

Ditches

11.11 D1 formed the eastern boundary of Compartment B and the western boundary of Compartment F. D1 was bounded by hedgerow H10 (see above; See Photograph 90, Appendix 3). The northern end of this ditch was shallow (~30cm) but was progressively deeper to the south (~1.75m deep). The bottom could not be seen from the edge at this point. A double hedgerow (H10, above) was present either side of the ditch feature at the northern end. At the southern end of the ditch it was bounded in parts by a linear dry reed

bed of common reed (*Phragmites australis*) occurring either side of the ditch. Where the reed bed was not present, tall ruderal and scrub species had colonised. Scrub species were either patches of dense bramble scrub or shrubs such as goat willow, hawthorn, dog rose and elder; tall ruderal vegetation was characterised by abundances of common nettle with occasional common hogweed and rosebay willowherb.

11.12 D7 formed the eastern boundary of Compartment E and part of the western boundary of Compartment G. D7 was dry at the time of survey and noted to have a fluctuating water table at other times of the year. The channel was approximately 50cm – 1m deep and approximately 1m wide. It was densely shaded by a defunct hedgerow that surrounded it (H9) and the channel was devoid of vegetation at the time of survey.

11.13 D8 formed the southern boundary of Compartment E and part of the northern boundary of Compartment H. D8 was dry at the time of survey and noted to be dry at other times of the year although considered likely to fill with water during periods of heavy rainfall. The channel was approximately 40-50cm deep and approximately 1m wide. It was densely shaded by a defunct hedgerow that surrounded it (H8) and the channel was devoid of vegetation at the time of survey.

11.14 D9 formed the south-eastern boundary with Compartment G, sharing the boundary with Compartment D. D9 was a channel approximately 1-1.25m deep with steeply sloping sides. The channel was around 1.5m wide, and a very shallow (~4-7cm deep) but very fast stream of water flowed south-west in this location. Asbestos roofing materials were present in the ditch at the north-eastern end. No vegetation was present in the channel itself although the banks were dominated by ivy, with frequent sycamore and occasionally locally frequent common nettle (see Photograph 91, Appendix 3). The southern end of this channel was littered with cans and bottles (see Photograph 92, Appendix 3).

11.15 Ditches D10, D11, and D12 were of a very similar character to D9, with similar heights and water depths. Litter in the form of cans and bottles were found frequently throughout the channels of these ditches (see Photographs 93-95, Appendix 3).

11.16 It should be noted that ditches D9-D12 were noted to be dry at different times of the year and these ditches were surveyed after heavy rainfall.

12.0 RESULTS: PONDS

12.1 Pond 1 (P1) was a small linear pond located on the north-western edge of Compartment D. The pond is heavily shaded by immature willow scrub and common duckweed (*Lemna minor*) covered the pond's surface. This is a manmade pond, likely created as part of a drainage system for the site. See Photograph 96, Appendix 3.

12.2 Pond 2 (P2) was a heavily-shaded and very shallow pond surrounded by alder and dense stands of grey willow, crack willow (*Salix fragilis*), hawthorn, and bramble scrub. No aquatic vegetation was present and marginal species were restricted to very occasional soft rush and Himalayan balsam. The pond was dry during 2015 surveys, and water levels fluctuated in the 2019 season. Wooden palettes and occasion litter was present within the pond. See Photograph 97, Appendix 3.

12.3 Pond 3 (P3) was wet at the time of survey, which was after a period of heavy rain. Reed canary grass (*Phalaris arundinacea*) dominated the area with water pepper (*Persicaria hydropiper)* and American water plantain (*Alisma subcordatum*) were occasionally present as submerged species, with very locally dominant creeping bent (*Agrostis stolonifera*), common nettle and creeping thistle frequent at the margins. Himalayan balsam was also encroaching on the area in moderate density. See Photograph 98, Appendix 3.

12.4 Ponds 4-6 lie within Radley Plantation and Pond LWS. Pond 5 (P5) was present partially on the site boundary. The pond was semi-shaded and at the time of survey little surface vegetation was present. Emergent bulrush was present to the south of the pond, with yellow iris (*Iris pseudoacorus*), soft rush, creeping buttercup, and Himalayan balsam present as emergent/marginal vegetation to the northern edge (see Photograph 99, Appendix 3).

13.0 INCIDENTAL FAUNAL OBSERVANCES

13.1 Incidental evidence and sightings of mammals, birds, and invertebrates were also recorded during habitat surveys, as detailed in the table below:

Species	Compartment	Month	Designation	Record
Insect				
Brimstone *Gonepteryx rhamni*	A, D	May, June		SIghting
Buff-tailed bumblebee *Bombus terrestris*	D	July		Sighting
Cinnabar moth *Tyria jacobaeae*	B, D	June, August	S41	Sighting
Comma *Polygonia c-album*	D, I	July, September		Sighting
Common red soldier beetle *Rhagonycha fulva*	B, D	June, July		Sighting
European honey bee *Apis mellifera*	B, D	June, July		Sighting
Garden spider *Araneus diadematus*	I	September		Sighting
Gatekeeper *Pyronia tithonus*	C, E	July		Sighting
Hawthorn shield bug *Acanthosoma haemorrhoidale*	D	September		Sighting
Large skipper butterfly *Ochlodes sylvanus*	E	July		Sighting
Large white butterfly *Pieris brassicae*	D, E, D	July		Sighting
Meadow brown butterfly *Maniola jurtina*	E, F	July, August		Sighting
Meadow grasshopper *Pseudocharthippus parallellus*	B	June		Sighting
Painted lady *Vanessa cardui*	E, F, H	July, August, September		Sighting
Peacock butterfly *Aglais io*	D, E, F	July, August		Sighting
Red admiral butterfly *Vanessa atalanta*	D	July		Sighting
Red-tailed bumblebee *Bombus lapidaries*	D	July		Sighting
Red-tailed cuckoo bumblebee *Bombus rupestris*	D	July		Sighting
Sawfly *Tenthredo maculate*	E	July		Sighting
Seven spotted ladybird *Coccinella septempunctata*	F	August		Sighting
Small skipper *Thymelicus sylvestris*	E	July		Sighting
Mammal				
European hedgehog *Erinaceus europaeus*	A, D	May, August	S41	Pawprints and scat
European Mole *Talpa europaea*	I	September		Molehill
Fox *Vulpes vulpes*	A, C, adjacent to D, G	May, July, September, October		Fox earths, feeding remains, sightings
Grey squirrel *Sciurus carolinensis*	D	September	WCA9	Sighting and bark stripping
Polecat *Mustela putorius*	F	August	S41, WCA 6	Scat
Rabbit *Oryctolagus cuniculus*	F, G	August, October		Sighting, burrows and scat

Birds				
Blackbird *Turdus merula*	B, E, D, H	June, July		Sighting
Buzzard *Buteo buteo*	A, D, E, F,	July, August, October		Sighting & heard
Carrion crow *Corvus corone*	H, G	September, October		Sighting
Chaffinch *Fringilla coelebs*	K, L	September, October		Sighting
Coal tit *Peripatus ater*	H	September		Sighting
Collared dove *Streptopelia decocto*	B	June		Sighting & heard
Common pheasant *Phasianus colchicus*	H	September		Sighting & heard
European Robin *Erithacus rubecula*	C, E, F, G, H	July, August, September, October		Sighting & heard
Jackdaw *Corvus monedula*	C	July		Sighting
Kestrel *Falco tinnunculus*	A, B	May, June		Sighting; seen quartering above field
Magpie *Pica pica*	All	June, July, August, September, October		Sighting & heard
Mallard *Anas platyrhynchos*	D	August		Sighting & heard
Pied wagtail *Motacilla alba*	D	August, October		Sighting
Starling *Sturnus vulgaris*	G	October	S41	Sighting
Swallow *Hirundo rustica*	I	September		Sighting
Wood pigeon *Columba palumbus*	C, D, F, H	July, August, September		Sighting & heard
Wren *Troglodytes troglodytes*	C, E, F, H	July, August, September		Sighting; seen nesting

14.0 REFERENCES

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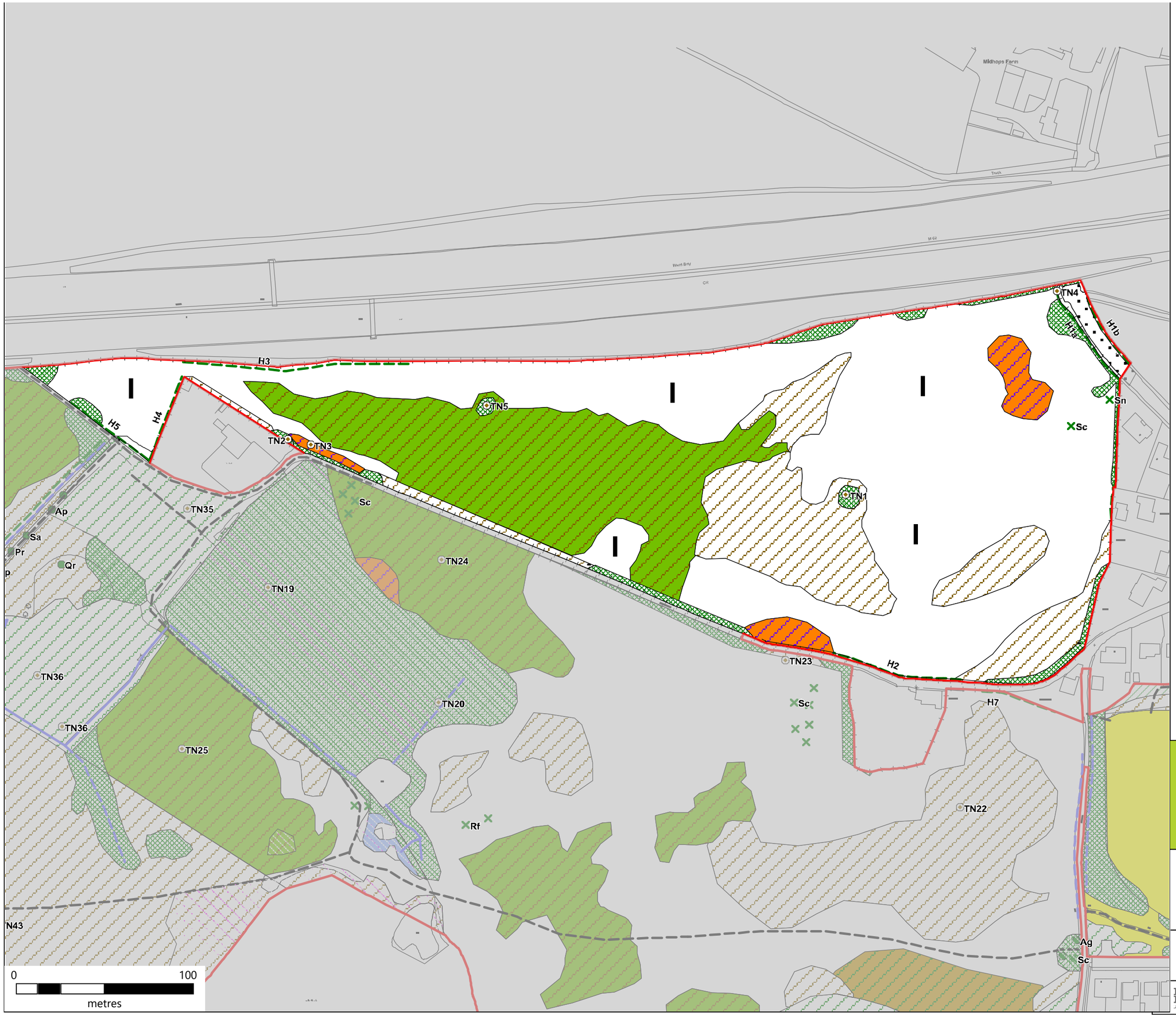
APPENDIX 1



- Bare ground/Hard standing
- Defunct native species poor hedgerow
- Dense scrub
- Marshy grassland (Non-priority)
- Scattered scrub
- Species poor improved grassland
- Tall ruderal
- Tall ruderal-grassland mosaic
- Fence
- Red line boundary
- Target notes

Sp_Code	Common	Scientific
Sc	Goat willow	Salix caprea
Sn	Elder	Sambucus nigra

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Site at Peel Hall, Warrington
Compartment A

Phase 1 Habitat Plan

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N

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Revision: 0
Date: 30/01/2020

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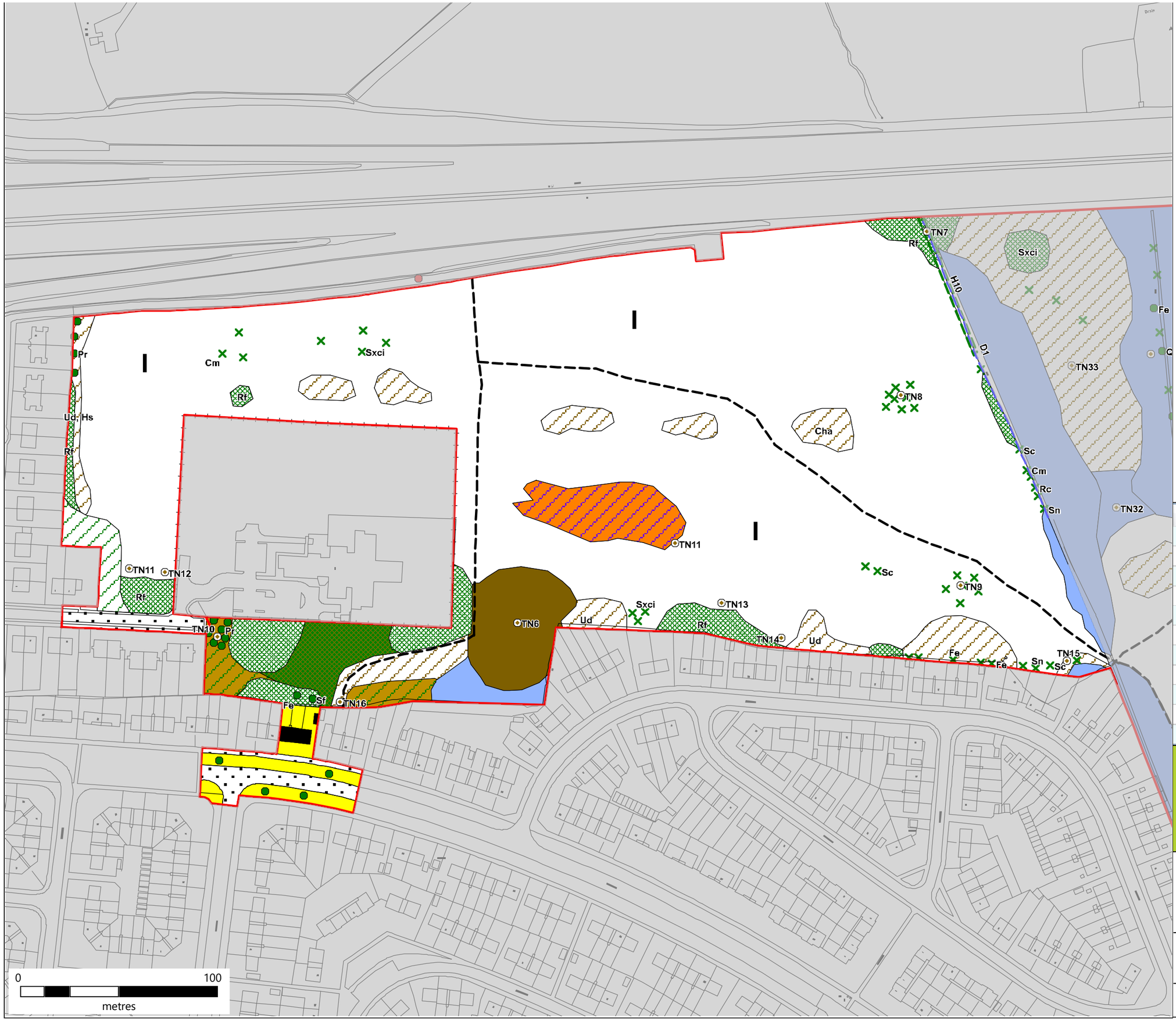

- Amenity grassland
- Bare ground/Hard-standing
- Bracken
- Building
- Defunct native species poor hedgerow
- Dense scrub
- Dry ditch
- Marshy grassland (Non-priority)
- Plantation broadleaved woodland
- Scattered scrub
- Scattered trees
- Species poor improved grassland
- Swamp
- Tall ruderal
- Tall ruderal-scrub mosaic
- Tall ruderal-scrub-grassland mosaic
- Fence
- Desire Line
- Cotoneaster
- Target notes
- Red line boundary

Sp_Code	Common	Scientific
Cm	Hawthorn	Crataegus monogyna
Fe	Ash	Fraxinus excelsior
Hs	Common hogweed	Heracleum sphondylium
Pr	Cherry sp.	Prunus sp.
Rc	Dog rose	Rosa canina
Rf	Bramble	Rubus fruticosus ag. sp.
Sc	Goat willow	Salix caprea
Sf	Crack willow	Salix fragilis
Sn	Elder	Sambucus nigra
Sxci	Grey willow	Salix cinerea
Ud	Common nettle	Urtica dioica

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Site at Peel Hall, Warrington
Compartment B

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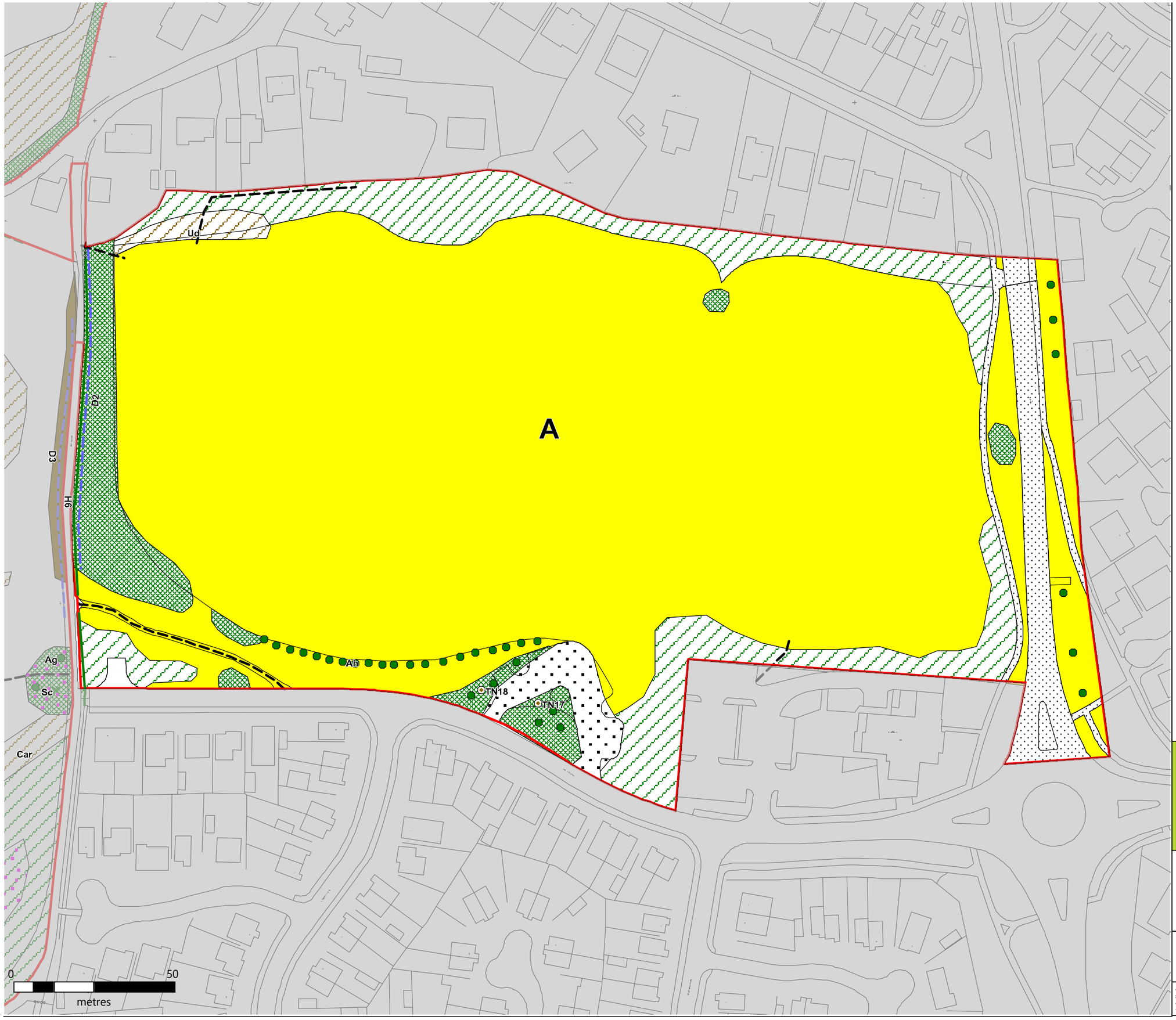

- A — Amenity grassland
- Bare ground/Hard standing
- Dense scrub
- Dry ditch
- Hedgerow
- Plantation broadleaved woodland
- Scattered rees
- Tall ruderal
- Desire lines
- Target notes
- Red line boundary

Sp_Code	Common	Scientific
Ah	Horse chestnut	Aesculus hippocastanum
Ud	Common nettle	Urtica dioica

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Site at Peel Hall, Warrington
Compartment C

Phase 1 Habitat Plan

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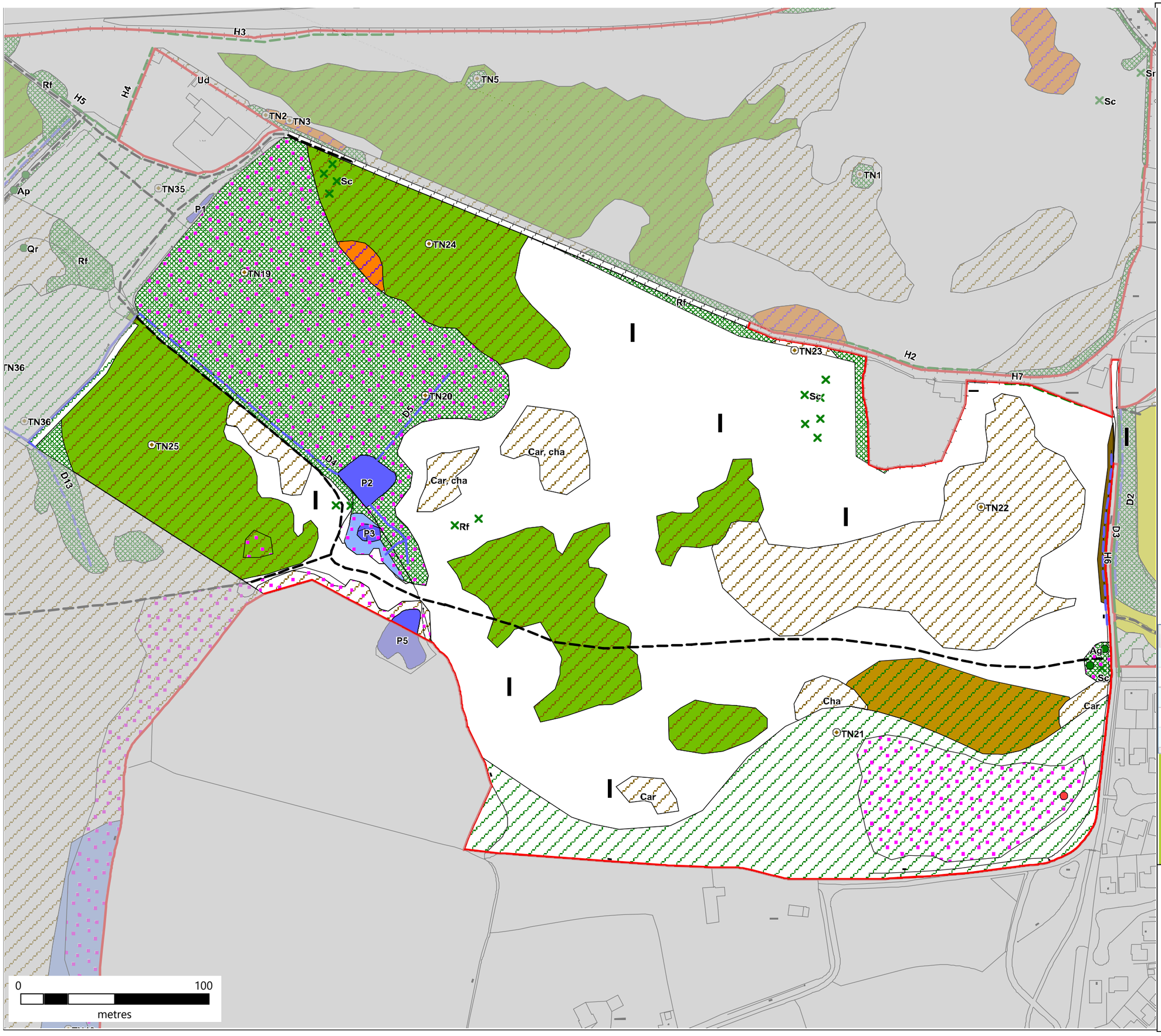

- Bracken
- Dense scrub
- Dry ditch
- Hedgerow
- Marshy grassland (Non-priority)
- Plantation broadleaved woodland
- Pond
- Scattered scrub
- Scattered trees
- Species poor neutral grassland
- Tall ruderal
- Tall ruderal-scrub mosaic
- Tall ruderal-grassland mosaic
- Swamp
- Wet ditch
- Fence
- Cotoneaster
- Himalayan balsam
- Desire line
- Target notes
- Red line boundary

Sp_Code	Common	Scientific
Ag	Alder	Alnus glutinosa
Car	Creeping thistle	Cirsium arvense
Cha	Rosebay willowherb	Chamaenerion angustifolium
Rf	Bramble	Rubus fruticosus ag. sp.
Sc	Goat willow	Salix caprea

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Site at Peel Hall, Warrington
Compartment D

Phase 1 Habitat Plan

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- Defunct native species poor hedgerow
- Dense scrub
- Dry ditch
- Scattered scrub
- Tall ruderal
- Tall ruderal-grassland mosaic
- Fence
- Spa Brook
- Target notes
- Red line boundary

Sp_Code	Common	Scientific
Sc	Goat willow	Salix caprea
Rf	Bramble	Rubus fruticosus
Sn	Elder	Sambucus nigra
Sxci	Grey willow	Salix cinerea

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Site at Peel Hall, Warrington
Compartment E

Phase 1 Habitat Plan

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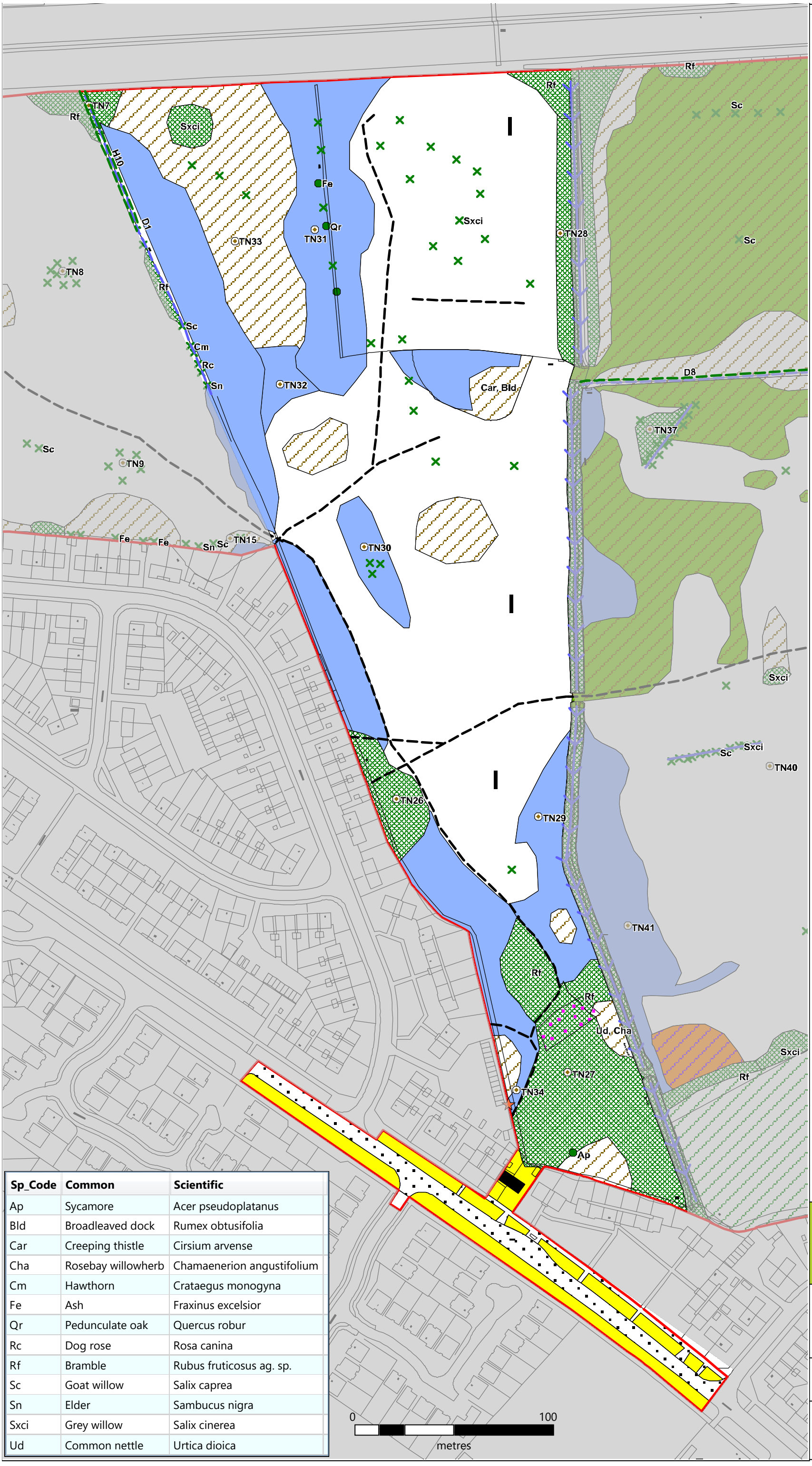

Sp_Code	Common	Scientific
Ap	Sycamore	Acer pseudoplatanus
Bld	Broadleaved dock	Rumex obtusifolia
Car	Creeping thistle	Cirsium arvense
Cha	Rosebay willowherb	Chamaenerion angustifolium
Cm	Hawthorn	Crataegus monogyna
Fe	Ash	Fraxinus excelsior
Qr	Pedunculate oak	Quercus robur
Rc	Dog rose	Rosa canina
Rf	Bramble	Rubus fruticosus ag. sp.
Sc	Goat willow	Salix caprea
Sn	Elder	Sambucus nigra
Sxci	Grey willow	Salix cinerea
Ud	Common nettle	Urtica dioica

- Amenity grassland
- Bare ground/hard standing
- Building
- Defunct native species poor hedgerow
- Dense scrub
- Dry ditch
- Scattered scrub
- Scattered trees
- Species poor neutral grassland
- Swamp
- Tall ruderal
- Spa brook
- Fence
- Desire line
- Virginia creeper
- Himalayan balsam
- Target notes
- Red line boundary

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Site at Peel Hall, Warrington
Compartment F

Phase 1 Habitat Plan
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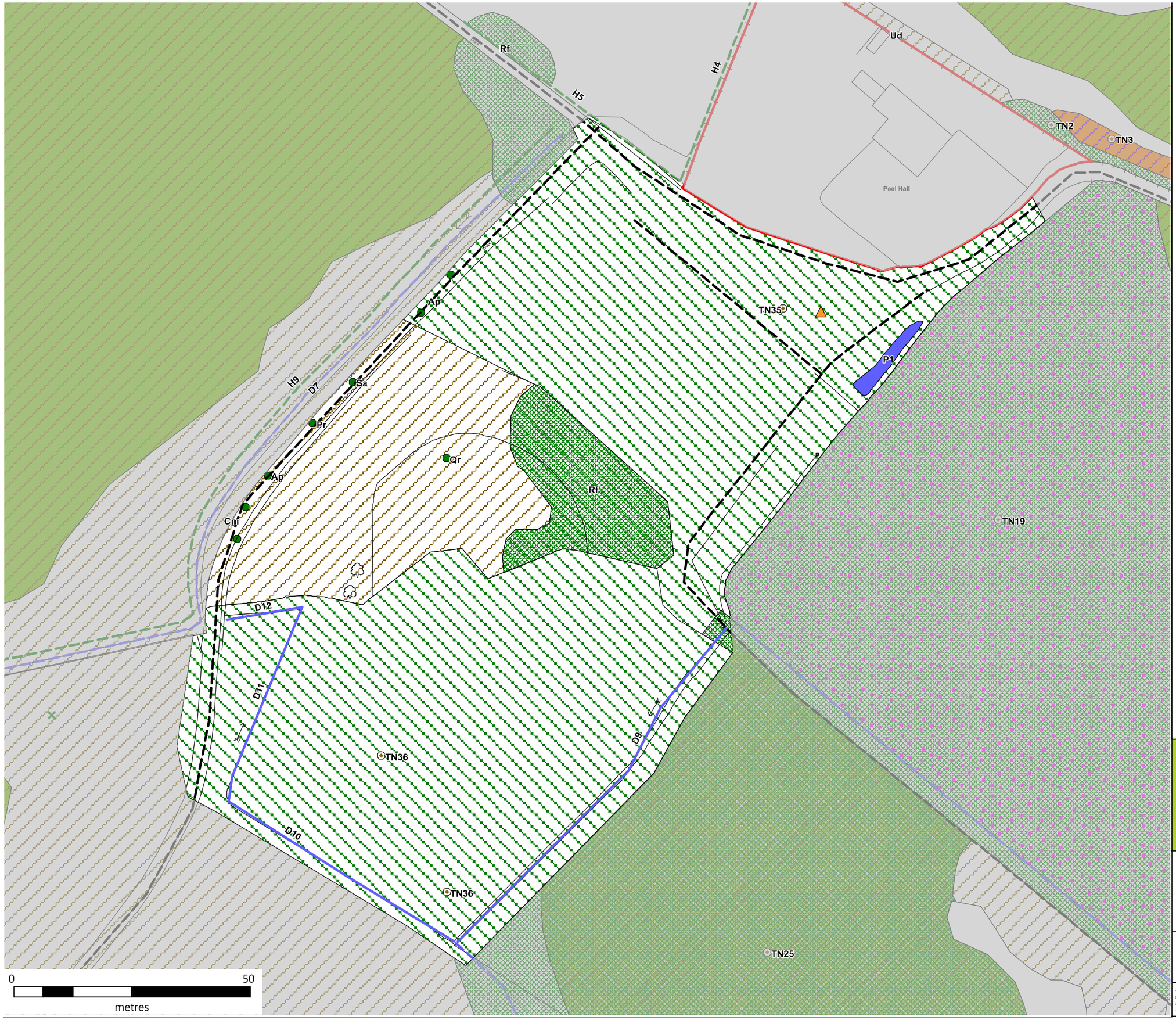

- Dense scrub
- Plantation broadleaved woodland
- Pond
- Tall ruderal
- Wet ditch
- Desire Line
- Montbretia
- Target notes
- Red line boundary

Sp_Code	Common	Scientific
Ap	Sycamore	Acer pseudoplatanus
Cm	Hawthorn	Crataegus monogyna
Pr	Cherry sp.	Prunus sp.
Qr	Pedunculate oak	Quercus robur
Rf	Bramble	Rubus fruticosus ag. sp.
Sa	Rowan	Sorbus aucuparia

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Site at Peel Hall, Warrington
Compartment G

Phase 1 Habitat Plan

Satnam Millennium Ltd

N

Drawing: 1820-T1-G
Revision: 0
Date:31/01/2020

Drawn by: LM
Checked by: PB
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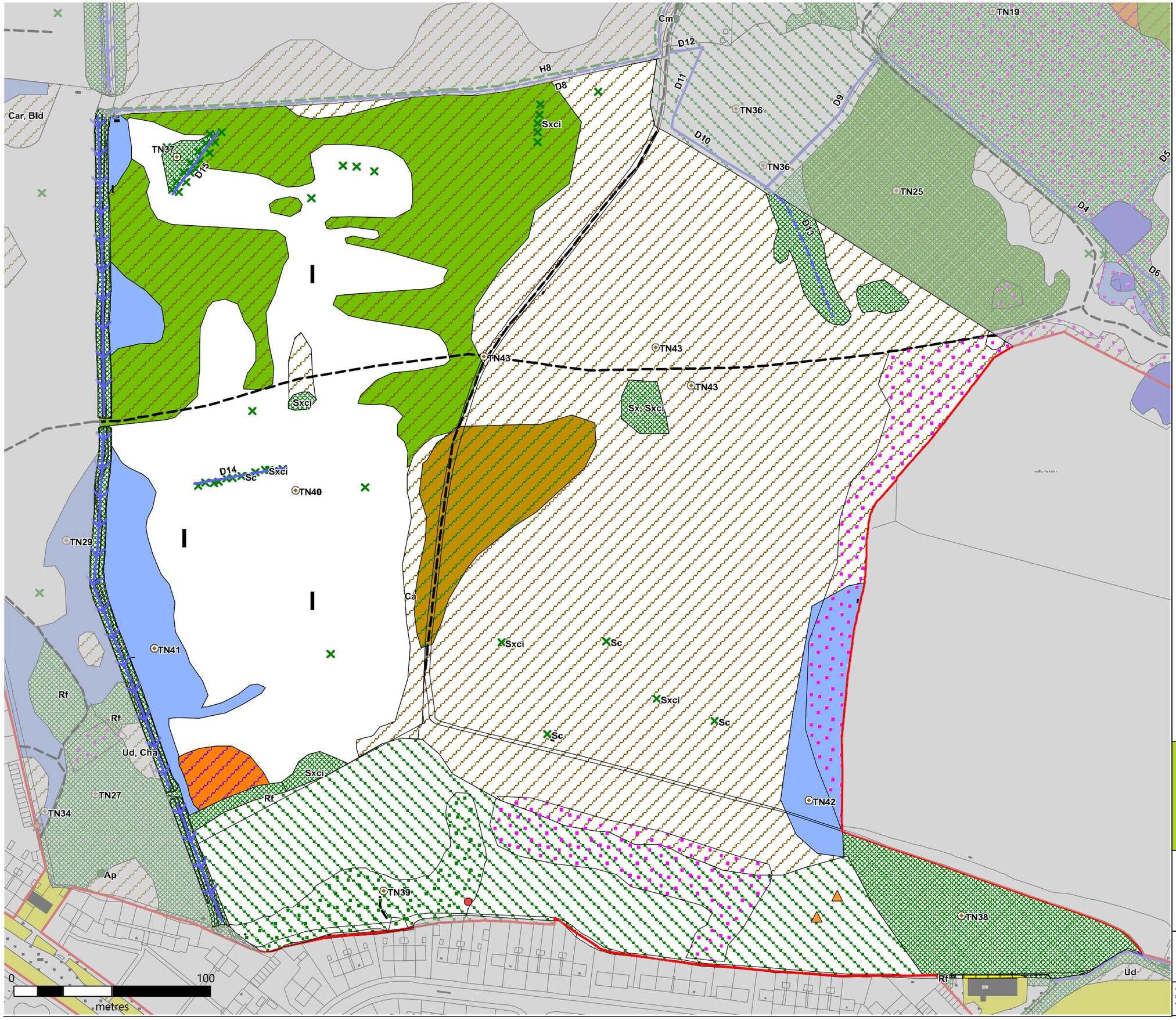

- Defunct native species poor hedgerow
- Dense scrub
- Dry ditch
- Marshy grassland (Non priority)
- Plantation broadleaved woodland
- Scattered scrub
- Species poor improved grassland
- Swamp
- Tall ruderal
- Tall ruderal-grassland mosaic
- Wet ditch
- Spa Brook
- Desire Line
- Himalayan Balsam
- Giant Hogweed
- Montbretia
- Cotoneaster
- Target notes
- Red line boundary

Sp_Code	Common	Scientific
Sc	Goat willow	Salix caprea
Sxci	Grey willow	Salix cinerea

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Site at Peel Hall, Warrington
Compartment H

Phase 1 Habitat Plan

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N

Drawing: 1820-T1-H
Revision: 0
Date:30/01/2020

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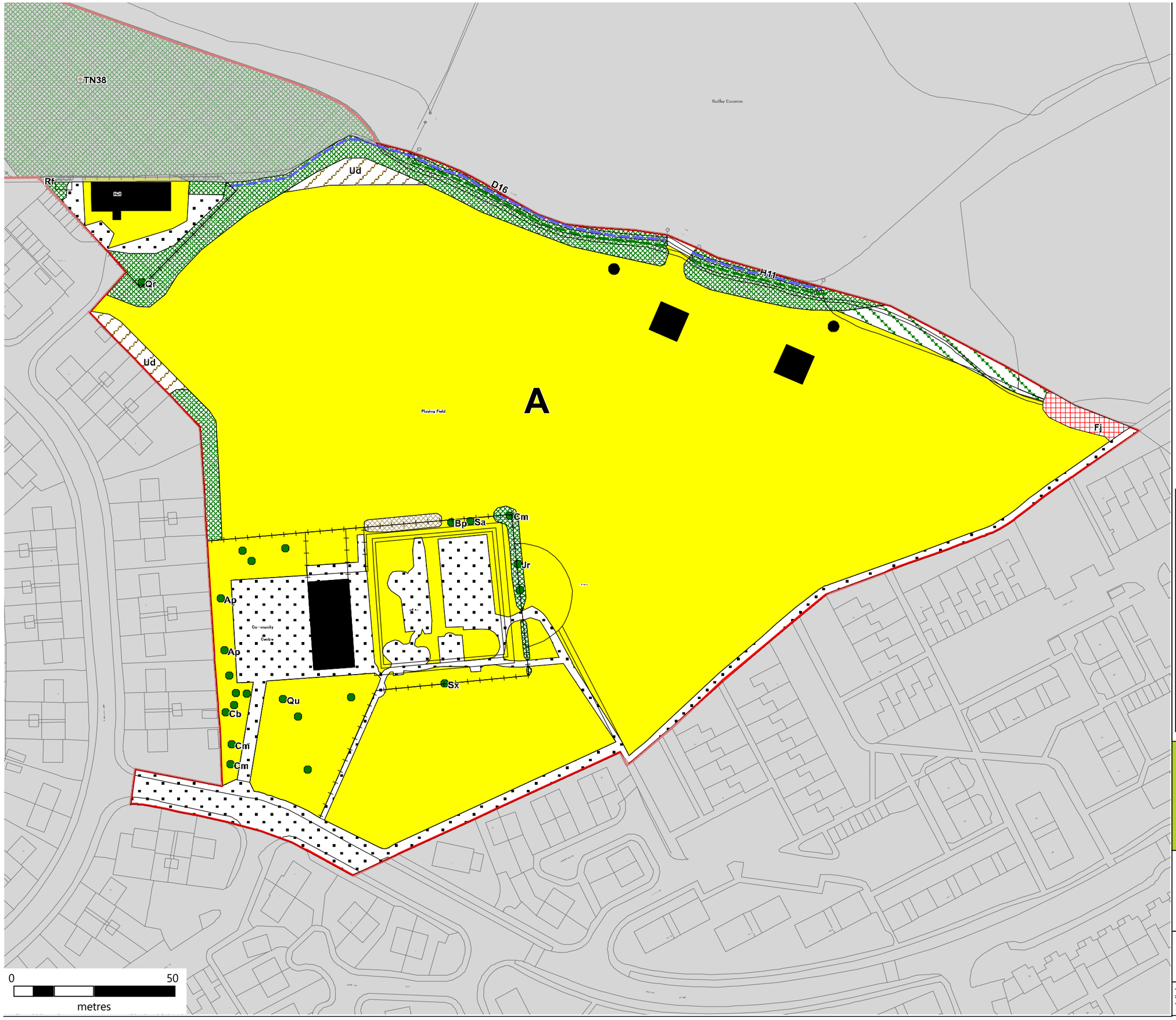

- A Amenity grassland
- Bare ground/Hard-standing
- Building/structure
- Defunct native specie poor hedgerow
- Dense scrub
- Dry ditch
- Introduced shrub
- Plantation broadleaved woodland
- Scattered trees
- Tall ruderal
- Japanese knotweed
- Fence
- Target notes
- Red line boundary

Sp_Code	Common	Scientific
Ap	Sycamore	Acer pseudoplatanus
Bp	Silver birch	Betula pendula
Cb	Hornbeam	Carpinus betulus
Cm	Hawthorn	Crataegus monogyna
Jk	Japanese knotweed	Fallopia japonica
Jr	Walnut	Juglans regia
Qr	Pedunculate oak	Quercus robur
Qu	Oak sp.	Oak
Sa	Rowan	Sorbus aucuparia
Sx	Willow sp.	Salix
Ud	Common nettle	Urtica dioica

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Site at Peel Hall, Warrington
Compartment I

Phase 1 Habitat Plan

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N

Drawing: 1820-T1-I
Revision: 0
Date:30/01/2020

Drawn by: LM
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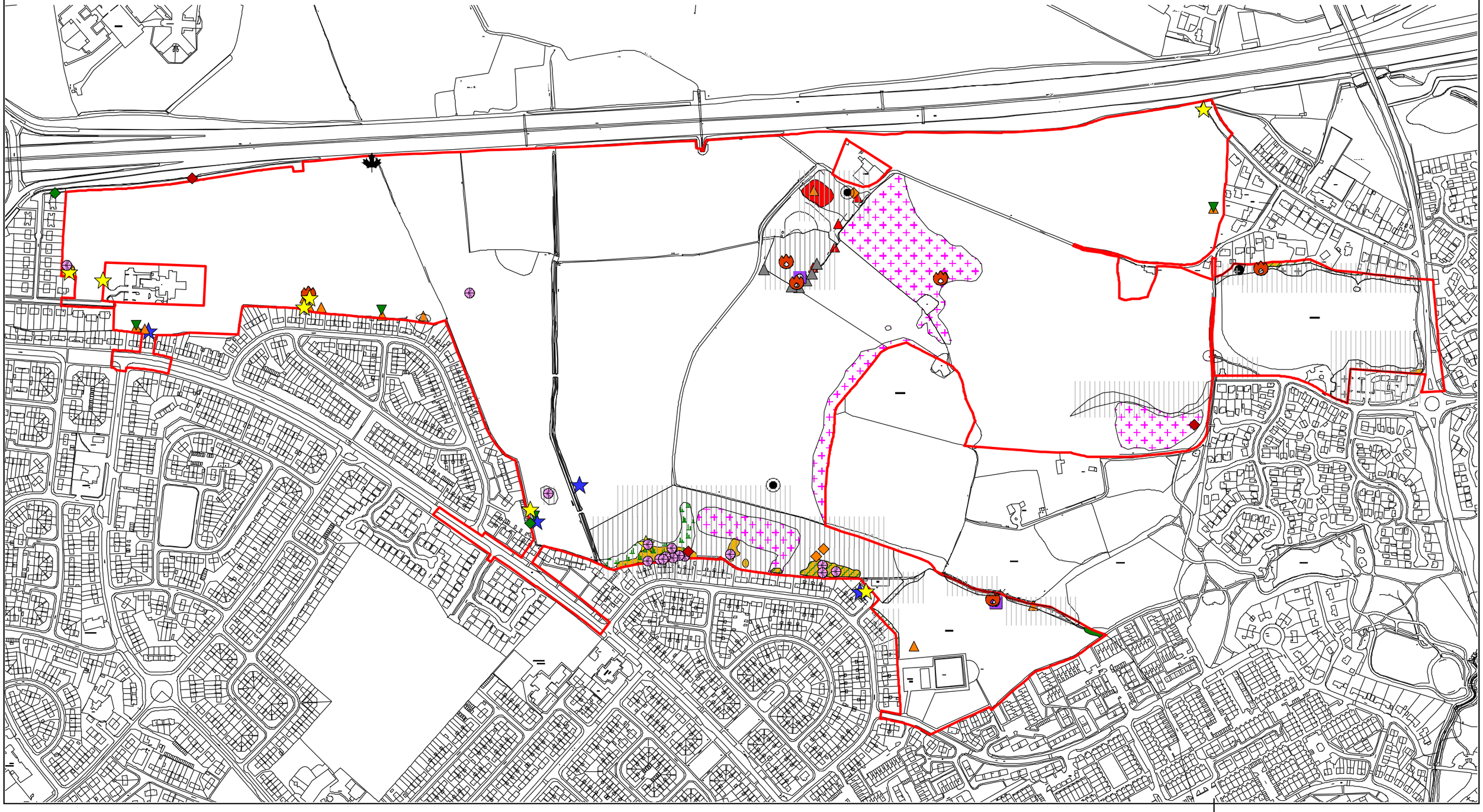
APPENDIX 2



Legend

Red line boundary

Anti-Social/Safety Concerns

- Air rifle target practice
- Evidence of drug use
- Marijuana growing operation
- Fire damage
- Open manhole
- Asbestos (concentrated)
- Asbestos (area)

Flytipping, Littering, and dumping

- Refurbishing/furniture waste
- Vehicle waste
- Discarded toys
- Non-green garden/ household waste (concentrated)
- Non-green garden/ household waste (area)
- Green garden waste (concentrated)
- Green garden waste (area)
- Pile of cans/bottles
- Area of low concentration food & drink waste
- Dog excrement in bags

Schedule 9 Invasive Species

- Japanese knotweed
- Giant Hogweed
- Himalayan Balsam
- Montbretia
- Cotoneaster
- Virginia creeper

%

0 250

metres

Peel Hall Farm, Warrington

Site Concerns Overview Map

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Checked by: DS
Scale: 1:5000 @ A3

Drawing: 1820-T1
Revision: 0
Date: 18/10/19

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APPENDIX 3

Compartment A

Photograph 1: A patch of mature scrub in the middle of the grassland of Compartment A (TN5); typical of mature scrub patches across the entire site.

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Compartment B

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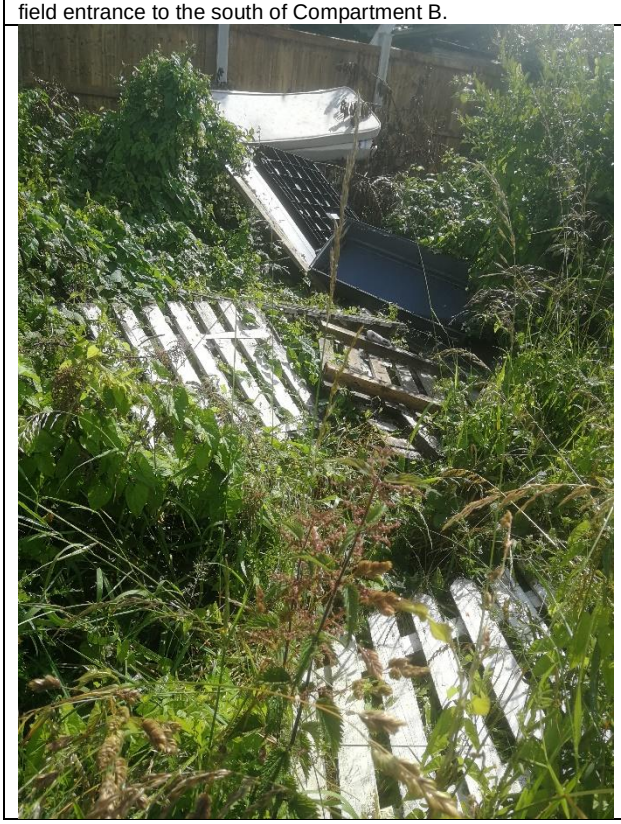
Photograph 13: An example of grassland habitat dominated by dense swathes of hairy tare at TN11 within Compartment B.

Photograph 14: Flytipped plastic coated boards adjacent to field entrance to the south of Compartment B.

Photograph 15: Burnt household waste within grassland habitat, TN13, Compartment B.



Photograph 16: Flytipped fence panels and furniture south of TN13	Photograph TN17: Flytipped mattress, south of TN13
	
Photograph 18: Path made of boards through stand of common reed (TN15), Compartment B	Photograph 19: Small “garden” area within otherwise tall ruderal habitat, TNNUMBER, Compartment B.

Compartment C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Compartment D

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Spa Brook

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ECOLOGY

ECO 10 2019 Roosting Bat Surveys

APP 1: Bat Survey Plans (Drawings 1820-T2-01 & 1820-T2-02)

APP 2: Raw Data - Preliminary Bat Roost Assessment of Buildings

APP 3: Raw Data - Dusk Emergence Bat Survey

APP 4: Survey Photographs

SITE AT PEEL HALL, WARRINGTON

For

SATNAM MILLENIUM LTD

ECO 10:
BAT ROOST SURVEYS

METHODOLOGIES AND RESULTS ONLY

APRIL – JULY 2019

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CONTENTS:

The current report comprises the methodologies and survey data of bat survey work only. Bat desk study data, an overview of bat survey results, an impact assessment of proposals in relation to bats and a bat mitigation strategy are included in Chapter 6 of the Environmental Statement (March 2020).

1.0 METHODOLOGIES

Preliminary Bat Roost Assessment of Buildings

1.1 In line with the specifications detailed in *Bat Mitigation Guidelines* (English Nature, 2004) and *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), a daytime survey of all buildings and structures to be potentially impacted upon by proposals was undertaken, involving a visual assessment to determine the potential roosting value of each building.

1.2 Each building within the site area was surveyed for features potentially suitable for roosting bats. Potential roosting features were inspected using a high-power torch and binoculars for evidence of possible bat presence. Any accessible features were fully surveyed for evidence of bat usage (in the form of droppings, urine staining, grease marks, scratch marks or feeding remains). For reasons of health and safety, the survey was only undertaken in areas accessible from 3.5m ladders.

1.3 The potential roosting value of buildings within the survey area was assessed using the categories detailed within *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), as detailed in Table 1.1 overleaf.

1.4 Buildings assessed included Property no.s 344, 348, 458, 460, 462 and 464 Poplars Avenue. Property no. 346 could not be accessed (see Survey Constraints, paragraph 1.30).

1.5 The daytime bat survey of 344, 458, 460, 462 and 464 Poplars Avenue were undertaken on 15th and 16th April 2019 by Lorraine McKee, MSc, GradCIEEM, Project Ecologist and Natural England Class 1 Bat Licence Holder (2016-24033-CLS-CLS).

1.6 348 Poplars Avenue was assessed on 17th June 2019 by Paula Bateson, MSc ACIEEM, Senior Ecologist and Natural England Class 1 Bat Licence holder (2015-16053-CLS-CLS). Joe Perkins BSc(Hons) contributed as a safety assistant during all daytime bat surveys.

Preliminary Bat Roost Assessment of Trees

1.7 In line with the specifications detailed in *Bat Mitigation Guidelines* (English Nature, 2004) and *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), a daytime survey of all trees on site was undertaken.

1.8 This assessment of trees was undertaken by Lorraine McKee in conjunction with various Phase 1 Survey visits undertaken between May and September 2019. A visual assessment was undertaken to determine the potential roosting value of each tree/tree group within the site area. Each tree was surveyed for features potentially suitable for roosting bats such as knot holes, woodpecker holes, tear outs, wounds, compression forks, butt rot, cracks, snaps, welds, lifting bark and dense ivy stems. Potential roosting features were

inspected using a high-power torch and binoculars for evidence of possible bat presence. Any accessible features were fully surveyed for evidence of bat usage (in the form of droppings, urine staining, grease marks, scratch marks or feeding remains). For reasons of health and safety, the survey was only undertaken in areas accessible from 3.5m ladders.

1.9 The potential roosting value of trees within the survey area was assessed using the categories detailed within *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), as detailed in Table 1.1 below.

Table 1.1: BCT Guidelines for assessing the potential suitability of proposed development sites for bats

BCT Suitability Category	Description
Negligible	Negligible habitat features likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger number of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roosting features but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Nocturnal Bat Emergence Surveys of Buildings

1.10 The Preliminary Bat Roost Assessment of Buildings identified all surveyed buildings to possess low potential value for roosting bats.

1.11 In line with the specifications detailed in Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), one dusk bat emergence survey was undertaken at each of these properties. The surveys commenced at least 20 minutes prior to sunset and continued until at least 90 minutes after sunset. The dusk emergence surveys were conducted using electronic bat detectors (Echo Meter Touch) to facilitate the detection of bats and to aid in the determination of species of bat using the site. Subsequent computer analysis of recordings allowed all species of bat using the site to be verified.

Nocturnal Bat Emergence Surveys of Trees

1.12 The Preliminary Bat Roost Assessment of Trees identified one tree within the site area to possess low potential value for roosting bats.

1.13 Whilst Bat Conservation Trust Guidance (Collins, 2016) does not specifically recommend further survey work for trees with low potential for roosting bats, a night-vision camera (Bushnell Equinox Digital Night Vision camera) was used to monitor the potential roosting feature for a full survey a precautionary measure.

A night vision camera was appropriate in this instance owing to the presence one potential roosting feature on the tree (one woodpecker hole), which was easily monitored by the close-focussing infra-red camera.

1.14 The camera was set up at the start of the September dusk transect survey and left recording until the end of the September dawn transect survey. Footage was reviewed on computer post-survey.

Ground Level Bat Roost Assessment of Trees

1.15 In line with the specifications detailed in *Bat Mitigation Guidelines* (English Nature, 2004) and *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), a daytime survey of the site was conducted.

1.16 A visual assessment was undertaken to determine the potential roosting value of the site. All trees within and close to the proposed development were surveyed for features potentially suitable for roosting bats. Potential roosting features were inspected using a high-power torch and binoculars for evidence of possible bat presence. Any accessible cracks, crevices, rot-holes or areas of delaminated bark were fully surveyed for evidence of bat usage (in the form of droppings, urine staining, grease marks, scratch marks or feeding remains). For reasons of health and safety, the survey was only undertaken in areas accessible from 3.5m ladders.

1.17 The potential roosting value of trees within the survey area was assessed using the categories detailed within *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), as detailed in Table 2.1 overleaf. Trees without suitable features to support roosting bats possess negligible value for roosting bats and are not discussed individually within the report owing to the number of trees on site. Trees with the potential to support roosting bats are discussed fully in the report and concluded to be either of low, moderate or high potential for roosting bats.

Emergence and Re-entry Surveys

1.18 In line with the specifications detailed in *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), one nocturnal bat survey and two dawn re-entry survey were undertaken on trees identified to possess high potential roosting value by the Preliminary Ground Level Bat Roost Assessment of Trees, and one nocturnal bat survey and one dawn re-entry survey were undertaken on trees identified to possess moderate potential roosting value.

1.19 The dawn surveys commenced 90 minutes prior to sunrise and continued until 10 minutes after sunrise. The nocturnal emergence survey commenced 20 minutes prior to sunset and continued until 90 minutes after sunset to cover peak emergence times. The surveys were conducted using electronic bat detectors (Echo Meter Touch) to facilitate the detection of bats and to aid in the determination of species of bat using the site. Subsequent computer analysis of recordings allowed all species of bat detected using the site to be identified. Infrared cameras (Bushnell Equinox Digital Night Vision camera and Cannon Legria Fs30 video camera with infra-red light) were also utilised to assist monitoring of roosting features.

BCT Suitability Category	Description
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A tree with one or more potential roost features (PRFs) that could be used by individual bats opportunistically. However these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by larger number of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Table 2.1: Bat Conservation Trust Categories for trees in relation to potential value for roosting bats (Collins, 2016)

Survey constraints

1.20 Of the seven buildings within the site area, one residence (No. 346, Poplars Avenue) could not be accessed to undertake an internal or external bat inspection, or dusk bat emergence survey. The house was viewed from the street and considered likely to be of the same build and internal loft space structure as all of the other houses surveyed, however the potential value of the property for bats could not be comprehensively assessed. Parts of the property were under observation during surveys undertaken on 344 and 348 Poplars Avenue due to the adjoining nature of the properties, however the property could not be fully surveyed to conclude the presence or likely absence of roosting bats.

1.21 Property No.s 350, 456 and 466 Poplars Avenue, are all properties directly connected to those within the site area, which could be indirectly impacted by proposals owing to proximity. These properties could not be accessed and were only partially covered by dusk emergence surveys of the neighbouring buildings.

1.22 Some outbuildings and garages could not be entered due to health and safety concerns, such as structural safety or the presence of asbestos.

1.23 The inspection of trees on site for potential roosting features was minorly constrained due to the presence of foliage throughout the summer months. This was not considered to be a major constraint due to a general lack of maturity in the tree species present on site.

1.24 The above constraints are taken into account within all conclusions, discussions and impact assessments in relation to roosting bats.

2.0 PRELIMINARY BAT ROOST ASSESSMENT OF BUILDINGS

Introduction

2.1 The site area includes Property no.s 344, 346, 348, 458, 460, 462 and 464 Poplars Avenue. 344, 346 and 348 Poplars Avenue are centred at Ordnance Survey Grid Reference SJ6115191385 whilst 458, 460, 462 and 464 Poplars Avenue are centred at Ordnance Survey Grid Reference SJ6063091667. Drawing 1820-T2-01 (Appendix 1) summarises the location of each property in relation to the site area.

2.2 Property no. 346 could not be accessed (see Survey Constraints, paragraph 1.20). Adjoining properties to buildings within the site area (350, 456 and 466) could also not be accessed (see Survey Constraints, paragraph 1.21).

2.3 The daytime bat survey of Property No. 344, 458, 460, 462, and 464 Poplars Avenue was carried out on the 15th and 16th April 2019 and Lorraine McKee MSc GradCIEEM, Project Ecologist and Natural England Class 1 Bat Licence Holder (2016-24033-CLS-CLS) with Joe Perkins assisting. The daytime bat survey of 348 Poplars Avenue was undertaken on 17th June 2019 by Paula Bateson BSc(Hons) ACIEEM, Senior Ecologist and Natural England Class 1 Bat Licence Holder (Reg. no: 2015-16053-CLS-CLS) with Joe Perkins assisting. Weather conditions at the time of the survey are detailed in Table 2.1.

Table 2.1: Weather conditions at the time of the daytime bat survey

Date	Precipitation	Wind (Beaufort)	Cloud cover (%)	Temperature (°C)
15th April 2019	Dry	F1	20	14
16th April 2019	Dry	F1	90	12
17th June 2019	Dry	F2	100	16

Results

2.4 The surveyed residences were all terraced two storey residences of brick construction with single pitched slate roofs. All properties appeared to be of structurally good condition at the time of survey, and all were occupied by residents apart from Property No. 460 Poplars Avenue. Each residence had single-storey outbuildings which were also assessed for bat potential.

2.5 The loft voids of each surveyed properties were of a typical rafter and purlin arrangement, with ridgeboard at the apex. All voids had a woven plastic lining under the slates and at least one partition wall, although the condition of these walls was highly variable. All voids were accessed via a hatch and had exposed rock wool insulation over floor joists, although some voids were also boarded.

2.6 The only potential roosting features recorded on each of the surveyed buildings comprised occasional lifted slate roof tiles and occasional dense ivy cover. Table 2.2 and Drawing 1820-T2-01 (Appendix 1) summarise the potential value of each building for roosting bats. Further detail on individual buildings is provided as Appendix 2.

Table 2.2: Summary of Bat Roost Assessment Results for buildings

Property no.	Key potential access points / roosting features	Evidence of bat usage	Potential roosting value	Potential impacts of proposals	Minimum survey effort required (Collins, 2016)
344	Main residence: Low number of gaps beneath slate roof tiles.	No evidence of bat activity however features too high to fully inspect.	Low	Demolition.	One dusk emergence or dawn re-entry survey.
	Outbuilding: No potential roosting features present	No evidence of bat activity.	Negligible	Demolition.	No further survey work required.
346	No access	No access	Unknown	Demolition.	Preliminary bat roost assessment.
348	Main residence: Low number of gaps beneath slate roof tiles.	No evidence of bat activity however features too high to fully inspect.	Low	Demolition.	One dusk emergence or dawn re-entry survey.
	Outbuilding: No potential roosting features present	No evidence of bat activity.	Negligible	Demolition.	No further survey work required.
350	No access	No access	Unknown	Disturbance through demolition of connecting building (348)	Preliminary bat roost assessment.
456	No access	No access	Unknown	Disturbance through demolition of connecting building (458)	Preliminary bat roost assessment.
458	Main residence: Low number of gaps beneath slate roof tiles.	No evidence of bat activity however features too high to fully inspect.	Low	Demolition.	One dusk emergence or dawn re-entry survey.
	Outbuilding: No potential roosting features present	No evidence of bat activity.	Negligible	Demolition.	No further survey work required.
460	Main residence: Low number of gaps beneath slate roof tiles.	No evidence of bat activity however features too high to fully inspect.	Low	Demolition.	One dusk emergence or dawn re-entry survey.
	Outbuilding: Occasional gaps behind bargeboards and ivy clad.	No evidence of bat activity however ivy foliage restricts view.	Low	Demolition.	One dusk emergence or dawn re-entry survey.
462	Main residence: Low number of gaps beneath slate roof tiles and behind soffit.	No evidence of bat activity however features too high to fully inspect.	Low	Demolition.	One dusk emergence or dawn re-entry survey.
	Outbuilding: No potential roosting features present	No evidence of bat activity.	Negligible	Demolition.	No further survey work required.
464	Main residence: Low number of gaps beneath slate roof tiles.	No evidence of bat activity however features too high to fully inspect.	Low	Demolition.	One dusk emergence or dawn re-entry survey.
	Outbuilding: No potential roosting features present	No evidence of bat activity.	Negligible	Demolition.	No further survey work required.
466	No access	No access	Unknown	Disturbance through demolition of connecting building (464)	Preliminary bat roost assessment.

3.0 BAT ROOST ASSESSMENT OF TREES

Introduction

3.1 The Preliminary Ground Level Roost Bat Assessment of Trees was conducted across various dates between April and September 2019, in conjunction with habitat data collection by Lorraine McKee MSc GradCIEEM, Project Ecologist and Natural England Class 1 Bat Licence Holder (2016-24033-CLS-CLS). A summary of survey results is provided as Appendix 1 (Appletons Drawing 1820-T2-02). Only trees within or adjacent to the proposed development were assessed by the survey work. Trees within Radley Woods were not included within the survey effort as they would not be impacted upon by proposals.

Survey results

3.2 The woodland habitats on site are largely represented by plantations of shrub species along with young and early-mature trees. Whilst early-mature trees can often have roost potential, they are not as productive (relative to tree roosts) as mature and over-mature specimens. The site contains no over-mature trees, although occasional mature trees were present. Adjacent habitats to the south (Radley Plantation and Pond LWS) provide a higher number of semi-mature and mature tree specimens.

3.3 One tree was identified to possess potential roosting value for bats, described by Table 3.1. The remainder of the trees which may be impacted upon by proposals did not possess any potential suitable features for roosting bats, and as such were considered of negligible suitability for roosting bats. Previous habitat surveys and tree assessments undertaken at the site further verify an overall lack of trees containing features potentially suitable for roosting bats.

Parameter	Result
Tree ref.	T1
Species	Willow
Age	Mature
Height (m)	~12m
Diameter at breast height (m)	~0.5
Potential Roost Feature, Height and Aspect	Woodpecker hole at 3.5m in height from ground level.
Evidence of bats and additional notes	Feature inspected with torch and binoculars. No primary or secondary evidence of bat activity recorded. Full internal inspection of feature could not be completed due to unsuitable ground conditions for ladder usage in the area in combination with the lean of the tree.
Photograph	Photograph 56, Appendix 4
Category of bat roost potential	**Low**

Table 3.1: Summary of Bat Roost Assessment results for trees

3.4 One additional tree was identified to possess low potential value for roosting bats (T2 on Drawing 1820-T2-02 & Photo 57, Appendix 4). This possessed four wound features with resultant exposed rotten heartwood. No significant cavities were noted however this tree has the potential to increase in value with time. As the tree currently possesses low potential value for roosting bats and is located within the centre of an area of woodland/scrub to be retained as part of proposals, this tree was not subject to any further detailed assessment or survey work.

4.0 DUSK BAT EMERGENCE SURVEYS

Buildings

4.1 To establish the presence or likely absence of roosting bats, 344, 348, 458, 460, 462, and 464 Poplars Avenue and their associated outbuildings were subject to one bat dusk emergence survey each.

4.2 The dusk bat emergence surveys were undertaken on 02/07/19, 09/08/19, and 15/07/19. These surveys were undertaken by Lorraine McKee (Project Ecologist and Natural England Class 1 Bat Licence Holder), Paula Bateson (Senior Ecologist and Natural England Class 1 Bat Licence Holder), Maxwell Cooper, Andrew Highlands, Joe Perkins, Katherine Judson (Ecological Field Assistants). David Starkie additionally assisted for safety purposes.

4.3 Raw data from the bat emergence surveys is provided in Appendix 3, including weather conditions. A summary of the results shown in Table 4.1 overleaf.

4.4 The results suggest the likely absence of roosting bats within 344, 348, 458, 460, 462 and 464 Poplars Avenue and their associated outbuildings. The surveys also concluded that the habitats surrounding the buildings are of low value to commuting and foraging bats.

Trees

4.5 Bat Conservation Trust guidance (Collins, 2016) does not recommend subsequent bat surveys on trees with low potential roosting value, however as a precaution a night vision camera was stationed at the Tree T1 to monitor the feature for the duration of the September transect survey work.

4.6 The camera was left in place from 20 minutes prior to sunrise on 19th September 2019 and removed at sunrise on 20th September 2019.

4.7 No bats were seen to enter or emerge from the woodpecker hole within the tree and no bats were seen to fly near or interact with the tree at any point during the overnight survey.

Table 4.1: Summary of Dusk Emergence Bat Survey Results

Residence	Date	Activity survey results
344	02/07/19	No bats were seen to emerge from any potential roosting features. Common pipistrelles were the primary species detected, with soprano pipistrelles being detected only once. No bats were seen during the survey as no bats interacted with the surveyed residence or the garage. Street side bat activity minimal. Low levels of bat activity recorded at nearby treeline and between back gardens.
348	02/07/19	No bats were seen to emerge from any potential roosting features. Common pipistrelles were the primary species detected, with soprano pipistrelles being detected only once. No bats were seen during the survey as no bats interacted with the surveyed residence or the garage. Street side bat activity minimal. Low levels of bat activity recorded at nearby treeline and between back gardens.
458	09/07/19	No bats were seen to emerge from any potential roosting features. Common pipistrelles were the primary species heard, with several noctules being heard along with one soprano pipistrelle. No bats were seen to interact with the primary residence or any outbuildings. Street side bat activity minimal. Low levels of bat activity recorded at nearby treeline and between back gardens.
460	09/07/19	No bats were seen to emerge from any potential roosting features. Common pipistrelles were the primary species heard, with several noctules being heard along with one soprano pipistrelle. No bats were seen to interact with the primary residence or any outbuildings. Street side bat activity minimal. Low levels of bat activity recorded at nearby treeline and between back gardens.
462	15/07/19	No bats were seen to emerge from any potential roosting features. Common pipistrelles were the primary species heard, with occasional noctules. No bats were seen to interact with the primary residence or any outbuildings. Street side bat activity minimal. Low levels of bat activity recorded at nearby treeline and between back gardens.
464	15/07/19	No bats were seen to emerge from any potential roosting features. Common pipistrelles were the primary species heard, with occasional noctules and one occurrence of a soprano pipistrelle. No bats were seen to interact with the primary residence or any outbuildings. Street side bat activity minimal. Low levels of bat activity recorded at nearby treeline and between back gardens.

5.0 REFERENCES

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APPENDIX 1

Legend

- Site boundary
- Building/strcuture of low potential value for roosting bats subject to nocturnal emergence survey - negative result
- Building/structure of negligible potential value for roosting bats
- No access

464

462

460

458

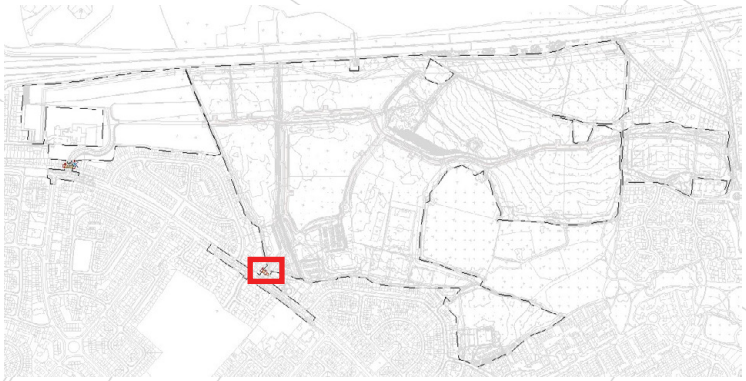
456

0 2.5 5 10 Metres

Bat Roost Survey Plan & Results - 1 of 2

Drawing: 1820-T2-01A
By: PB
Date: Jan 2020
Site name: Site at Peel Hall, Warrington

appletons



N

Legend

- Site boundary
- Building/strcuture of low potential value for roosting bats subject to nocturnal emergence survey - negative result
- Building/structure of negligible potential value for roosting bats
- No access

350

348

346

344

0 2.5 5 10 Metres

Bat Roost Survey Plan & Results - 2 of 2

Drawing: 1820-T2-01B
By: PB
Date: Jan 2020
Site name: Site at Peel Hall, Warrington

appletons

N

T2

T1

0 87.5 175 350 Metres

Legend

Site boundary

Tree with low potential value for roosting bats. Subject to nocturnal emergence survey - negative result

Tree groups with negligible potential value for roosting bats

Bat Roost Survey of Trees

Drawing: 1820-T2-02
By: PB
Date: Jan 2020
Site name: Site at Peel Hall, Warrington

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APPENDIX 2

Table A2.1: External assessment of residences surveyed on Poplar Avenue (continues)

Property	Building Features and Condition	Potential value for roosting bats/evidence of bat usage
344	Brickwork: • Good condition with negligible mortar loss.	Brickwork: No potential roosting features within building brickwork.
	Roof: • Hipped roof, end of terrace. • Occasional gaps under ridge tiles on hipped roof. • Slight gap between chimney and roof ridge tile with occasionally lifted slates.	Roof: Low number of gaps potentially suitable for individual crevice dwelling bats. No evidence of bat presence recorded from ground level however features could not be fully inspected owing to height.
	Windows: • Functional & good condition.	Windows: No potential roosting features present.
	Porch: • Enclosed porch present, of wood and glass construction with a tiled roof (see Photograph 1). • Gap present at driveway side porch eave (see Photograph 4).	Porch: Low number of gaps potentially suitable for individual crevice dwelling bats. All gaps fully inspected and no evidence of bat presence identified.
	Eaves: • Eaves overhang the wall with plastic lining exposed by design. • Tears present in exposed (by design) plastic weave to the front of the building (see Photograph 3).	Eaves: Tears considered of negligible potential value as potential roosting features owing to plastic weave material
	Additional notes: • Security light present. • Birds nest present in gutter	Additional notes: Security light decreases potential value of property for roosting bats. Liming from birds nest indicates potential access point into the loft void (see Photograph 2).
346	No access See 'additional notes' for 348.	Potential value for roosting bats unknown
348	Brickwork: • Good condition. • Negligible mortar loss.	Brickwork: No potential roosting features within building brickwork.
	Roof: • Slates generally in good condition (see Photograph 5). • One slate was missing close to the ridge and another slate was broken midway down the pitch, both on the southern aspect. • Occasional gaps present beneath ridge tiles. • Lead flashing lifted at base of chimney; chimney in otherwise good condition	Roof: Low number of gaps potentially suitable for individual crevice dwelling bats. No evidence of bat presence recorded from ground level, however features could not be fully inspected owing to height. Lead flashing lifted at base of chimney.
	Windows: • uPVC – Functional and in good condition.	Windows: No potential roosting features present.
	Porch: • A small porch was present around the front door. • This was of brick construction with a slate roof and a uPVC door and windows (see Photograph 6). • To the rear of the property a small porch of glass, wood and brick was present with a sheet plastic roof (see Photograph 7).	Porch: No potential roosting features present.

Table A2.1: External assessment of residences surveyed on Poplar Avenue (continues)

Property number	Building Features and Condition	Potential value for roosting bats / evidence of bat usage
348	Eaves: • Boarded with wooden boxed soffits. • Soffits had a continuous narrow (<1.5cm) gap present between the brick wall top and the boarding along the eastern half of the eaves on the southern elevation. This feature was blocked with cobwebs. • The soffit ended at the adjacent properties and didn't appear to be capped (see Photograph 8).	Eaves: Cobwebs along the continuous narrow gap indicates no recent usage by fauna such as bats. The uncapped soffit may provide a potential ingress point for bats and breeding birds into the soffit, however the feature was relatively open in terms of suitability for crevice dwelling bats. No evidence of bat usage recorded, however feature not fully inspected owing to height.
	Conservatory: • Of brick, glass and wood construction with a sheet plastic roof joined to the house by lead flashing. • The lead flashing was lifted in an upwards direction.	Conservatory: The crevice features created by the lifted lead flashing were exposed to the elements and thus of negligible value to roosting bats. No other potential features for bats were recorded associated with the conservatory.
	Alleyway: • Present between 346 and 348 Poplars Avenue providing access from the front to the rear garden of the properties (see Photographs 53 and 54). • Approximately 1.5m wide and 2.25m tall • Red brick construction with a cement ceiling. The brickwork was in good condition with negligible mortar loss.	Alleyway: No potential roosting features present.
458	Brickwork: • Good condition. • Negligible/minor mortar loss.	Brickwork: No potential roosting features within building brickwork.
	Roof: • Hipped roof, end of terrace. • Ridge tiles in generally good condition. • Slight lift around lead flashing around the chimney. • One broken slate was present on the porch roof, just above guttering, with occasional lifted slates present (see Photograph 10).	Roof: Low number of gaps present potentially suitable for individual crevice dwelling bats. No evidence of bat presence recorded from ground level, however features could not be fully inspected owing to height.
	Windows: • uPVC – Functional and in good condition.	Windows: No potential roosting features present.
	Porch: • Open porch present with a slate roof and brick pillars supporting (see Photograph 9).	Porch: One broken slate was present on the porch roof, just above guttering, with occasional lifted slates present (see Photograph 10).
	Eaves: • Sloping boxed soffits around house in generally good condition. • Where gaps were present, cobwebs were obvious. • Guttering attached to boxed soffit.	Eaves: Low number of gaps present potentially suitable for individual crevice dwelling bats, however cobwebs at these gaps indicate no recent usage by fauna such as bats.
	Extension (continues): • Single storey extension of brick construction with a flat bitumen covered roof with a parapet of approximately 10cm. • The walls and roof were in generally good condition with negligible mortar loss.	Extension: The wide gap present behind the cladding and gutterboard was blocked by dense cobwebs all the way around indicating a lack of disturbance by bats. No other potential features for bats were recorded associated with the extension.

Table A2.1: External assessment of residences surveyed on Poplar Avenue (continues)

Property number	Building Features and Condition	Potential value for roosting bats / evidence of bat usage
458	• Light moss covered the roof. • A uPVC gutterboard was present, with uPVC cladding on one side of the extension. A wide gap was present under the cladding and gutterboard. • A security light was present on the northern aspect of the extension.	
	Additional notes: • This building has an attached garage (see Photograph 11).	Additional notes: Discussed in Table 2.4.
460	Brickwork: • Good condition. • Negligible/minor mortar loss.	Brickwork: No potential roosting features within building brickwork.
	Roof: • Hipped roof, end of terrace. • Generally good condition with well mortared ridge tiles (see Photograph 12). • Slightly lifted slates occasional throughout roof. Gap under lead flashing at chimney.	Roof: Low number of gaps present potentially suitable for individual crevice dwelling bats. No evidence of bat presence recorded from ground level however features could not be fully inspected owing to height.
	Windows: • uPVC in good condition.	Windows: No potential roosting features present.
	Porch: • None present	-
	Eaves: • Sloping boxed soffits around house (see Photograph 13). No gaps noted.	Eaves: No potential roosting features within soffits.
462	Brickwork: • Good condition. • Negligible/minor mortar loss.	Brickwork: No potential roosting features within building brickwork.
	Roof: • Good condition. • Ridge tiles mortared well (see Photograph 14). • Slightly lifted slates occasional throughout roof. • Lifting in lead flashing at the front of the house.	Roof: Low number of gaps present potentially suitable for individual crevice dwelling bats. No evidence of bat presence recorded from ground level however features could not be fully inspected owing to height.
	Windows: • uPVC – Functional and in good condition.	Windows: No potential roosting features present.
	Porch: • None present	Porch: -
	Eaves (continues): • Boxed wooden soffits with metal grills at front of house in very good condition. • To rear, no soffit; gutterboard only with overhanging eaves and exposed plastic lining.	Eaves: Gap where wall meets eaves wall along rear of house which may provide access into loft. No evidence of bat presence recorded from ground level however features could not be fully inspected owing to height.

Table A2.1: External assessment of residences surveyed on Poplar Avenue (continued)

Property number	Building Features and Condition	Potential value for roosting bats / evidence of bat usage
462	• Gap where wall meets eaves wall along rear of house which may provide access into loft. • Plastic lining at eaves exposed by design and occasionally torn (see Photograph 15).	
	Alleyway: • Present between 462 and 464 Poplars Avenue providing access from the front to the rear garden of the properties (see Photographs 53 and 54). • Approximately 1.5m wide and 2.25m tall • Red brick construction with a cement ceiling. The brickwork was in good condition with negligible mortar loss. • Grilled vent present into potential wall cavity (see Photograph 55).	Alleyway: The grilled vent was considered to be of negligible value to roosting bats due to the small size of the gaps in the grill. No other potential roosting features recorded.
464	Brickwork: • Moderate mortar loss but largely superficial, with only one or two potential deeper gaps. • Mortar loss higher towards the 466 side, but still considered to be shallow and superficial.	Brickwork: Deeper gaps caused by mortar loss may provide potential suboptimal features for roosting bats. No evidence of recent usage recorded by the survey.
	Roof: • Good condition overall (see Photograph 16). • Some mortar loss under ridge tiles.	Roof: Low number of gaps present potentially suitable for individual crevice dwelling bats. No evidence of bat presence recorded from ground level however features could not be fully inspected owing to height.
	Windows: • uPVC – Functional and in good condition.	Windows: No potential roosting features present.
	Porch: • None present	Porch: -
	Eaves: • Wooden boxed soffits with metal grills are present to the front of the house. One end (next to 462) is open with obvious liming from birds present (see Photograph 17). • To the rear the eaves overhang with a gutterboard and exposed (by design) plastic lining. • Plastic lining at eaves exposed by design and occasionally torn.	Eaves: Nesting birds within the eaves to the rear indicate a gap between the eaves and the wall, similar to that seen at neighbouring 462 although this could not be directly observed from ground level at 464. Tears considered of negligible potential value as potential roosting features owing to plastic weave material
	Additional notes: • A starling was seen to leave the uncapped soffit during the survey. • Liming was seen around a drainpipe indicating nesting birds (see Photograph 18).	Additional notes: -

Table A2.2: Internal assessment of residences surveyed on Poplar Avenue (continues)

Property number	General Description	Partition Wall/s	Sarking	Potential bat access points into loft space	Evidence of roosting bats
344	• Loft space floor 75% boarded. • Used as storage space. • Relatively clean. • Water damage on hipped side of roof. • Mouse and rat droppings were present with shredded papers. • Apex height: 1m • Width by length: 6x8m. • Restricted height due to hipped roof • Beams in good condition with no splits recorded.	Partition wall of redbrick and large block construction with a chimney flue in the centre of the wall. Gaps of over 30cm in size were present between wall top and underside of roof (see Photograph 19). Due to the size of these gaps, property 344 was considered to be sharing loft space with the adjacent property (346) in terms of bat access.	Occasional tears in plastic lining (see Photograph 20) may provide potential crevice dwelling features for bats, however woven plastic is suboptimal as a material for roosting bats in terms of entanglement.	Potential access point to interior via a small hole near the roof apex. This hole was blocked by dense cobwebs indicating a lack of recent usage by bats. This was the only area of light ingress noted. Evidence of liming left by birds was present near partition wall, indicative of access points to the outside that were potentially hidden by rock wool at eaves, or within the adjacent residence (see Photograph 21).	Loft space fully inspected, and no evidence of bat activity recorded.
346	No access	No access. Loft directly connects to Property 344 via gaps above partition wall (see above).	No access	No access	No access
348	• Loft space floor boarded to eaves. Space generally clean. • Low number of household items stored in the loft space. • Rock wool exposed at the eaves. • Apex height: 1.5m • Width by length: 6x8m • Cobwebs common within the beam apexes. • A low number of mouse droppings were present in the space. • Beams in good condition with no splits recorded	Two partition walls were present as this is a mid-terrace property. The western wall (shared with 350 Poplars Avenue) was of brick and large block construction which was flush to the rafters (Photograph 22). However, numerous gaps were present within this wall in general where mortar had broken away. No evidence of potential bat usage was found upon inspection. The eastern wall (shared with 346 Poplars Avenue) was clad with thick insulation material which blocked any potential gaps present (see Photograph 23).	Plastic lining in notably good condition.	No access points to the exterior were recorded internally, however small mammals could conceivably gain access to the loftspace from the adjacent property via the holes in the western partition wall. No light ingress was recorded.	Loft space fully inspected, and no evidence of bat activity recorded.
458	• Loft space floor boarded almost throughout. Space generally clean. • Moderately cluttered with household items. • Cobwebs were common within the beams (see Photograph 24). • Apex height: 1m • Width by length: 6x8m	Partition wall of large block construction with a chimney flue in the centre of the wall. The wall extended to the roof and was well-mortared with occasional shallow gaps of negligible potential for roosting bats. One large former pipe hole leading to the adjacent property was present in the wall (see Photograph 25). Cobwebs were present across this hole and a draft was felt.	An overlap was present within the plastic weave material, providing a potential roosting feature (see Photograph 26).	No obvious access points to the exterior were seen internally, however small mammals could conceivably gain access to the loftspace from the adjacent property via the hole in the partition wall (see Photograph 25). No light ingress was recorded.	Loft space fully inspected, and no evidence of bat activity recorded.

Table A2.2: Internal assessment of residences surveyed on Poplar Avenue (continues)

Property number	General Description	Partition Wall/s	Sarking	Potential bat access points into loft space	Evidence of roosting bats
458	• Restricted height due to hipped roof A split was present within the ridgebeam. Upon inspection it was found to be shallow and of negligible value to roosting bats. • Extension roof space: an active living space at the time of survey.				
460	• No floor boarding present; crawl boards required. • Rock wool dense and ~30cm deep; reinsulated in 2011. • Moderately clean. • Evidence of water damage near the chimney breast (see Photograph 27). • Beams in good condition with no splits recorded • Apex height: 1.5m Width by length: 8.5x8m	Partition wall of large block and redbrick construction which was fairly flush to the rafters in this location. The chimney flue was present in the centre of the partition wall, with a layer of rendering over the top of most of the flue. Gaps present where purlins went through the partition wall (see Photograph 27).	The lining was in generally poor condition with several large tears near the hatch entry point, though it should be noticed that these were densely cobwebbed (see Photograph 28).	Whilst no light ingress was recorded, a draft was noticed near tears in the plastic lining.	Loft space fully inspected, and no evidence of bat activity recorded, although difficult to fully inspect due to the depth of rockwool.
462	• No floorboards present; crawl boards required. • Access restricted. • Relatively clean with a layer of dust. • Rock wool dense and ~30cm deep. • Apex height: 1.5m • Width by length: 8.5x8m • Beams in good condition with no splits recorded • The space was warm.	Two partition walls were present. Both walls were of a large block and redbrick construction. A chimney flue was present in the partition shared with 460, with a layer of rendering over the top of most of the flue. Gaps present where the purlins went through the partition wall. Wall was fairly flush to the rafters in this location (see Photograph 29). The partition wall shared with 464 had a gap along the length of the top of the wall which varied in size between 10cm-25cm (see Photograph 30). This loft space was therefore seen as interconnected with the loft space of 464 Poplars Avenue (with respect to bats) due to the size and length of this gap.	Lined with plastic throughout loft space. One area of removed plastic recorded which allowed a pipe access to the outside. This exposed the underside of adjacent roof slates.	Whilst no daylight could be seen, a draft was present in the loft space. Gaps were present around a pipe through the roof however, these gaps were blocked with dense cobwebs (see Photograph 31).	Loft space fully inspected, and no evidence of bat activity recorded, although difficult to fully inspect due to the depth of rockwool.

Table A2.2: Internal assessment of residences surveyed on Poplar Avenue (continued)

Property number	General Description	Partition Wall/s	Sarking	Potential bat access points into loft space	Evidence of roosting bats
464	• No floorboards present; • Rock wool dense and ~30cm deep. Moderately clean. • Cluttered with large household items including a sofa, a mattress and several full bin bags (see Photograph 32). • Apex height: 1.5m Width by length: 8.5x8m	Partition walls of redbrick and large block construction with a chimney flue in the centre of the wall. The partition wall shared with 462 had a gap along the length of the top of the wall which varied in size between 10cm-30cm (see Photograph 33). This loft space was therefore seen as interconnected with the loft space of 462 Poplars Avenue (with respect to bats) due to the size and length of this gap. The partition wall shared with 466 Poplars Avenue was in good repair with holes found to be stopped up. Occasional small gaps were present towards the apex and eaves (see Photograph 32).	One large tear was present in the plastic lining.	A slight draft was present, coming from 462.	Loft space fully inspected, and no evidence of bat activity recorded, although difficult to fully inspect due to large items being stored in the space.

Table A2.2: Internal assessment of residences surveyed on Poplar Avenue

Table A2.3: Assessment of outbuildings associated with residences surveyed on Poplar Avenue (continues)

Property Number	Outbuilding Description	Potential access points / roosting features	Suitability for roosting bats
344	• Shed of wood panel and concrete construction with a single pitch single-skinned roof. • Roof of corrugated concrete asbestos. • Ridgebeam present to the interior of the roof (see Photograph 34). • Usage: Storage (Rarely disturbed) • Doors were wood panelled; windows were of glass with wood frames. The building itself was neglected but structurally sound.	No external potential roosting features. Large gap present above doors providing access to interior (see Photograph 35). Significant gaps at ridge peak, although the roof itself was mossy and showed no sign of access disturbance. Gap present where walls and roof met; highly cobwebbed indicating a lack of disturbance.	No potential roosting features for crevice dwelling bats. Light environment owing to windows resulted in a suboptimal day roost for species such as brown long-eared bats. Potential value as a night feeding roost or similar for brown long-eared bats, however no feeding remains or other evidence of bat usage recorded.
348	• Brick outbuilding contemporaneous with house with a small wooden lean-to shed. • Both the brick outbuilding and the wooden lean-to shed had flat roofing covered with bitumen. • Mortar and wood both in good condition. • The interior of both was boarded (see Photograph 36). • A security light was present on the brick outbuilding. • Both the brick outbuilding and the wooden lean-to shed were relatively undisturbed, evident from hanging cobwebs. • Doors and window frames were of wood. Windows were of glass. The wooden lean-to shed was without windows.	No external potential roosting features. A small gap between the roof and the wall tops was present on both the lean to and the brick outbuilding which could be utilised as access points to the internal space by bats (see Photograph 38). Both gaps densely cobwebbed, although the brick outbuilding was also ivy-covered in parts making it difficult to inspect the gap (see Photograph 37). This ivy was thin-stemmed and possessed no potential roosting features.	The only gaps into the building were blocked with dense cobwebs indicating a lack of usage by bats.
458	• A brick garage built onto the side of the house. • Relatively new with negligible mortar loss within brickwork. • One security light present to the rear. • Dead ivy occasionally present, though these stems were the remnants of removal. • Roof was flat with parapet to the west (see Photograph 40). • PVC gutterboard present. • The front aspect of the roof went up at a 90° angle and was slate covered to the southern aspect (see Photograph 41). • No windows present. • The front of the building featured a typical residential garage door; to the rear was a wooden framed door. • The roof interior was boarded and showed a steel beam construction (see Photograph 42). • Usage: Frequent human disturbance	Large gaps were present around the top and sides of the garage door which could grant access to the interior of the garage. Interior of the garage was lacking in crevice features. Slates at the front of the garage were shared with the porch frontage; porch frontage had broken and lifted slates (see Photograph 10).	No potential roosting features for crevice dwelling bats. Has potential value as a night feeding roost or similar for brown long-eared bats, however space frequently disturbed and no feeding remains or other evidence of bat usage recorded.

Table A2.3: Assessment of outbuildings associated with residences surveyed on Poplar Avenue (continued)

Property Number	Outbuilding Description	Potential access points / roosting features	Suitability for roosting bats
460	• A brick outbuilding contemporaneous with the construction of the house (see Photograph 43) and an additional garage were present (see Photograph 44). • Both were unused at the time of the survey as the residence was unoccupied. • Building interior was very light owing to the presence of a window on the western aspect of the garage (see Photograph 47). • No access was possible to the interior of the garage due to both structural safety and asbestos concerns. • The garage had a flat roof with corrugated asbestos sheeting laid atop. • A very slight (2.5cm) parapet was present, along with wooden bargeboards. The bargeboards had a deep gap, which due to the size was of negligible value to roosting bats. Ivy grew along the eastern aspect. • The front of the garage bore a wooden façade • The garage had a standard metal garage door and a wooden door, which was hanging at a distinct angle (see Photograph 45). • The brick outbuilding had negligible mortar loss with obvious repairs to the mortar on the eastern aspect.	One cobwebbed hole found ~1.5m up the western wall which provided access to the interior of the building (see Photograph 46). A wide gap was present where the roof of the brick outbuilding met the walls. This gap was shallow and densely cobwebbed and considered to be of negligible value to roosting bats One hole which provided access into the brick outbuilding was present between the bricks; however, this was densely cobwebbed and was considered to be of negligible value to roosting bats. A wide gap was present under the bargeboards of the garage outbuilding, which was partially cobwebbed and occasionally obscured by ivy.	All gaps into the internal space were blocked with dense cobwebs, aside from occasional gaps behind bargeboards. Ivy cover also presents a potential roosting feature, although no obvious sheltered features between stems were recorded, ivy foliage could obscure potential features.
462	• A brick outbuilding contemporaneous with the construction of the main residence. • This building was semi-detached and shared a wall with the adjacent property (464) (see Photograph 48). • Roof was flat, bitumen covered, with a slight slope. An additional security light was present on the northern aspect. • A gutter affixed to a gutter board was present on the northern aspect. • The interior of the building was wood panelled with a plastic liner stapled to the wood. The roof showed signs of dampness (see Photographs 49 and 50). • Usage: Occasional disturbance • The outbuilding had a glass window with a wooden door and wooden frames on both.	Minor mortar loss was present on the western aspect; however this was directly beneath a security light and thus unsuitable for roosting bats. A wide gap was present where the roof of the brick outbuilding met the walls. This gap was shallow and densely cobwebbed and considered to be of negligible value to roosting bats.	No potential roosting features for crevice dwelling bats or access points into the internal space.

Table A2.3: Assessment of outbuildings associated with residences surveyed on Poplar Avenue (continued)

Property Number	Outbuilding Description	Potential access points / roosting features	Suitability for roosting bats
464	• A brick outbuilding contemporaneous with the construction of the main residence. This building was semi-detached and shared a wall with the adjacent property (462) (see Photograph 51). Roof was flat, bitumen covered, with a slight slope. Unlike the adjacent building, no security light or guttering was present. • The building had a wooden door with wooden frame and a glass window with a PVC frame. • No access to the interior was possible. • Usage: Unknown	Minor mortar loss was present on the northern aspect, although this did not lead into the interior of the building and was shallow. On the northern aspect, paint was peeling from the gutterboard and a slight gap was present on the northern aspect where part of the bitumen had deteriorated away. A small hole (~3cm x ~3cm) was present within a metal service pipe leading from the house to the outbuilding (see Photograph 52). This was inspected and no evidence of bats was found. This feature is considered suboptimal for roosting bats due to the heat conductivity properties of metal.	All potential external features were inspected and no evidence of bat usage was recorded. One small gap was present into the internal space, which could not be accessed.

APPENDIX 3

Emergence/Re-entry Form

Project: 1820 Peel Hall (344 Poplars Avenue)		**Date: 2nd July 2019**	**Lead Surveyor: LM**
Temperature (st-fin): 16-15	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry – Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 21:27	**Survey End: 23:12**	**Sunset Time: 21:42**	**Detector used: EM Touch & Duet**

Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc	Surveyor
22:04	Common pipistrelle x1	1	Heard only	AH (Back)
22:17	Common pipistrelle x1	1	Heard only	AH (Back)
22:17	Common pipistrelle x1	1	Heard only	LM (Front)
22:19	Common pipistrelle x1	1	Heard only	AH (Back)
22:19	Common pipistrelle x1	1	Heard only	LM (Front)
22:30	Common pipistrelle x1	1	Heard only	LM (Front)
22:30	Common pipistrelle x1	1	Heard only	AH (Back)
22:35	Common pipistrelle x1	1	Heard only	AH (Back)
22:38	Common pipistrelle x1 Soprano pipistrelle x1	1 1	Heard only; feeding buzzes; perhaps in ash tree behind.	LM (Front)
22:38	Common pipistrelle x1 Soprano pipistrelle x1	1 1	Heard only	AH (Back)
22:40 – 22:44	Common pipistrelle x1	10	Heard only	AH (Back)
22:45	Common pipistrelle x1	4	Heard only	AH (Back)
22:45	Common pipistrelle x1	2	Heard only	LM (Front)
22:48 – 22:49	Common pipistrelle x1	8	Heard only	AH (Back)
22:50	Common pipistrelle x1	2	Heard only	LM (Front)
22:50	Common pipistrelle x1	3	Heard only	AH (Back)
22:51	Common pipistrelle x1	2	Heard only	LM (Front)
22:51	Common pipistrelle x1	3	Heard only	AH (Back)
22:53 – 22:54	Common pipistrelle x1	6	Heard only	AH (Back)
22:55	Common pipistrelle x1	1	Heard only	LM (Front)
23:00	Common pipistrelle x1	5	Heard only	AH (Back)
23:03 – 23:10	Common pipistrelle x1	Multiple	Passes heard only; intermittent calling, but every minute continuously over these 6 minutes. Suspect calls coming from wooded area behind	AH (Back)
23:11	Common pipistrelle x1	1	Heard only	LM (Front)
Summary: Common pipistrelles were the primary species heard, with soprano pipistrelles being heard only once, but by both surveyors. No bats were seen to interact with the primary residence or the garage, which were easily surveyed. Activity streetside was minimal with low levels of activity present, likely around the rear treeline, in the back garden. No bats were seen during the survey, putting them likely behind the surveyors, in hard to spot places.				

Emergence/Re-entry Form

Project: 1820 Peel Hall (348 Poplars Avenue)		**Date: 2nd July 2019**	**Lead Surveyor: LM**
Temperature (st-fin): 16-15	**Wind speed (st-fin):F1-F1**	**Precipitation (st-fin): Dry – Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 21:27	**Survey End: 23:12**	**Sunset Time: 21:42**	**Detector used: EM Touch**

Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc	Surveyor
22:04	Common pipistrelle x1	1	Heard only, foraging – likely in trees/shrubs at end of garden	JP (Back)
22:17	Common pipistrelle x1	1	Heard only	JP (Back)
22:19	Common pipistrelle x1	1	Heard only; likely passing behind?	AC (Front)
22:30	Common pipistrelle x1	1	Heard only; faint	AC (Front)
22:38	Common pipistrelle x1	1	Heard only	AC (Front)
22:42	Common pipistrelle x1	1	Heard only	JP (Back)
22:45	Common pipistrelle x1	2	Heard only	AC (Front)
22:49	Common pipistrelle x1 Soprano pipistrelle x1	1 1	Heard only; foraging Heard only; foraging	JP (Back)
22:50	Common pipistrelle x1	2	Heard only	AC (Front)
22:50	Common pipistrelle x1	1	Heard only	JP (Back)
22:55	Common pipistrelle x1	1	Heard only	AC (Front)
23:07	Common pipistrelle x1	2	Heard only; foraging	JP (Back)
23:08	Common pipistrelle x1	1	Heard only	JP (Back)
Summary: Common pipistrelles were the primary species heard, with soprano pipistrelle being heard only once by one surveyor. No bats were seen to interact with the primary residence or any outbuilding. Activity streetside was minimal with similarly minimal levels of activity present, likely around the rear treeline, in the back garden. No bats were seen during the survey and were likely behind the surveyors.				

Emergence/Re-entry Form

Project: 1820 Peel Hall (458 Poplars Avenue)		**Date: 9th July 2019**	**Lead Surveyor: LM**
Temperature (st-fin): 21-18	**Wind speed (st-fin):F1-F1**	**Precipitation (st-fin): Dry – Dry**	**Cloud cover (st/fin): 70%-70%**
Survey Start: 21:22	**Survey End: 23:07**	**Sunrise/Sunset Time: 21:37**	**Detectors used: EM Touch**

Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc	Surveyor
22:05	Common pipistrelle x1	1	Heard only	LM (Front)
22:07	Noctule x1	1	Distant pass heard only	LM (Front)
22:08	Noctule x1	1	Heard only	MC (Rear)
22:09	Common pipistrelle x1	1	Flew between 458 and 460, going north	LM (Front)
22:09	Common pipistrelle x1	1	Heard only	MC (Rear)
22:14	Common pipistrelle x1	1	Distant pass heard only	LM (Front)
22:14	Common pipistrelle x1	1	Heard only	MC (Rear)
22:21	Common pipistrelle x1	1	Flew east to west down the street along the treeline	LM (Front)
22:34	Noctule x1	2	Heard only	LM (Front)
22:34	Noctule x1	4	Heard only	MC (Rear)
22:56	Noctule x1	1	Heard only	MC (Rear)
23:03	Common pipistrelle x1	1	Heard only	MC (Rear)
23:05	Common pipistrelle x1	1	Heard only	MC (Rear)
23:06	Soprano pipstrelle x1	1	Heard only	LM (Front)
23:07	Noctule x1	1	Heard only	MC (Rear)
Summary: Common pipistrelles were the primary species heard, with several noctules being heard along with one soprano pipistrelle. No bats were seen to interact with the primary residence or any outbuildings. Activity streetside was minimal with similarly minimal levels of activity present in the back garden, likely around the rear treeline.				

Project: 1820 Peel Hall (460 Poplars Avenue)		Date: 9th July 2019	Lead Surveyor: LM
Temperature (st-fin): 21-18	Wind speed (st-fin):F1-F1	Precipitation (st-fin): Dry – Dry	Cloud cover (st/fin): 70%-70%
Survey Start: 21:22	Survey End: 23:07	Sunrise/Sunset Time: 21:37	Detectors used: EM Touch

Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc	Surveyor
22:05	Common pipistrelle x1	1	Low flying pass/commuting from between 458 and 460	AH (Rear)
22:05	Common pipistrelle x1	1	Heard only	JP (Front)
22:05	Noctule x1	1	Heard only	JP (Front)
22:08	Noctule x1	1	Heard only	AH (Rear)
22:08	Noctule x1	1	Heard only	JP (Front)
22:09	Common pipistrelle x1	1	Heard only	AH (Rear)
22:14	Common pipistrelle x1	1	Commuting; passing between 458 and 460, heading north	JP (Front)
22:22	Common pipistrelle x1	1	Heard only	JP (Front)
22:34	Noctule x1	4	Heard only	AH (Rear)
22:34	Noctule x1	5	Flying high over the road	JP (Front)
23:03	Common pipistrelle x1	2	Heard only	AH (Rear)
23:05	Common pipistrelle x1	1	Heard only	AH (Rear)
23:05	Soprano pipistrelle x1	1	Heard only	AH (Rear)
23:06	Soprano pipistrelle x1	1	Heard only	JP (Front)
23:07	Noctule x1	2	Heard only	AH (Rear)
Summary: Common pipistrelles were the primary species heard, with several noctules being heard along with one soprano pipistrelle. No bats were seen to interact with the primary residence or any outbuildings. Activity streetside was minimal with similarly minimal levels of activity present, likely around the rear treeline, in the back garden.				

Project: 1820 Peel Hall (462 Poplars Avenue)		Date: 15th July 2019	Lead Surveyor: LM
Temperature (st-fin): 21-18	Wind speed (st-fin):F1-F1	Precipitation (st-fin): Dry – Dry	Cloud cover (st/fin): 75%-75%
Survey Start: 21:16	Survey End: 23:04	Sunrise/Sunset Time: 21:32	Detectors used: EM Touch

Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc	Surveyor
21:39	Common pipistrelle x1	1	Distant pass, heard only	LM (Front)
21:44	Noctule x1	1	Heard only	KJ (Rear)
22:02	Common pipistrelle x1	1	Foraging around the back tree line	KJ (Rear)
22:09	Common pipistrelle x1	1	Flew south between the gap in 458 and 460, around the ash tree, then west	LM (Front)
22:09	Common pipistrelle x1	1	Heard only	KJ (Rear)
22:24	Common pipistrelle x1	1	Flew south between the gap in 458 and 460; flew south towards ash tree	LM (Front)
22:35	Noctule x1	1	Distant pass, heard only	LM (Front)
22:35	Noctule x1	1	Heard only	KJ (Rear)
22:49	Common pipistrelle x1	1	Heard only	KJ (Rear)
22:51	Common pipistrelle x1	1	Heard only	LM (Front)
22:53	Common pipistrelle x1	1	Distant pass, heard only	LM (Front)
22:57	Common pipistrelle x1	2	Heard only	KJ (Rear)
22:57	Noctule x1	1	Distant pass, heard only	LM (Front)
22:58	Common pipistrelle x1	2	Heard only	LM (Front)
23:01	Common pipistrelle x1	1	Heard only	LM (Front)
Summary: Common pipistrelles were the primary species heard, with occasional noctules. No bats were seen to interact with the primary residence or any outbuildings. Activity streetside was minimal with similarly minimal levels of activity present in the back garden, likely around the rear treeline.				

Project: 1820 Peel Hall (464 Poplars Avenue)		Date: 15th July 2019	Lead Surveyor: LM
Temperature (st-fin): 21-18	Wind speed (st-fin):F1-F1	Precipitation (st-fin): Dry – Dry	Cloud cover (st/fin): 75%-75%
Survey Start: 21:16	Survey End: 23:04	Sunrise/Sunset Time: 21:32	Detectors used: EM Touch

Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc	Surveyor
22:09	Common pipistrelle x1	1	Heard only	MC (Front)
22:09	Common pipistrelle x1	1	Commuting/foraging along back row of trees	AH (Rear)
22:09	Soprano pipistrelle x1	1	Heard only	AH (Rear)
22:23	Noctule x1	1	Heard only	MC (Front)
22:27	Common pipistrelle x1	1	Heard only	AH (Rear)
22:35	Noctule x1	1	Heard only	MC (Front)
22:35	Noctule x1	1	Heard only	AH (Rear)
22:49	Common pipistrelle x1	1	Heard only	MC (Front)
22:51	Common pipistrelle x1	1	Heard only	AH (Rear)
22:52	Noctule x1	1	Heard only	AH (Rear)
22:53	Common pipistrelle x1	1	Foraging along back row of trees	AH (Rear)
22:57	Common pipistrelle x1	1	Heard only	MC (Front
22:59	Common pipistrelle x1	1	Heard only	AH (Rear)
Summary: Common pipistrelles were the primary species heard, with occasional noctules and one occurrence of a soprano pipistrelle. No bats were seen to interact with the primary residence or any outbuildings. Activity streetside was minimal with similarly minimal levels of activity present in the back garden, likely around the rear treeline.				

APPENDIX 4

Photograph 1: Enclosed porch of wood and glass (344 Poplars Avenue)

Photograph 2: Nest in guttering seen from below with liming evident (344 Poplars Ave.)

Photograph 3: Tears in hessian weave as seen from below (344 Poplars Avenue)

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Photograph 5: Roof in generally good condition with only occasional small gaps (348 Poplars Avenue)

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Photograph 10: Broken and lifted slates on porch roof (458 Poplars Avenue)

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Photograph 13: Sloping boxed PVC soffits at 460 Poplars Avenue

Photograph 14: General character of 462 Poplars Avenue

Photograph 15: Gap where wall meets eaves at rear of house (462 Poplars Avenue)

Photograph 16: General character of 464 Poplars Avenue

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Photograph 18: Liming present indicating a gap not visible at ground level between the top of the wall and the eaves (464 Poplars Avenue).

Internal Photos

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Photograph 21: Liming at partition wall indicating a hidden loft access used by birds (344 Poplars Avenue)

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Photograph 24: General character of 458 Poplars Avenue, showing partition wall and chimney breast shared with 456 Poplars Avenue.

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Photograph 32: General character of the loft interior of 464 Poplars Avenue with mattress and furniture storage. Partition wall shared with 466 Poplars Avenue

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Outbuildings and Garages: External and Internal

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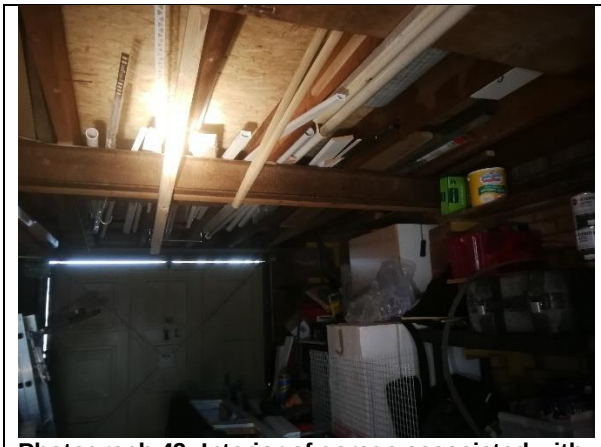
Photograph 39: Interior of lean-to shed associated with 348 Poplars Avenue

Photograph 40: Rear of garage outbuilding associated with 458 Poplars Avenue

Photograph 41: Side view of the front aspect of the garage associated with 458 Poplars Avenue

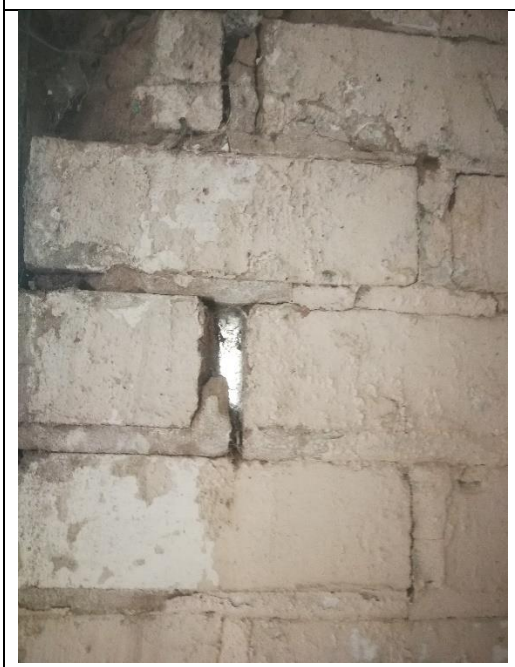


Photograph 42: Interior of garage associated with 458 Poplars Avenue

Photograph 43: Rear of 460 Poplars Avenue with contemporaneous outbuilding on the left of the photograph

Photograph 44: Garage associated with 460 Poplars Avenue (as seen from the upstairs window of 458 Poplars Avenue)

Photograph 45: Front of garage associated with 458 Poplars Avenue with wooden façade; door at an angle



Photograph 46: Cobwebbed gap within outbuilding contemporaneous with 458 Poplars Avenue

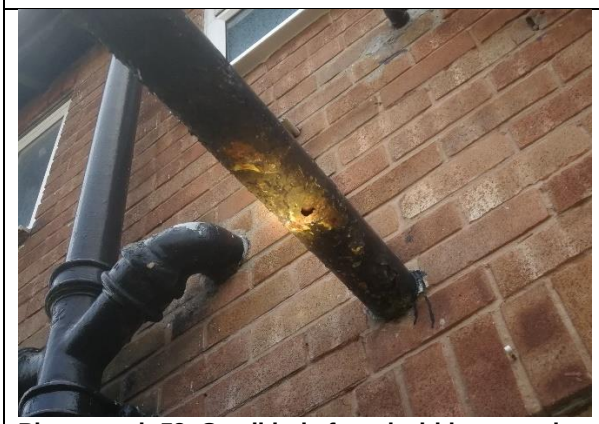
Photograph 47: PVC window on site of garage associated with 458 Poplars Avenue.

Photograph 48: Outbuilding contemporaneous with 462 Poplars Avenue

Photograph 49: Interior of outbuilding contemporaneous with 462 Poplars Avenue

Photograph 50: Roof of outbuilding associated with 462 Poplars Avenue, showing liner and signs of dampness

Photograph 51: General character of outbuilding associated with 464 Poplars Avenue



Photograph 52: Small hole found within a metal service pipe connected to both the residence and the outbuilding associated with 464 Poplars Avenue

Photograph 53: A side alley between 348 and 346 Poplars Avenue

Photograph 54: Interior of the side alley between 462 and 464 Poplars Avenue

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ECOLOGY

ECO 11 2019 Foraging Bat Surveys

APP 1: Figures 1820-T3-01 & -02: Transect routes

APP 2: Figure 1820-T3-03: Overview of common pipistrelle bat activity

Figure 1820-T3-04: Overview of noctule bat activity

Figure 1820-T3-05: Overview of soprano, nathusius & natterer's bat activity

APP 3: Raw transect data

SITE AT PEEL HALL, WARRINGTON

For

SATNAM MILLENNIUM LTD

ECO 11:
BAT ACTIVITY SURVEY

METHODOLOGIES AND RESULTS ONLY

APRIL - SEPTEMBER 2019

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CONTENTS:

The current report comprises the methodologies and survey data of bat activity survey work only. Bat desk study data, an overview of bat activity survey results, an impact assessment of proposals in relation to foraging and commuting bats and a bat mitigation strategy are included in Chapter 6 of the Environmental Statement (March 2020).

1.0 METHODOLOGY

Habitat Suitability Assessment

1.1 The potential value of the habitats on site for bats was assessed using the categories detailed within Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), Table 1.2. This assessment also considers adjacent habitats, and connectivity to suitable roosting and foraging habitats within the wider area. Results from previous bat activity surveys (see Desk Study Report 1820-E1) are also taken into account.

1.2 The habitat suitability assessment was also utilised to map appropriate transect routes, which aimed to incorporate transects within or near each broad habitat type on site, but with focus on linear habitat features of higher potential value to bats.

Table 1.2: BCT Guidelines for assessing the potential suitability of proposed development sites for bats

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

Manual Transect Surveys

1.3 To provide an overall picture of site usage by bats, the site area was subject to a bat activity survey based upon the National Bat Monitoring Programme methodology designed by the Joint Nature Conservation Committee and the Bat Conservation Trust guidelines (Collins, 2016).

1.4 The Habitat Suitability Assessment concluded that the Site at Peel Hall is likely to be of moderate value to commuting and foraging bats. For sites with a moderate suitability for foraging and commuting bats, Bat Conservation Trust guidance (Collins, 2016) recommends one survey visit per month (April to October) in appropriate weather conditions to bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.

1.5 Bat Conservation Trust guidance (Collins, 2016) also recommends that transect surveys are to be combined with monthly automated static bat detector surveys. Automated bat surveys were not undertaken in this instance due to the risk of equipment destruction or theft from the site.

1.6 Monthly manual transect surveys were undertaken between April and September inclusive. Survey visits were scheduled between 3-5 weeks apart. Owing to the size of the site, the survey area was split into seven transect routes, labelled on Drawing 1820-T3-01.

1.7 Transect surveys were undertaken by seven surveyors with an additional person chaperoning for safety purposes. Survey personnel included: Lorraine McKee (Project Ecologist) as lead surveyor, Paula Bateson (Senior Ecologist) and Lorna Cruice, Stuart Walker, David Starkie, Andrew Highlands, Joe Perkins, Katherine Jenkins, Anna Cocker, Max Cooper and Alice O'Grady (Ecologist Field Assistants).

1.8 The transect surveys commenced 20 minutes prior to sunset and continued for approximately 2-2.5 hours. The surveys were undertaken using electronic bat detectors (Echo Meter EM3+ and Echo Meter Touch). Computer analysis of bat detector information collected allowed all species using the site at the time of the surveys to be identified. The dawn transect survey began 2.5 hours prior to sunrise and ended at sunrise exactly.

1.9 Surveyors initially adopted static positions at strategic vantage points to locate commuting activity/routes onto the site. Observations from the vantage points continued for between 20 and 40 minutes after the start of the survey to allow for early emerging bats commuting on to the site following roost emergence; walked transects were then conducted. Each transect route had a total of nine stop points. The transect routes were walked at a slow pace by the surveyors, stopping at each stop point for a period of three minutes. All bat activity encountered by the surveyor during the transect survey was recorded.

1.10 The transect routes were generally repeated each survey visit to ensure consistency in relation to comparison of results between months. Some adaptations were made to transect routes in August and September based on access constraints due to vegetation height and safety concerns (see Paragraph 1.18).

Data Analysis

1.11 Data collected during transects was mapped within MapInfo. Bat calls that were heard only were represented by point data; the flight paths of any seen bats were recorded as polyline data. Each record was mapped by month, species, and transect in order to allow a full analysis. Each occurrence of a bat (heard or seen) was treated as one record or "contact".

Spatial

1.12 Spatial analysis of bat data collected during transects was undertaken using heatmapping within QGis. Each species was given a different colour, with the layer appearance set to multiply so that bat data overlaps could be easily seen. Using this method, darker spots on the map indicate higher levels of bat activity. Contacts were analysed by transect and species.

Temporal

1.13 Temporal data analysis was undertaken as part of the mapping process within MapInfo with additional counts in Excel. Contacts across site were analysed by month and species. It should be noted that spatial and temporal data was also analysed together in order to reveal any additional information.

Time of First Contact

1.14 Times for first contact were recorded in minutes for each species relative to the time of sunset. Raw data alongside a First Contact Time Average per transect per species was used in order to drawn informed conclusions with respect to likely roosting locations.

Qualitative

1.15 Observations of bat activity recorded by surveyors were compiled and reviewed, in terms of number of bats seen, behaviour and flight directions.

Survey constraints

1.16 Bat Conservation Trust guidance (Collins, 2016) recommends that monthly automated surveys are undertaken in conjunction with transect surveys for sites with moderate potential value for foraging/commuting bats. Static bat detectors were not deployed in this instance due to the risk of equipment theft or vandalization.

1.17 Transect routes were started from the same vantage and stop points each visit and walked in the same directions each visit. This approach was undertaken for the purpose of accurately comparing data between months, however it is acknowledged that this approach comes with the inherent risk that areas of bat activity at certain locations and times could be missed, especially given the large size of the site.

1.18 The August and September transect routes were modified for all transects except Transect 1, due to safety concerns with respect to impenetrable vegetation and conditions underfoot. Transects aimed to cover as many original stop points and linear features as possible. All transect routes are shown on Drawings 1820-T3-01 and -02.

1.19 Woodland habitats were not entered into by any of the transect routes owing to safety hazards (e.g. giant hogweed, fly tipping, asbestos and evidence of drug use). Woodland edge habitats were fully surveyed.

1.20 The survey methodology dictates that surveyors stop at stop points for a period of three minutes. Occasionally surveyors stopped for a minute or two longer for a variety of reasons including logistical challenges or attempting to sight a flight path. This was not considered a significant constraint to overall conclusions of the survey work.

1.21 The site was not surveyed during October due to inclement weather conditions. It is acknowledged within the guidance that “April, September and October surveys are weather- and location-dependent. Conditions may become more unsuitable in these months…”.

1.22 Whilst the April transect is cited as dry at both survey start and end, a light shower lasting approximately 15 minutes occurred during the survey. This is considered to be only a minor constraint upon the survey as bats were encountered in expected numbers. It should also be noted that both the September dusk and September dawn surveys were subject to thick mist during sunset and sunrise in some parts of the site, which may influence results (Transects 2, 3, 5, 6, and 7).

1.23 The May transects were undertaken across two separate dates: Transect Routes 2-7 were undertaken on 14th May 2019, whilst Transect 1 was undertaken on 21st May 2019. The survey was split due to reasons of safety due to antisocial behaviour within the park.

1.24 Bats were frequently unsighted and heard only at the north of the site; surveyors reported that they were dazzled by motorway lights in these areas making bats harder to see.

1.25 Each occurrence of a bat (heard or seen) was treated as one record or “contact” in the context of data analysis. This may result in the over-representation of species with short wavelength echolocation, and underrepresentation of bat species with long wavelength echolocation. For example, one pipistrelle bat foraging along the length of a hedgerow may be recorded as several separate bat passes, whereas continuous noctule activity may only be recorded as one contact if the bat does not go out of range.

1.26 All of the above constraints are taken into account within all conclusions, discussions and impact assessments in relation to foraging and commuting bats.

2.0 HABITAT SUITBILITY ASSESSMENT

2.1 The site comprises a series of large abandoned arable fields colonised by extensive stands of tall ruderal vegetation and scrub, with outgrown hedgerows and ditches as field boundaries. Other habitats include immature broad-leaved woodland and a number of small ponds. The habitats on site were considered suitable foraging and commuting habitats for bat species associated with edge-habitats such as pipistrelle species and bats associated with open habitats such as noctule. However, the hedgerows were largely fragmented, and the open fields suffer from light pollution owing to the M62 streetlighting and thus the site does not present optimal habitat conditions. Bat species associated with woodland may also utilise the site owing to the connectivity of the young woodland on site with the established woodland of Radley Plantation. These wooded habitats provide areas of shelter and darker conditions for light-sensitive species.

2.2 The site provides the largest area of semi-natural habitat within the immediate locality and is likely to be of high foraging value to any bat roosts within the immediate locality, e.g. any roosts within adjacent areas of residential settlement.

2.3 In terms of connectivity, the southern wooded boundary of the site directly connects to Radley Plantation at its eastern-most point, which links to Radley Common and Peel Hall Park. Black Brook flows through Peel Hall Park providing a narrow habitat corridor to further areas of potential urban-edge foraging habitat. To the west however, the woodland along the southern site boundary represents the limit of this habitat corridor, with scattered green amenity spaces as the only potential steppingstones between the site area and suitable foraging habitat to the west such as Sankey Brook (>1km from the site).

2.4 The ecological desk study undertaken for the study site (included in Appletons Report 1820-E1) identified records of foraging common pipistrelles within the site area as well as records of common pipistrelle within the local area. One record of a common pipistrelle maternity roost was identified 1.7km south-east associated with an EPSM licence. Owing to the distance and lack of habitat connectivity, it is not considered likely that the site provides core foraging habitat for the maternity roost that was displaced. No other species of bat was identified by the desk study search within 2km of the site.

2.5 Surveys undertaken at the site conducted within 2015 and 2016 identified common pipistrelle bats only, which foraged predominantly in central and southern areas of the study site, specifically where woodland edge/linear tree and scrub/hedgerow was present. Other areas where such habitats are absent or sparse, i.e. the east and north-west, featured lower levels of foraging activity. Peak observances of bats on site were during breeding bat season with variations of site contacts attributed to potential roost movement or a change in prey species location.

2.6 Based on previous bat survey results, desk study information and assessment of the site habitats and location in the context of surrounding habitats, the Site at Peel Hall was considered of ‘moderate’ potential value to commuting and foraging bats.

3.0 BAT ACTIVITY SURVEY RESULTS

Introduction

3.1 Bat Conservation Trust guidance recommends at least one survey per month throughout the bat activity season for sites of moderate potential value, including one dusk and dawn survey. The dates, weather conditions and sunset times of each survey visit are provided as Table 3.1.

Table 3.1: Dates, sunset/rise times and weather conditions at time of survey visits

Survey date / Parameter	24/04/19		14/05/19		24/06/19		23/07/19		27/08/19		19/09/19		20/09/19	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
Temperature (ºC)	11	11	15	13	17	16	29	26	20	17	16	11	12	10
Cloud cover (%)	100	100	0	0	85	100	40	40	80	95	20	0	0	0
Precipitation	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
Wind speed (Beaufort)	F2	F1	F1	F1	F2	F1	F0	F0	F0	F0	F0	F0	F0	F0
Sunset / sunrise time	20:27		21:02		21:43		21:21		20:12		19:16		06:52	

3.2 The May survey of Transect Route No. 1 was undertaken one week later than the remainder of the May transect routes, owing to reasons of safety due to antisocial behaviour within the park. The weather conditions for that survey visit are summarised within Table 6.2.

Table 3.2: Date, sunset time and weather conditions at the time of the Transect 1 May survey visit

Survey date / Parameter	21/05/19	
	Start	End
Temperature (ºC)	16	13
Cloud cover (%)	20	50
Precipitation	Dry	Dry
Wind speed (Beaufort)	F1	F0
Sunset time	21:13	

3.3 Transect surveys were undertaken by seven surveyors with an additional person chaperoning for safety purposes. Transect surveys took place between April and September and were conducted at a minimum of 3 weeks apart. Surveys were undertaken by Lorraine McKee (Project Ecologist and Natural England Class 1 Bat Licence Holder), Paula Bateson (Senior Ecologist and Natural England Class 1 Bat Licence Holder), Lorna Cruice, Stuart Walker, Andrew Highlands, Joe Perkins, Katherine Jenkins, Anna Cocker, Maxwell Cooper and Alice O'Grady (Ecological Field Assistants). David Starkie acted as safety chaperone.

Transect Results – Quantitative Data

3.4 Transect routes are provided as Appendix 1. Five species of bat were recorded during the seven survey visits which comprised common pipistrelle (*Pipistrellus pipistrellus),* soprano pipistrelle (*Pipistrellus pygmaeus)*, noctule (*Nyctalus noctula)*, Nathusius' pipistrelle (*Pipistrellus nathusii)* and Natterer's bat (*Myotis nattereri*). A total of 519 contacts were recorded during the seven surveys. A summary of the results is provided in the text below.

Spatial analysis

3.5 Overviews of bat activity per species including flight paths are provided as Appendix 2.

3.6 Analysis of where bat calls were recorded showed a strong species bias towards certain areas on site. Figure 3.1 shows collated bat data for all transects, coloured per species.

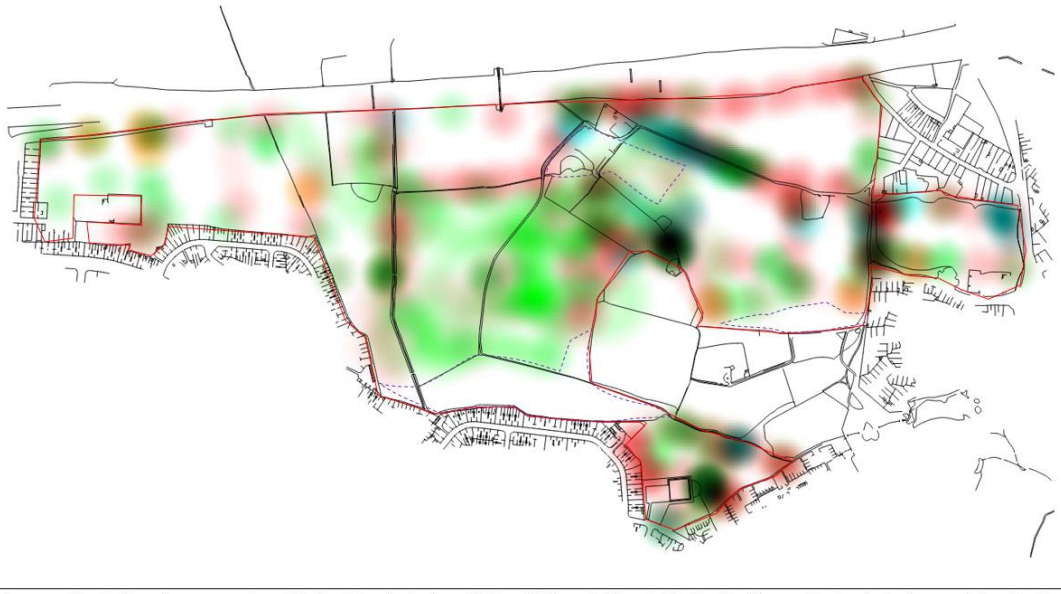

Figure 1: A heat map of collated bat data at the Site at Peel Hall. Natterer's bat data not included as only two points of data were collected for this species.

3.7 General levels of bat activity within the site were highest around the two ponds to the north of Radley Woods, along Radley Lane adjacent to the playing fields, and along the boundaries of the playing field to the far south of the site (Transect 1). Owing to habitat types and location, these areas are the most sheltered in terms of weather and light pollution from the motorway, however activity was also moderately high along the access road to Peel Hall Farm, which is relatively open in nature in terms of habitat types.

3.8 Activity levels were lowest across the northern edge of the survey area adjacent to the motorway, and also at the western-most field (Transect 2) with only 39 contacts recorded at this transect in total across all seven surveys. By contrast, the highest number of total bat contacts (100) was recorded in Transect 7, which is bound by woodland edge, pond and scrub to the south and east. Table 6.3, below, provides contact data by species and transect.

Table 6.3 Collated bat contacts by transect and species. Green is used to highlight highest numbers

Transect Number	1	2	3	4	5	6	7
Total Bat Contacts	88	39	81	87	55	69	100
Total Common pipistrelle activity	65	21	66	68	39	46	59
Total Soprano pipistrelle activity	6	0	1	8	2	1	12
Total Nathusius pipistrelle activity	2	3	0	1	1	0	2
Total Noctule activity	15	15	14	10	13	21	11
Total Natterer's bat activity	0	0	0	0	0	1	1

3.9 Common pipistrelle was the most frequently recorded species across all transects and was strongly associated with boundary features. Numbers were highest along roads and near ponds. Common pipistrelles were most frequently recorded in Transects 4, 3 and 1, which comprise the two playing fields and a field at the north-western corner of the site. Common pipistrelles were least frequently recorded in Transect 2, a field at the north-eastern corner of the site which suffers greatest light pollution.

3.10 Soprano pipistrelles were most frequently recorded in association with boundary features, with numbers highest along roads and near ponds. However, soprano pipistrelles were primarily present within the east of the site and found to be largely absent from the west and centre of the site.

3.11 Noctules were recorded across much of the site area with a preference to open habitats in the centre of site. The fewest number of noctule contacts was recorded at the eastern playing field with is closed in by residential housing to the north, south and east.

3.12 Nathusius pipistrelles were rarely recorded, with the number of contacts across the seven site visits nine. These contacts were recorded at the two playing fields and the two most north-western fields of the site area.

3.13 Natterer's bat was recorded only twice; both of these contacts were recorded near ponds and woodland in the centre of the site.

Temporal analysis – Overall bat activity

3.14 Bat activity was at its lowest during the September dawn survey, with no bats being recorded at all. Table 6.4 overleaf contains total number of bat contacts for each month.

3.15 Bat activity across site increased by 70% between April and May and by 47.5% between May and June. July bat activity across site was depressed and dropped by 47.5% in comparison with June numbers. Bat activity increased by 21% between July and August, with bat activity levels remaining the same between August and September.

Species Temporal Analysis

3.16 Table 6.4 summarises number of bat contacts per species for each month.

Table 6.4: Bat species data by month. Green highlights the months with highest numbers per species; gold highlights highest numbers in aggregate data per species and per month.

Species	April dusk	May dusk	June dusk	July dusk	August dusk	September		Total
						dusk	dawn	
Common pipistrelle	43	58	97	35	57	74	0	364
Soprano pipistrelle	3	6	5	2	8	6	0	30
Nathusius pipistrelle	0	2	1	2	1	3	0	9
Noctule	1	14	14	41	30	14	0	114
Natter's bat	0	0	1	0	1	0	0	2
Total	47	80	118	80	97	97	0	519

3.17 Common pipistrelles were recorded on site during all months of the survey period and most common in June with 97 contacts. Across the surveying period 364 contacts were made by this species across site.

3.18 Soprano pipistrelles were recorded on site during all months of the survey period and were most common in August with 8 contacts during this month.

3.19 Nathusius pipistrelles were recorded on site between May and September dusk in very low numbers; total contacts across site for this species reached 9, with the highest number (3) occurring during the September dusk survey.

3.20 Noctules were recorded on site during all months, with a total of 114 contacts for the survey period. Noctules were most frequently recorded during July (41 contacts).

3.21 Natterer's bats were recorded on site only during June and August; two total contacts were recorded for this species.

First Contact Times

3.22 Table 6.5 provides data by species, transect and average first contact time. This indicates which species are consistently earliest to arrive on site and where. Table 6.6 provides a summary of the overall earliest arrival times per species and Transect.

Table 6.5: Average time (minutes after sunset) of first contact by species and location. Amber indicates time is within species-specific peak emergence time. White indicates time is post- peak emergence time for that species.

Bat sp./ Transect no.	1	2	3	4	5	6	7
Common pipistrelle	22.3	42.6	27.5	28.6	42.5	35.8	29.5
Soprano pipistrelle	50.75	-	39	43.4	63.5	67	55
Nathusius pipistrelle	-	99	-	78	56	-	14
Noctule	16.3	30	8.5	33.25	19.8	16.8	30.6
Natterer's bat	-	-	-	-	-	84	106

Table 6.6: Earliest first contact time (minutes after sunset) of each species by transect and month. Green indicates time is prior to the peak emergence time for that species; amber indicates time is within species-specific peak emergence time. White indicates time is post- peak emergence time for that species.

Bat sp./ Transect no.	1	2	3	4	5	6	7
Common pipistrelle	15 (April)	27 (Sept)	30 (June)	21 (May)	28 (June)	23 (April)	17 (April)
Soprano pipistrelle	28 (Sept)	-	39 (April)	21 (June)	45 (April)	67 (May)	43 (May)
Nathusius pipistrelle	-	99 (Sept)	-	78 (Aug)	56 (June)	-	14 (May)
Noctule	-3 (Sept)	6 (June)	-2 (Sept)	16 (Sept)	13 (May)	8 (Sept)	8 (April)
Natterer's bat	-	-	-	-	-	84 (June)	106 (Aug)

3.23 Common pipistrelle bats were recorded within or prior to the peak emergence time for this species at each of the transect areas on at least four occasions, and noctule bats were recorded at five of the seven transect routes within or prior to the peak emergence time for this species, on at least three occasions. Natterer's bat comprised the only species detected on site that was not recorded within its peak emergence time.

3.24 Later than average first contact times were recorded for all bat species with contacts during July.

Additional Qualitative data

3.25 Peel Hall and Peel Cottage are not included within the site development area and thus were not included in the survey remit. No categorical evidence of emerging bats from these buildings was recorded however, the presence of pipistrelle bats foraging within immediate proximity to these structures prior to the emergence period (i.e. sunset to 20 minutes after), suggests the likelihood that these buildings support roosting pipistrelle bats.

3.26 Bats were not observed commuting into the site in large numbers. Low numbers of pipistrelle bats (<5) were seen to emerge from residences adjacent to the southern playing field. All other bats commuting on to site come from various directions to the south, east and west.

3.27 Noctule activity generally comprised observations of singular bats only. Note that noctule activity comprised long periods of foraging activity over open site habitats, which may not be fully represented by quantitative analysis of 'number of contacts'.

3.28 High-flying noctules were occasionally seen to pass over the motorway. No other species were recorded to fly across the motorway.

3.29 As the spatially mapped data implies, most soprano and common pipistrelle activity recorded comprised low numbers of bats (<3) foraging along linear habitat features, generally within 5m of the habitat edge. Feeding buzzes and social calls were regularly recorded.

3.30 The only natterer's bat activity detected was adjacent to woodland habitats and was unseen. It is assumed that this activity was bats utilising the dark, sheltered habitats within adjacent woodland areas.

4.0 INTERPRETATION OF DATA

4.1 Five bat species were recorded to use the site for foraging and commuting including both common and uncommon species: common pipistrelle, soprano pipistrelle and noctule (common and widespread species in England) Natterer's bat (uncommon but widespread species in England) and Nathusius' pipistrelle (rare but widespread species in England). Common pipistrelle and noctule were most frequently recorded species.

4.2 Common pipistrelle and noctule were most frequently recorded species but used the site in different ways as expected for their species with common pipistrelles preferring boundary features and noctules preferring open habitats.

4.3 Areas of light spill along the northern site boundary coincided with lower than average bat activity, although occasional noctules were recorded to pass over the carriageway.

4.4 The number of recorded bat contacts at Peel Hall was considered overall to be low considering the size of the site. Recorded activity was highly clustered at optimum habitats.

4.5 The overall bat activity was found at pond habitats, along Radley Lane, within the playing field to the south and along the access drive to the kennels.

4.6 Common pipistrelle bats regularly utilise linear habitat features for foraging, including woodland edge, ditch, pond and hedgerow features. Highest levels of foraging activity were recorded at the pond towards the north of Radley Plantation, and pipistrelle levels were generally comparatively higher at the east and south of the site where more unlit boundary features were present.

4.7 Noctule bats regularly utilise the open field habitats within the centre and west of the site area for foraging, although no more than one bat was recorded at any one time. This species was most regularly recorded foraging over the open grassland and ruderal habitats.

4.8 Based on the locations of Natterer's bat recordings, it is assumed that the species utilises the Radley Plantation and connecting woodland habitats for foraging

4.9 Nathusius' pipistrelle recordings were rare and sporadic, and mainly confined to the north-west, south and eastern areas of the site.

4.10 A low number of soprano pipistrelle bats utilise field boundary habitats within the east of the site area for foraging.

4.11 The survey results indicated the close proximity of several small bat roosts to the site:

- Common pipistrelle bats were recorded within immediate proximity to Peel Hall and Peel Cottage prior to the peak emergence times for these species, suggesting the likelihood that these buildings supporting roosting pipistrelle bats.
- Small numbers of common pipistrelle bats (<5) were also seen to emerge from residences adjacent

to the southern playing field.

- Instances of individual or small numbers of common and soprano pipistrelle bats commuting into the site from various directions demonstrates that bats from a number of separate roosts in the locality are using the site for foraging purposes. Common pipistrelle bats were recorded within and prior to their peak emergence times within each of the seven surveyed areas of the site.
- Common pipistrelle bat activity was at its highest during the June survey, potentially suggesting the use of the site by a common pipistrelle maternity colony where female bats generally forage in close proximity to dependent young within roosts. Bats were not observed commuting into the site in large numbers from one particular direction.
- Nathusius pipistrelle activity was detected within the peak emergence time for this species during one of the seven survey visits, suggesting the presence of a Nathusius pipistrelle roost nearby utilised at least on a transient basis.
- Noctule recordings were detected prior to and within the peak emergence times for this species on five out of the seven survey visits implying the presence of a noctule roost nearby. It should be noted that whilst noctules prefer to roost in trees, they will also roost within buildings.

4.12 Overall bat activity in July 2019 was depressed in comparison to June. The July 2019 survey was undertaken on one of the hottest days of the year in Warrington, which can influence flight patterns and the suitability and foraging habitats. For example, several waterbodies on site had dried out in July 2019, which would have decreased water availability and insect load. Some bats that would normally feed at Peel Hall may have chosen to forage at wetter sites with increased insect load during this month. Alternative explanations include the transient nature of roosting bats, including maternity roosts, which can influence bat numbers and dispersal activity into and over large tracts of habitats.

5.0 COMPARISON WITH PREVIOUS SURVEY DATA

5.1 Common pipistrelle was the only bat species recorded by 2015 and 2016 bat surveys at the site. The additional four species recorded in 2019 may be owing to an increased number of survey visits undertaken, and/or the succession of site habitats from arable to a mosaic of ruderal, scrub and grassland. The presence of soprano pipistrelle bats may be an indication that site habitats have increased in moisture.

5.2 In 2015/2016 pipistrelle activity was focussed along linear habitat features such as hedgerows, woodland edge and ditches, and was the case in 2019.

5.3 Similar to 2019, overall bat activity at the site was relatively low in 2015/2016 given the size of the area and proximity of potential roosting habitats. It is likely that the relatively exposed nature of the site to the north in relation to light pollution, and fragmented nature of hedgerows reduces the suitability of the site.

5.4 The playing field to the south of the site was not included in the 2015/2016 bat survey remit.

5.5 The 2015, 2016 and 2019 all surveys recorded highest bat activity levels within peak breeding season.

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APPENDIX 1

Transect Paths April to August

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5
- Transect 6
- Transect 7

Site at Peel Hall, Warrington

Bat Transect Paths April to August

Satnam Millenium Ltd

N

Drawing: 1820-T3-01 Drawn by: LM
Revision: 0 Checked by: PB
Date: 03/12/19 Scale: 1:6,000 @ A3

Landscape Institute Registered practice

Appletons 17 Chorley Old Road, Bolton, BL1 3AD. Tel: 01204 393006
Web: www.appletons.uk.com Email: info@appletons.uk.com

Transect 1
Transect 2
Transect 3
Transect 4
Transect 5
Transect 6
Transect 7

Site at Peel Hall, Warrington

Bat Transect Paths August to September

Satnam Millenium Ltd

N

Drawing: 1820-T3-02 Drawn by: LM
Revision: 0 Checked by: PB
Date: 03/12/19 Scale: 1:6,000@A3

Landscape Institute Registered practice

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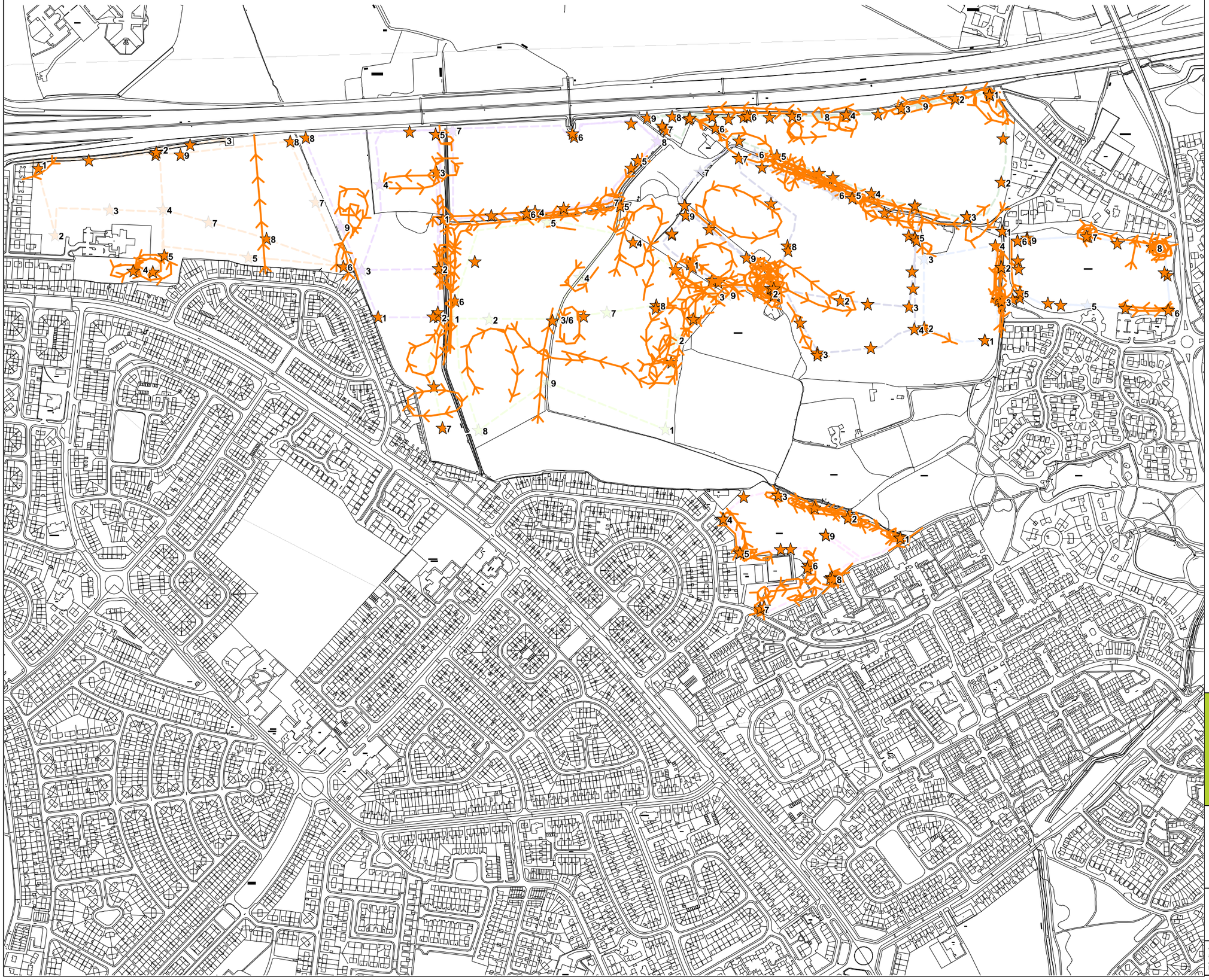
APPENDIX 2



Common pipistrelle

appletons

Site at Peel Hall, Warrington

Common Pipistrelle Data April to September

Satnam Millenium Ltd

N

Drawing: 1820-T3-04 Drawn by: LM
Revision: 0 Checked by: PB
Date: 03/12/19 Scale: 1:6,000@A3

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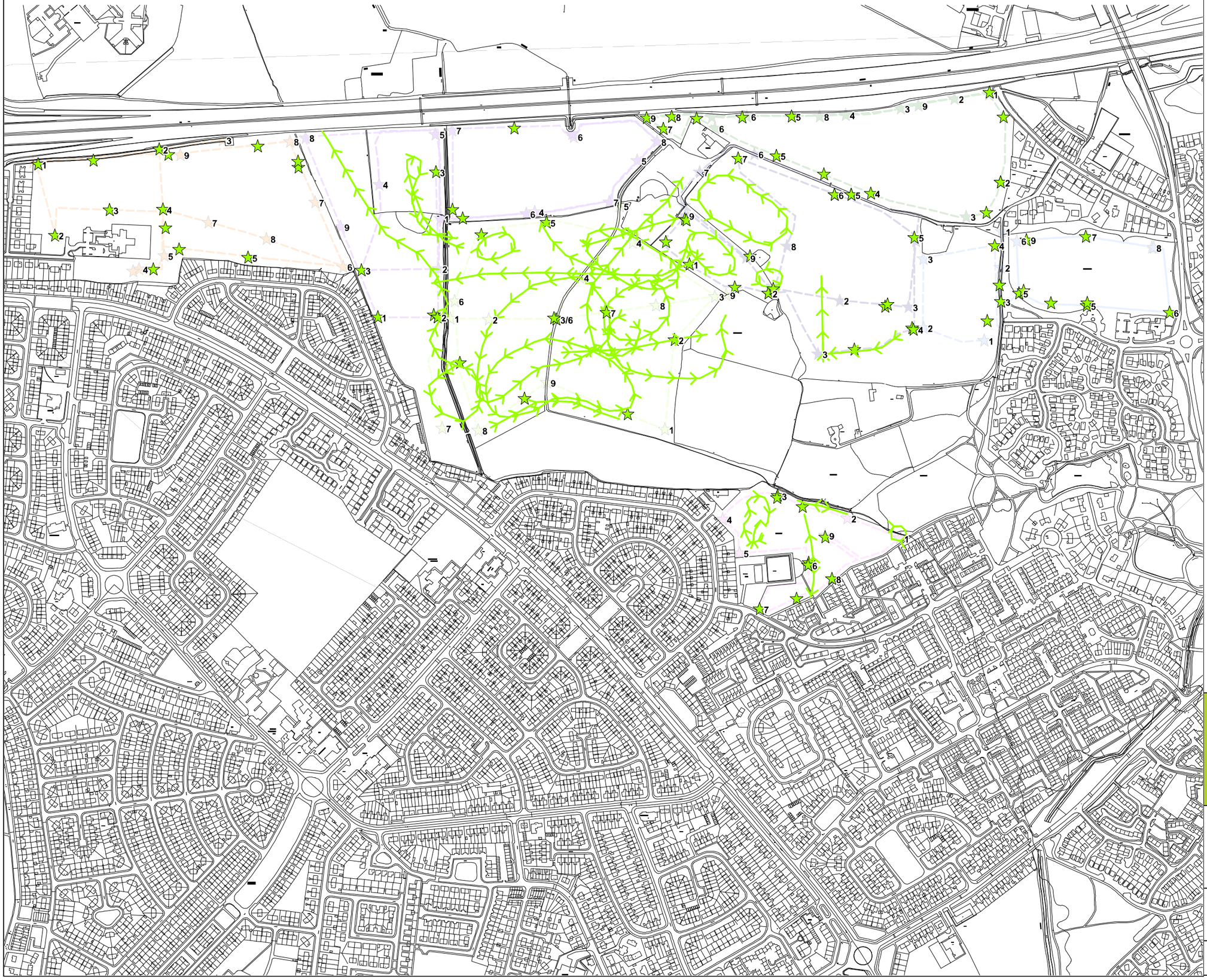


Noctule

Site at Peel Hall, Warrington

Noctule Data April to September 2019

Satnam Millenium Ltd

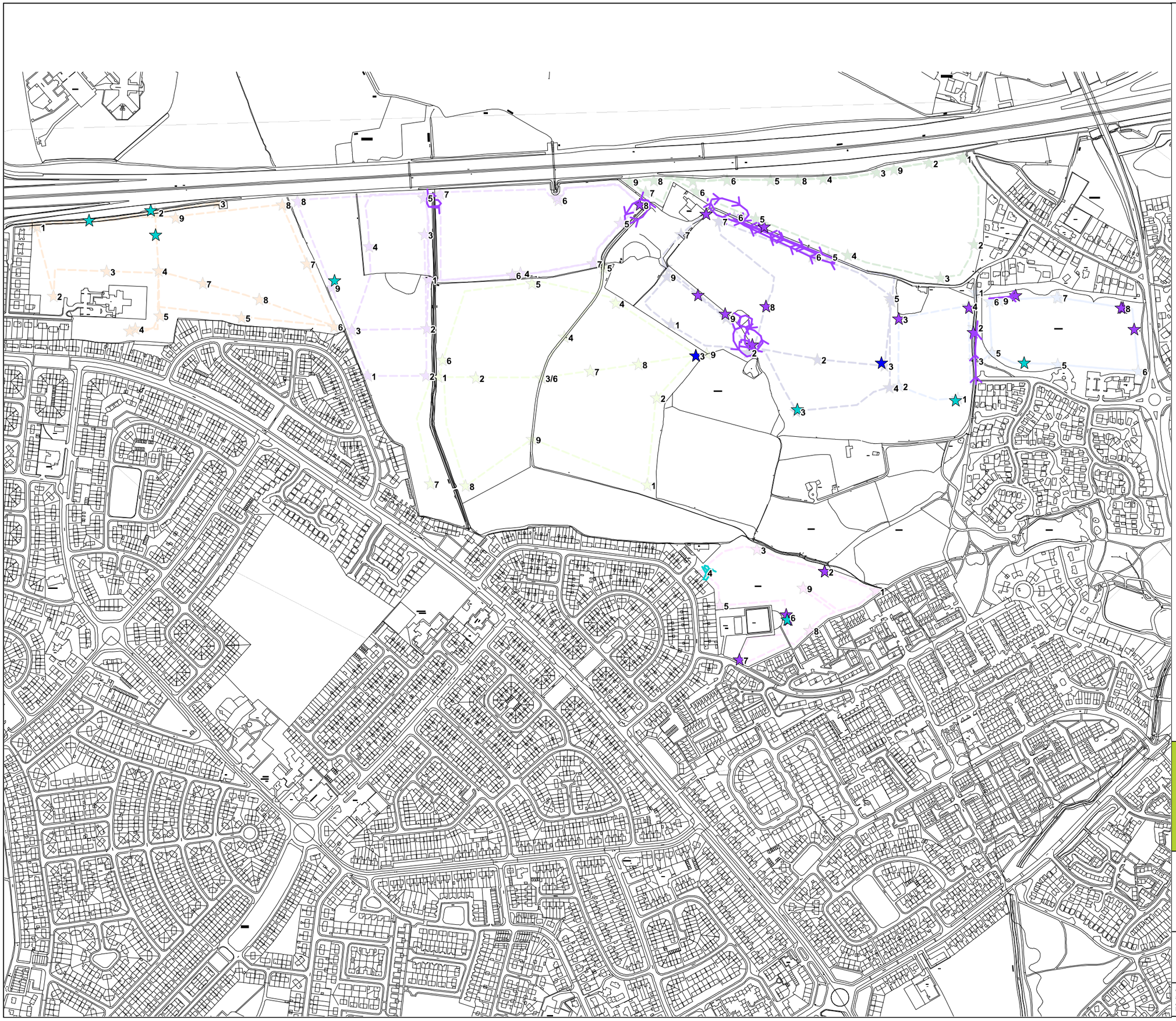
N

Drawing: 1820-T3-05
Revision: 0
Date: 03/12/19

Drawn by: LM
Checked by: PB
Scale: 1:6,000@A3

Landscape Institute Registered practice

Appletons 17 Chorley Old Road, Bolton, BL1 3AD. Tel: 01204 393006
Web: www.appletons.uk.com Email: info@appletons.uk.com



Soprano pipistrelle

Nathusius pipistrelle

Natterer's bat

appletons

Site at Peel Hall, Warrington

Soprano Pipistrelle, Nathusius Pipistrelle, and Natterer's Bat Data April to September

Satnam Millenium Ltd

N

Drawing: 1820-T3-06
Revision: 0
Date: 03/12/19

Drawn by: LM
Checked by: PB
Scale: 1:6,000@A3

Landscape Institute Registered practice

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APPENDIX 3

Transect Form: Transect 1, April

Project: 1820 Peel Hall, Warrington	**Date: 24/04/19**	**Lead Surveyor: LM**	**Surveyor: LC**
Temperature (st-fin): 11 – 11	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 100/100**
Survey Start: 20:10	**Survey End: 22:10**	**Sunrise/Sunset Time: 20:27**	**Detector used: iPhone**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:10-20:30	-	-	-
2	20:31-20:34	-	-	-
3	20:36-20:40	-	-	-
4	20:42-20:45	Common pipistrelle x1	1	Very faint pip – not seen
5	20:47-20:50	Common pipistrelle x2	1	1 C. pip seen commuting from playground area to trees; one C. Pip was not seen
6	20:53 – 20:56	-	-	-
7	20:59 – 21:01	-	-	-
8	21:04 – 21:07	Common pipistrelle x1	5+	4/5 seconds circling near light column by houses
9	21:09 – 21: 12	-	-	-
1	21:13 – 21: 18	Common pipistrelle x1	1	Briefly heard only
2	21:19 – 21:22	-	-	-
3	21:30 – 21:33	-	-	-
4	21:35 – 21:39	Common pipistrelle x1	1	21:38 briefly heard/not seen
5	21:41 – 21:44	-	-	-
6	21:46 – 21:49	-	-	-
7	21:50 – 21:53	-	-	-
8	21:53 – 21:56	Common pipistrelle x1	1	Not seen, but heard near where heard previously at point 8 at 21:55
9	21:57 – 22:00	-	-	-
Last 10 minutes: Walked along edge of trees from points 1-3. Nothing seen or heard.				

Transect Form: Transect 1, May

Project: 1820 Peel Hall, Warrington	**Date: 21/05/2019**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 15 - 13	**Wind speed (st-fin): F1 - F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 20%-50%**
Survey Start: 20:53	**Survey End: 22:54**	**Sunrise/Sunset Time: 21:13**	**Detector used: EM3 (iPhone) and Duet**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:53 - 21:13	-	-	-
2	21:15 - 21:18	-	-	-
3	21:21 - 21:24	-	-	-
4	21:25 - 21:28	-	-	-
5	21:29 - 21:31	-	-	-
6	21:32 - 21:35	-	-	-
7	21:37 - 21:40	-	-	-
8	21:43 - 21:46	-	-	-
9	21:47 - 21:50	-	-	-
1	21:52 - 21:56	Common pipistrelle x1	Continual	Up and down tree line feeding, 4+ bats. One suspected to have come from roost in house. Continual up and down trees foraging and loopin
2	21:58 - 22:01	Common pipistrelle x1	Continual	Up and down tree line feeding, 4+ bats. Continual up and down trees foraging and looping
2/3	22:02 – 22:03	Common pipistrelle x1	Continual	Up and down tree line foraging and looping, 4+ bats
3	22:04 - 22:07	-	-	-
4	22:08 - 22:11	Common pipistrelle x2	Continual	Spiralling and feeding near trees
5	22:12 - 22:15	Common pipistrelle x1	1	Heard only
6	22:18 - 22:19	Common pipistrelle x1	1	Heard only
7	22:21 - 22:24	-	-	-
8	22:27 - 22:30	-	-	-
9	22:32 - 22:35	-	-	-
1	22:39 - 22:43	-	-	-
2	22:44 - 22:47	-	-	-
3	22:51 - 22:54	-	-	-

Transect Form: Transect 1, June

Project: 1820 Peel Hall, Warrington	**Date: 25/06/19**	**Lead Surveyor: LM**	**Surveyor: SW**
Temperature (st-fin): 17-16	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 85%-100%**
Survey Start: 21:28	**Survey End: 23:43**	**Sunrise/Sunset Time: 21:43**	**Detector used: Green**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:28 – 21:47	-	-	-
2	21:49 – 21:53	-	-	-
4	21:57 – 22:01	-	-	-
3	22:03 – 22:07	Common pipistrelle x1	1	Heard only
5	22:09 – 22:13	Common pipistrelle x3	Continuous	Constant foraging in trees
5/6	22:14	Common pipistrelle x1	1	Heard only
6	22:15 – 22:19	Common pipistrelle x1	3	Heard only
6/7	22:20 – 22:21	Common pipistrelle x1	Continual	Constant activity between 6 & 7. Spirals.
7	22:22 – 22:27	Common pipistrelle x1	Continual	Constant foraging and activity with spirals.
7/8	22:28	Common pipistrelle x1	Continual	Constant foraging and activity with spirals.
8	22:29 – 22:33	Common pipistrelle x1	1	Seen to pass between houses going northwest
9	22:35 – 22:39	Common pipistrelle x1	1	Heard only
1	22:41 – 22:44	Common pipistrelle x1	1	Heard only
2	22:46 – 22:49	Common pipistrelle x1	1	Heard only
2/3	22:50	Common pipistrelle x1	2	Foraging along treeline
3	22:52 – 22:56	-	-	-
4	22:58 – 23:02	Common pipistrelle x1	1	Heard only
5	23:03 – 23:07	-	-	-
6	23:09 – 23:12	Soprano pipistrelle x1	1	Heard only
7	23:15 – 23:19	-	-	-
8	23:20 – 23:24	-	-	-
9	23:26 – 23:29	-	-	-
1	23:30 – 23:33	-	-	-
2	23:34 – 23:37	Common pipistrelle x1	1	Heard only
3	23:39 – 23:43	-	-	-

Transect Form: Transect 1, July

Project: 1820 Peel Hall, Warrington	**Date: 23/07/2019**	**Lead Surveyor: LM**	**Surveyor: SW**
Temperature (st-fin): 29 - 26	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin): Dry - dry**	**Cloud cover (st/fin): 40%-40%**
Survey Start: 21:06	**Survey End: 22:54**	**Sunrise/Sunset Time: 21:21**	**Detector used: Orange Sticker**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:06 – 21:26	**-**	**-**	-
2	21:27 – 21:31	**-**	**-**	-
3	21:34 – 21:38	**-**	**-**	-
4	21:40 – 21:44	Common pipistrelle x 2	2	Heard only
5	21:46 – 21:50	-	-	-
6	21:52 – 21:56	-	-	-
7	21:57 – 22:02	Noctule x 1	Continual	Heard only
7/8	22:03	Noctule x1	Continual	Heard only
8	22:04 – 22:08	Noctule x1 Common pipistrelle x1	Continual 1	Heard only Circles around the hedgerows in gardens; foraging
9	22:10 – 22:14	**-**	**-**	-
1	22:16 – 22:20	Common pipistrelle x1	Continual	Circles around trees; foraging activity
2	22:22 – 22:26	Common pipistrelle x1 Soprano pipistrelle x1	Continual 1	Foraging spirals around trees
2/3	22:27	Common pipistrelle x1	1	Heard only
3	22:28 – 22:32	Common pipistrelle x1	1	Heard only
3/4	22:33	Common pipistrelle x1	1	Heard only
4	22:34 – 22:38	Common pipistrelle x1 Nathusius pipistrelle x1	1 Continual	Heard only To and fro between trees and back of houses
5	22:39 – 22:43	Common pipistrelle x1	Continual	Heard only
5/6	22:44	Common pipistrelle x1	1	Heard only
6	22:45 – 22:49	Noctule x1 Common pipistrelle x1 Nathusius pipistrelle x1	1 1 1	Heard only Heard only Heard only
7	22:50 – 22:54	**-**	**-**	-

Transect 1: August

Project: 1820 Peel Hall, Warrington	**Date: 27/08/2019**	**Lead Surveyor: LM**	**Surveyor: DS**
Temperature (st-fin): 20-17	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin): Dry - dry**	**Cloud cover (st/fin): 80%-95%**
Survey Start: 19:57	**Survey End: 22:12**	**Sunrise/Sunset Time: 20:12**	**Detector used: Blue**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:57 – 20:17	**-**	**-**	-
2	20:20 – 20:23	**-**	**-**	-
3	20:25 – 20:28	Noctule x1	4	Heard only
4	20:29 – 20:33	Noctule x1 Common pipistrelle x1	3 2	Flew high in a loop from south to north and back again over main playing field Flew south to north over field towards trees
5	20:35 – 20:38	Noctule x1 Common pipistrelle x1	3 1	Flew south to north over field in one pass; other passes heard only Heard only
6	20:40 – 20:43	Noctule x1 Common pipistrelle x1 Soprano pipistrelle x1	1 Continuous 1	Heard only Seen circling around trees and scrub continuously; foraging Heard only; likely circling around the trees and scrub
7	20:46 – 20:49	-	-	-
8	20:51 – 20:53	Common pipistrelle x1	3	Heard only
9	20:53 – 20:55	Common pipistrelle x1	1	Heard only
1	20:55 – 20:58	-	-	-
2	21:00 – 21:03	Common pipistrelle x1	3	Seen flying east to west along hedge and trees
3	21:06 – 21:09	-	-	-
4	21:10 – 21:13	-	-	-
5	21:15 – 21:18	-	-	-
6	21:20 – 21:24	-	-	-
7	21:26 – 21:29	Common pipistrelle x1	1	Heard only
8	21:31 – 21:34	Common pipistrelle x1	1	Heard only
9	21:36 – 21:39	Noctule x1	2	Heard only
1	21:41 – 21:44	Common pipistrelle x1	2	Heard only
2	21:46 – 21:49	Soprano pipistrelle x1	1	Heard only
2/3	21:50	Noctule x1	1	Heard only
3	21:51 – 21:54	Noctule x1	1	Heard only
4	21:55 – 21:58	-	-	-
5	21:59 – 22:01	-	-	-
6	22:01 – 22:04	Common pipistrelle x1	2	Heard only; very brief
7	22:05 – 22:08	-	-	-

8	22:09 – 22:12	Common pipistrelle x1	1	Heard only

Transect 1: September Dusk

Project: 1820 Peel Hall, Warrington	**Date: 19/09/2019**	**Lead Surveyor: LM**	**Surveyor: AH**
Temperature (st-fin): 16-11	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin):Dry-Dry**	**Cloud cover (st/fin): 20%-80%**
Survey Start: 18:56	**Survey End: 21:16**	**Sunrise/Sunset Time: 19:16**	**Detector used: Red**

Stop Point	**Time**	**Species**	**No. Passes**	**Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc**
1	18:56 – 19:16	Noctule x1	1	Circling high above the treeline
2	19:26 – 19:29	Noctule x1	Continual	Foraging and feeding along the treeline
3	19:30 – 19:33	-	-	-
4	19:35 – 19:38	-	-	-
5	19:39 – 19:42	Common pipistrelle x1	1	Commuting along treeline to the back of the houses; social calls also heard
6	19:44 – 19:47	Noctule x1 Soprano pipistrelle x1	Continual 1	Feeding/foraging in the open field Heard only
7	19:48 – 19:51	Soprano pipistrelle x1 Common pipistrelle x1	1 Continual	Heard only Heard only; social calls also heard
8	19:52 – 19:53	-	-	-
9	19:54 – 19:58	-	-	-
1	20:00 – 20:03	Common pipistrelle x1	Continual	Commuting up and down the path to the east of Point 1
2	20:05 – 20:08	Common pipistrelle x1	Continual	Continuous foraging along treeline, chasing behaviour and social calling observed
3	20:10 – 20:13	-	-	-
4	20:15 – 20:18	Common pipistrelle x1	1	Heard only
5	20:20 – 20:23	Common pipistrelle x1	1	Heard only
6	20:24 – 20:27	Noctule x1	1	Heard only
7	20:30 – 20:33	-	-	-
8	20:34 – 20:37	Common pipistrelle x1	Continual	Heard only; social calling picked up and sounds like the bat is circling
9	20:37 – 20:40	Common pipistrelle x1	Continual	Heard only (distant)
1	20:41 – 20:45	Common pipistrelle x1	4	Heard only
2	20:47 – 20:50	Common pipistrelle x1	Continual	Heard only, social calling; likely feeding near trees
3	20:53 – 20:57	-	-	-
4	20:57 – 21:00	Common pipistrelle x1	2	Heard only
5	21:02 – 21:05	-	-	-
6	21:06 – 21:09	-	-	-
7	21:10 – 21:13	Common pipistrelle x1	1	Heard only

8	21:14 – 21:17	Common pipistrelle x1	Continual	Flying along hedgelines in gardens near houses, foraging

Transect 1: September Dawn

Project: 1820 Peel Hall	**Date: 20/09/2019**	**Lead Surveyor: LM**	**Surveyor: BH**
Temperature (st-fin): 12-10	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin):Dry-Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 04:19	**Survey End: 06:53**	**Sunrise/Sunset Time: 06:52**	**Detector used: Red**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	04:19 – 04:22	-	-	-
2	04:26 – 04:29	-	-	-
3	04:31 – 04:34	-	-	-
4	04:35 – 04:37	-	-	-
5	04:37 – 04:40	-	-	-
6	04:41 – 04:44	-	-	-
7	04:46 – 04:49	-	-	-
8	04:50 – 04:53	-	-	-
9	04:55 – 04:58	-	-	-
1	05:00 – 05:03	-	-	-
2	05:05 – 05:08	-	-	-
3	05:10 – 05:13	-	-	-
4	05:14 – 05:17	-	-	-
5	05:18 – 05:21	-	-	-
6	05:23 – 05:26	-	-	-
7	05:27 – 05:30	-	-	-
8	05:31 – 05:34	-	-	-
9	05:36 – 05:39	-	-	-
1	05:41 – 05:44	-	-	-
2	05:46 – 05:49	-	-	-
3	05:50 – 05:53	-	-	-
4	05:55 – 05:58	-	-	-
5	06:00 – 06:03	-	-	-
6	06:05 – 06:08	-	-	-
7	06:10 – 06:13	-	-	-
8	06:14 – 06:17	-	-	-
9	06:18 – 06:21	-	-	-

1	06:23 – 06:26	-	-	-
2	06:29 – 06:34	-	-	-
3	06:37 – 06:40	-	-	-
4	06:42 – 06:45	-	-	-
5	06:47 – 06:53	-	-	-

Transect 2: April

Project: 1820 Peel Hall, Warrington	**Date: 24/04/19**	**Lead Surveyor: LM**	**Surveyor: AC**
Temperature (st-fin): 11 – 11	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 100/100**
Survey Start: 20:10	**Survey End: 22:10**	**Sunrise/Sunset Time: 20:27**	**Detector used: Red**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:10 – 20:30	-	-	-
2	20:32 – 20:35	-	-	-
3	20:39 – 20:42	-	-	-
4	20:46 – 20:49	-	-	-
5	20:54 – 20:56	-	-	-
6	20:59 – 21:02	Common pipistrelle x 1	2	Seen 2 following fence and tree line heading northwest
7	21:03 – 21:06	-	-	-
8	21:09 – 21:12	-	-	-
9	21:15 – 21:18	-	-	-
1	21:22 – 21:25	-	-	-
2	21:26 – 21:29	-	-	-
3	21:31 – 21:34	-	-	-
4	21:38 – 21:41	Common pipistrelle x1	1	Seen not heard
5	21:45 – 21:48	-	-	-
6	21:51 – 21:54	-	-	-
7	21:56 – 21:59	-	-	-
8	22:01 – 22:04	-	-	-
9	22:08 – 22:10	-	-	-

Transect 2: May

Project: 1820 Peel Hall, Warrington	**Date: 14/05/19**	**Lead Surveyor: LM**	**Surveyor: AC**
Temperature (st-fin): 15-13	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 20:47	**Survey End: 23:03**	**Sunrise/Sunset Time: 21:02**	**Detector used: Orange**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:47 – 21:07	-	-	-
2	21:08 – 21:12	-	-	-
3	21:14 – 21:17	Noctule x1	1	Distant pass, heard only
4	21:21 – 21:24	-	-	-
5	21:28 – 21:31	-	-	-
6	21:35 – 21:38	Common pipistrelle x 2	1	Heading SE along hedgerow; 2nd bat went NE following fence & tall grass
7	21:40-21:43	-	-	-
7-8	21:44	Noctule x1	1	Heard only
8	21:46-21:47	-	-	-
8-9	21:50	Noctule x1	1	Heard only
9	21:53-21:56	-	-	-
1	22:01-22:04	-	-	-
2	22:06-22:09	-	-	-
3	22:11-22:14	-	-	-
3-4	22:18	Noctule x1	1	Heard only
4	22:20-22:23	-	-	-
5	22:28-22:31	-	-	-
6	22:34-22:37	Common pipistrelle x1	1	Heard only
7	22:39-22:42	-	-	-
8	22:44-22:47	Common pipistrelle x1	1	Heard only, faint calling
9	22:50-22:53	Common pipistrelle x1	2	Heard only, faint calling
9-1	22:54	Common pipistrelle x 1 Noctule x1	1 1	Heard only Heard only
1	22:58-23:01	Noctule x1	1	Heard only

Transect 2: June

Project: 1820 Peel Hall, Warrington	**Date: 25/06/19**	**Lead Surveyor: LM**	**Surveyor: MC**
Temperature (st-fin): 17-16	**Wind speed (st-fin): F2-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 85%-100%**
Survey Start: 21:28	**Survey End: 23:43**	**Sunrise/Sunset Time: 21:43**	**Detector used: Green**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:28 – 21:48	-	-	-
2	21:49 – 21:52	Noctule	1	Heard only
3	21:57 – 22:01	-	-	-
4	22:03 – 22:06	-	-	-
5	22:09 – 22:12	-	-	-
6	22:14 – 22:18	-	-	-
7	22:22 – 22:25	-	-	-
8	22:31 – 22:35	-	-	-
9	22:38 – 22:42	-	-	-
1	22:46 – 22:49	-	-	-
2	22:51 – 22:55	-	-	-
3	22:59 – 23:02	-	-	-
4	23:04 – 23:07	-	-	-
5	23:11 – 23:14	-	-	-
6	23:19 – 23:23	-	-	-
7	23:29 – 23:33	-	-	-
8	23:36 – 23:39	-	-	-
9	23:42 – 23:43	-	-	-

Transect 2: July

Project: 1820 Peel Hall, Warrington	**Date: 23/07/19**	**Lead Surveyor: LM**	**Surveyor: MC**
Temperature (st-fin): 29 - 26	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 40% - 40%**
Survey Start: 21:06	**Survey End: 22:54**	**Sunrise/Sunset Time: 21:21**	**Detector used: Pink**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:06 – 21:26	**-**	**-**	**-**
2	21:28 – 21:31	**-**	**-**	**-**
3	21:36 – 21:39	**-**	**-**	**-**
4	21:42 – 21:45	**-**	**-**	**-**
4/5	21:46	Noctule x1	1	Heard only
5	21:47 – 21:50	-	-	-
6	21:53 – 21:56	-	-	-
7	22:01 – 22:04	-	-	-
7/8	22:05	Noctule x1	1	Heard only
8	22:07 – 22:10	-	-	-
9	22:13 – 22:17	-	-	-
1	22:23 – 22:27	Noctule x1 Common pipistrelle x1	1 1	Heard only Heard only
2	22:31 – 22:34	-	-	-
3	22:38 – 22:41	-	-	-
4	22:43 – 22:46	-	-	-
5	22:48 – 22:54	Noctule x1	1	Heard only

Transect 2: August

Project: 1820 Peel Hall, Warrington	**Date: 27/08/19**	**Lead Surveyor: LM**	**Surveyor: MC**
Temperature (st-fin): 20-17	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 80% - 95%**
Survey Start: 19:57	**Survey End: 22:12**	**Sunrise/Sunset Time: 20:12**	**Detector used: Pink**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:57 – 20:17	**-**	**-**	**-**
2	20:20 – 20:25	**-**	**-**	**-**
3	20:25 – 20:28	**-**	**-**	**-**
4	20:30 – 20:34	Noctule x1	1	Heard only
5	20:36 – 20:39	-	-	-
5/6	20:44	Noctule x1	1	Heard only
6	20:45 – 20:59	-	-	-
7	20:51 – 20:54	-	-	-
8	20:57 – 21:00	-	-	-
9	21:02 – 21:08	-	-	-
8	21:10 – 21:13	Common pipistrelle x1	1	Heard only
7	21:17 – 21:20	Common pipistrelle x1	1	Seen near the south side of the building nearer to point 6. Circling.
6	21:23 – 21:27	Common pipistrelle x1	1	Foraging around trees and scrub
5	21:29 – 21:32	-	-	-
4	21:35 – 21:38	-	-	-
3	21:41 – 21:44	-	-	-
2	21:46 – 21:49	-	-	-
1	21:51 – 21:54	-	-	-
2	21:55 – 21:58	-	-	-
2/3	21:58	Common pipistrelle x1	1	Heard only
3	21:59 – 22:02	-	-	-

Transect 2: September Dusk

Project: 1820 Peel Hall, Warrington	**Date: 19/09/19**	**Lead Surveyor: LM**	**Surveyor: MC**
Temperature (st-fin): 16 – 11	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 20% - 0% (Mist)**
Survey Start: 19:00	**Survey End: 21:16**	**Sunrise/Sunset Time: 19:16**	**Detector used: EM3**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:00-19:23	-	-	-
2	19:25-19:28	-	-	-
3	19:30-19:33	-	-	-
4	19:37-19:40	-	-	-
5	19:43-19:46	Common pipistrelle x1	1	Heard only
5/6	19:46	Common pipistrelle x1	1	Heard only
6	19:47-19:50	Common pipistrelle x1	1	Heard only
7	19:53-19:56	-	-	-
8	20:00-20:03	Common pipistrelle x1	1	Flew from direction of houses to south, crossing field and went over motorway
9	20:06-20:12	-	-	-
8	20:15-20:19	-	-	-
7	20:21-20:24	-	-	-
6	20:27-20:30	-	-	-
5	20:31-20:34	-	-	-
4	20:36-20:39	-	-	-
3	20:41-20:44	-	-	-
2	20:45-20:48	Noctule x1	3	Heard only
2/1	20:48	Noctule x1	3	Heard only
1	20:50-20:54	Common pipistrelle x1	3	Passed overhead from motorway towards houses to the west; then two heard only
1/2	20:55	Common pipistrelle x1 Nathusius pipistrelle x1	3 1	Heard only Heard only
2	20:58-21:01	Common pipistrelle x1 Nathusius pipistrelle x1	6 4	Heard only Heard only
3	21:03-21:06	-	-	-
3/4	21:08	Nathusius pipistrelle x1 Common pipistrelle x1	1 1	Heard only Heard only
4	21:10-21:13	-	-	-
5	21:15-21:18	-	-	-

Transect 2: September Dawn

Project: 1820 Peel Hall, Warrington	**Date: 20/09/19**	**Lead Surveyor: MC**	**Surveyor: LM**
Temperature (st-fin): 12-10	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 04:25	**Survey End: 06:52**	**Sunrise/Sunset Time: 06:52**	**Detector used: Orange EM3**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	04:25-04:45	**-**	**-**	-
2	04:46-04:49	**-**	**-**	-
3	04:52-04:56	**-**	**-**	-
4	04:57-05:00	**-**	**-**	-
5	05:02-05:05	**-**	**-**	-
6	05:07-05:11	**-**	**-**	-
7	05:15-05:18	**-**	**-**	-
8	05:20-05:23	**-**	**-**	-
9	05:25-05:31	**-**	**-**	-
8	05:33-05:36	**-**	**-**	-
7	05:38-05:42	**-**	**-**	-
6	05:45-05:48	**-**	**-**	-
5	05:51-05:54	**-**	**-**	-
4	05:56-05:59	**-**	**-**	-
3	06:01-06:05	**-**	**-**	-
2	06:07-06:10	**-**	**-**	-
1	06:14-06:21	**-**	**-**	-
2	06:23-06:26	**-**	**-**	-
3	06:29-06:32	**-**	**-**	-
1	06:34-06:52	**-**	**-**	-

Transect 3: April

Project: 1820 Peel Hall, Warrington	**Date: 24/04/19**	**Lead Surveyor: LM**	**Surveyor: JP**
Temperature (st-fin): 11 – 11	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 100/100**
Survey Start: 20:10	**Survey End: 22:10**	**Sunrise/Sunset Time: 20:27**	**Detector used: EM Touch**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:10 – 20:30	-	-	-
2	20:35 – 20:38	-	-	-
3	20:43 – 20:46	-	-	-
4	20:50 – 20:53	-	-	-
5	20:57 – 21:00	Common pipistrelle x1	1	Commuting down road & hedgerow, west to east
5/6	21:01 21:06 21:06	Common pipistrelle x1 Common pipistrelle x1 Soprano pipistrelle x1	1 1 1	Heard, not seen Foraging around trees at small wooded area near house Foraging around trees at small wooded area near house
6	21:09 – 21:11	Common pipistrelle x1	2	Foraging up tree line – not on house side
6/7	21:15	Common pipistrelle x1	1	Heard, not seen
7	21:16 – 21:19	-	-	-
8	21:23 – 21:26	-	-	-
9	21:29 – 21:32	Common pipistrelle x 1	1	Heard not seen
1	21:34 – 21:37	Common pipistrelle x 1 Common pipistrelle x 1	1 Continuous	Heard at 21:34, but not seen. One heard 21:35, foraging along hedgerow
1/2	21:38	Common pipistrelle x1	Continuous	Foraging along hedgerow
2	21:42 – 21:45	-	-	-
3	21:48 – 21:51	Common pipistrelle x1	Continuous	Foraging, heard, not seen.
3/4	21:52	Common pipistrelle x1	1	Heard, not seen
4	21:56 – 21:59	-	-	-
5	22:03 – 22:06	-	-	-
6	22:07 – 22:10	-	-	-

Transect 3: May

Project:1820 Peel Hall, Warrington	**Date: 14/05/2019**	**Lead Surveyor: LM**	**Surveyor: JP**
Temperature (st-fin): 15-13	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 20:38	**Survey End: 23:02**	**Sunrise/Sunset Time: 21:02**	**Detector used: Blue**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:38 – 21:11	-	-	-
2	21:21 – 21:24	-	-	-
3	21:27 – 21:30	Common pipistrelle x1	2	Foraging and looping around trees.
3/4	21:31-35	Common pipistrelle x1	5	Foraging up and down road by house
4	21:36-21:39	Common pipistrelle x1	3	Commuting down road along hedge/scrub
4/5	21:41	Common pipistrelle x1	3	Foraging up and down hedgerow by road
5	21:44-21:47	Common pipistrelle x1	5+	Foraging up and down hedgerow by road
5/6	21:47 – 21:51	Common pipistrelle x2	Continual	Foraging up and down hedgerow by road
6	21:52-21:55	Common pipistrelle x1	1	Heard only
7	21:57-22:00	-	-	-
8	22:05-22:08	-	-	-
8/9	22:09	Common pipistrelle x1		Foraging around scrub
9	22:13-22:16	-	-	-
1	22:20-22:23	-	-	-
1/2	22:24 – 22:29	Common pipistrelle x1	5	Heard, not seen. Foraging.
2	22:30 – 22:33	Common pipistrelle x1	Continual	Heard only
3	22:36-22:39	Common pipistrelle x1	3	Heard only
3/4	22:40	Common pipistrelle x1	1	Heard only
3/4	22:42	Common pipistrelle x1		Heard only
4	22:43-22:46	-	-	-
4/5	22:47	Common pipistrelle x1		Heard only. Foraging.
5	22:49-22:52	-	-	-
6	22:57-23:00	-	-	-
6/7	23:02	-	-	FINISH

Transect 3: June

Project: 1820 Peel Hall, Warrington	**Date: 25/06/19**	**Lead Surveyor: LM**	**Surveyor: KJ**
Temperature (st-fin): 17-16	**Wind speed (st-fin): F2-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 85%-100%**
Survey Start: 21:28	**Survey End: 23:43**	**Sunrise/Sunset Time: 21:43**	**Detector used: Orange**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:28 – 21:48	-	-	-
2	21:51 – 21:54	Noctule x1	1	Heard only
3	21:57 – 22:00	-	-	-
4	22:03 – 22:06	Common pipistrelle x1	1	Heard only
4/5	22:07	Common pipistrelle x1	1	Heard only
5	22:10 – 22:13	-	-	-
6	22:17 – 22:20	Common pipistrelle x1	1	Several passes heard only. Foraging along treeline. Social calls.
6/7	22:23	Common pipistrelle x1	1	Heard only
7	22:25 – 22:28	Common pipistrelle x1	1	Social calling
7/8	22:31	Common pipistrelle x1	4	Heard only
8	22:34 – 22:37	Common pipistrelle x1	3	Seen and heard foraging around shrubs/trees
9	22:40 – 22:47	Common pipistrelle x1	Continual	Foraging up and down around shrubs/trees
1	22:58 – 23:01	Common pipistrelle x1	1	Heard only
2	23:06 – 23:09	-	-	-
3	23:11 – 23:14	Common pipistrelle x1	4	Heard only
4	23:16 – 23:19	-	-	-
4/5	23:20	Common pipistrelle x1	1	Foraging along hedgerow
5	23:23 – 23:26	Common pipistrelle x1	1	Heard only
6	23:28 – 23:31	Common pipistrelle x1	1	Heard only
7	23:35 – 23:38	Common pipistrelle x1	5	Heard only
7/8	23:40 – 23:43	Common pipistrelle x1	3	Foraging along vegetation

Transect 3: July

Project: 1820 Peel Hall, Warrington	**Date: 23/07/19**	**Lead Surveyor: LM**	**Surveyor: JP**
Temperature (st-fin): 29-26	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 40%-40%**
Survey Start: 21:06	**Survey End: 22:51**	**Sunrise/Sunset Time: 21:21**	**Detector used: Blue**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:01 – 21:21	-	-	-
2	21:30 – 21:34	Noctule x1	1	Heard only
2/3	21:37	Noctule x1	1	Heard only
3	21:41 – 21:44	-	-	-
4	21:51 – 21:54	Noctule x1	1	Heard only
4/5	21:55 – 21:57	Noctule x1	3	Heard only; one pass lasting 13 seconds
5	22:07 – 22:10	Noctule x1	6	Heard only; one pass lasting 14 seconds; likely circling
6	22:11 – 22:14	-	-	-
6/7	22:16 – 22:17	Noctule x1 Common pipistrelle x1	2 1	Heard only Distant pass; heard only
7	22:18 – 22:21	Noctule x1 Common pipistrelle x1	3 1	Intermittent passes, heard only Heard only
7/8	22:22	Noctule x1 Common pipistrelle x1	1 1	Heard only Heard only
8	22:25 – 22:29	-	-	-
8/9	22:31	Common pipistrelle x1	2	Heard only
9	22:34 – 22:37	-	-	-
1	22:39 – 22:42	-	-	-
1/2	22:44	Noctule x1	2	Heard only
2	22:45 – 22:49	-	-	-
3	22:51 – 22:54	-	-	-

Transect 3: August

Project: 1820 Peel Hall, Warrington	**Date: 27/08/19**	**Lead Surveyor: LM**	**Surveyor: AH**
Temperature (st-fin): 20-17	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 80%-95%**
Survey Start: 19:57	**Survey End: 22:12**	**Sunrise/Sunset Time: 20:12**	**Detector used: Blue**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:57 – 20:17	-	-	-
2	20:18 – 20:21	-	-	-
3	20:22 – 20:25	-	-	-
4	20:26 – 20:29	-	-	-
5	20:31 – 20:34	Noctule x1	1	Heard only
6	20:36 – 20:39	-	-	-
7	20:41 – 20:44	Common pipistrelle x1	1	Distant pass, heard only
8	20:45 – 20:48	Noctule x1	1	Heard only
9	20:48 – 20:54	Noctule x1	1	Heard only
8	20:55 – 20:58	-	-	-
7	20:59 – 21:02	-	-	-
6	21:04 – 21:07	-	-	-
5	21:08 – 21:11	-	-	-
4	21:12 – 21:15	Common pipistrelle x1	2	Heard only; likely circling scrub
3	21:16 – 21:19	Common pipistrelle x1	2	Foraging along the treeline
2	21:20 – 21:23	Common pipistrelle x1	1	Heard only
1	21:24 – 21:27	Common pipistrelle x1	1	Flying low near trees

Transect 3: September Dusk

Project: 1820 Peel Hall, Warrington	**Date: 19/09/19**	**Lead Surveyor: LM**	**Surveyor: Emma**
Temperature (st-fin): 16 – 11	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 20% - 0% (Mist)**
Survey Start: 18:50	**Survey End: 21:16**	**Sunrise/Sunset Time: 19:16**	**Detector used: EM Touch (iPhone)**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	18:50-19:20	Noctule x1	9	Heard only
2	19:23-19:27	-	-	-
3	19:32-19:35	-	-	-
4	19:36-19:39	-	-	-
5	19:40-19:43	-	-	-
6	19:44-19:47	-	-	-
7	19:49-19:52			
8	19:52-19:55			
9	19:56-20:02	Common pipistrelle x1	2	Heard only
8	20:04-20:07	-	-	-
7	20:08-20:11	-	-	-
6	20:12-15	Common pipistrelle x1	1	Heard only
6/5	20:20	Common pipistrelle x1	1	Heard only
5	20:21-20:24	Common pipistrelle x1	4	Flying low, moving between the field and the motorway several times in circles
4	20:25-20:29	Common pipistrelle x1	Continual	Flying low in circles between the field and the motorway edge; feeding around scrub?
3	20:30-20:33	Common pipistrelle x1	1	Heard only
2	20:33-20:36	Common pipistrelle x1	2	Heard only
1	20:36-20:39	Common pipistrelle x1	1	Heard only
2	20:40-20:43	-	-	-
3	20:44-20:47	Common pipistrelle x1	Continual	Heard only; potentially in circles due to the way the calls sound
4	20:48-20:51	Common pipistrelle x1	Continual	Heard only, more than 1 bat. Likely in circles due to the call sounds
5	20:53-20:56	Common pipistrelle x1	6	Heard only
6	20:57-21:00	Common pipistrelle x1	2	Heard only
6/7	21:01	Common pipistrelle x1	1	Heard only
7	21:02-21:05	Common pipistrelle x1	1	Heard only
8	21:06-21:09	Common pipistrelle x1	1	Heard only
9	21:09-21:12	-	-	-
8	21:12-21:16	-	-	-

Transect Form: Transect 3, September Dawn

Project: 1820 Peel Hall, Warrington	**Date: 20/09/19**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 12-10	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 04:20	**Survey End: 06:52**	**Sunrise/Sunset Time: 06:52**	**Detector used: EM Touch (iPhone)**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	04:20-04:24	**-**	**-**	-
2	04:26-04:32	**-**	**-**	-
3	04:34-04:38	**-**	**-**	-
4	04:42-04:47	**-**	**-**	-
5	04:52-04:58	**-**	**-**	-
6	05:01-05:06	**-**	**-**	-
7	05:10-05:14	**-**	**-**	-
8	05:19-05:22	**-**	**-**	-
9	05:27-05:31	**-**	**-**	-
1	05:34-05:38	**-**	**-**	-
2	05:42-05:46	**-**	**-**	-
3	05:49-05:52	**-**	**-**	-
4	05:58-06:02	**-**	**-**	-
5	06:08-06:12	**-**	**-**	-
6	06:14-06:17	**-**	**-**	-
7	06:20-06:23	**-**	**-**	-
8	06:26-06:29	**-**	**-**	-
9	06:31-06:52	**-**	**-**	-

Transect 4: April

Project: 1820 Peel Hall, Warrington	**Date: 24/04/19**	**Lead Surveyor: LM**	**Surveyor: SW**
Temperature (st-fin): 11 – 11	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 100/100**
Survey Start: 20:10	**Survey End: 22:10**	**Sunrise/Sunset Time: 20:27**	**Detector used: EM Touch**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:10 – 20:32	-	-	-
2	20:35 – 20:38	-	-	-
3	20:43 – 20:47	-	-	-
4	20:50 – 20:55	-	-	-
4/5	20:58	Common pipistrelle x1	1	Not seen, heard only.
5	21:01 – 21:06	Common pipistrelle x1	1	Pip heard 21:01 by hedge flying towards motorway.
6	21:09 – 21:13	Common pipistrelle x1	1	Faint and distant pass, heard only.
7	21:17 – 21:20	-	-	-
8	21:23 – 21:27	-	-	-
9	21:29 – 21-33	-	-	Note: No bats, but a hedgehog seen at pitches in the scrub towards the road edge
1	21:38 – 21:42	-	-	-
2	21:45 – 21:49	-	-	-
3	21:52 – 21:55	-	-	-
4	21:58 – 22:02	-	-	-
5	22:06 – 22:10	-	-	-

Transect 4: May

Project: 1820 Peel Hall, Warrington	**Date: 14/05/2019**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 15-13	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 05% - 0%**
Survey Start: 20:38	**Survey End: 23:02**	**Sunrise/Sunset Time: 21:02**	**Detector used: iPhone/duet**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:38-21:05	-	-	
2	21:09-21:12	-	-	
3	21:15-21:18	-	-	
4	21:23-21:28	Common pipistrelle x1	1	Heard only.
	21:33	Common pipistrelle x1	Continual	Feeding up and down road/hedgerow.
5	21:36-21:39	-	-	
6	21:40-21:43	Soprano pipistrelle x1	2	Commuting east to west along back hedgerow/trees.
7	21:46-21:49	-	-	
8	21:51-21:54	Common pipistrelle x1	4	Feeding & commuting at trees.
9	21:59-22:02	-	-	
	22:03	Common pipistrelle x1 Soprano pipistrelle x1	Continual	Commuting & feeding - multiple and continuous.
1	22:05-22:08	-	-	
2	22:11-22:15	Common pipistrelle x1	2	Commuting west to east down treeline.
3	22:19-22:22	Common pipistrelle x1 Soprano pipistrelle x1	3 1	Heard only, one seen commuting around tees to north
4	22:25-22:28	Common pipistrelle x1	-	
5	22:35-22:40	-	-	
6	22:41-22:44	-	-	
7	22:46-22:49	Common pipistrelle x1	1	Heard only
8	22:52-22:55	Common pipistrelle x1	1	
9	22:58-23:00	-	-	

Transect 4: June

Project: 1820 Peel Hall, Warrington	**Date: 25/06/19**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 17 - 16	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry - dry**	**Cloud cover (st/fin): 85% - 100%**
Survey Start: 21:28	**Survey End: 23:43**	**Sunrise/Sunset Time: 21:43**	**Detector used: iPhone**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:27 – 21:47	-	-	-
2	21:49 – 21:53	-	-	-
3	21:57 – 22:00	-	-	-
4	22:04 – 22:08	Common pipistrelle x1 Soprano pipistrelle x1	2 1	Heard only Heard only
4/5	22:12	Common pipistrelle x1	2	Flying north along the road
5	22:15 – 22:18	-	-	-
5/6	22:21	Common pipistrelle x1	1	Heard only
6	22:23 – 22:26	Common pipistrelle x1	1	Heard only
7	22:28 – 22:33	Common pipistrelle x1	Continuous	Circling and foraging around trees
8	22:35 – 22:38	-	-	-
9	22:40 – 22:44	Common pipistrelle x2	Continuous	Commuting and foraging up and down treeline
9/1	22:42	Common pipistrelle x4	Continuous	Commuting and feeding up and down the road
1	22:47 – 22:50	Common pipistrelle x1 Noctule x1	3 1	Heard only
2	22:52 – 22:55	Common pipistrelle x1	1	Heard only
3	22:59 – 23:03	-	-	-
4	23:08 – 23:11	Common pipistrelle x3	Continuous	Commuting and feeding, with a pair chasing down the hedgerow
4/5	23:15	Common pipistrelle x5	Continuous	Feeding up and down the road and hedgerows
5	23:18 – 23:22	-	-	-
5/6	23:24	Common pipistrelle x1	Continuous	Heard only
6	23:26 – 23:29	Common pipistrelle x1	1	Heard only
7	23:31 – 23:34	Common pipistrelle x1	Continuous	Feeding and circling at the trees near the streetlight
8	23:37 – 23:40	Common pipistrelle x2	2	Commuting and chasing up the treeline, east to west
9	23:42 – 23:45	-	-	-

Transect 4: July

Project: 1820 Peel Hall, Warrington	**Date: 23/07/19**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 29-27	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 40%-40%**
Survey Start: 21:06	**Survey End: 22:51**	**Sunrise/Sunset Time: 21:21**	**Detector used: iPhone**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:06 – 21:26	-	-	-
2	21:29 – 21:32	-	-	-
3	21:37 – 21:40	-	-	-
4	21:50 – 21:54	Noctule x1	1	Distant pass; heard only
4/5	22:05	Common pipistrelle x1	2	Up and down north-south down hedgerows along the road
5	22:07 – 22:11	-	-	-
6	22:13 – 22:17	Common pipistrelle x1	2	Flew west, circling the treeline
7	22:21 – 22:26	-	-	-
8	22:28 – 22:32	Soprano pipistrelle x1	3	Distant pass, heard only
8/9	22:34	Common pipistrelle x1	1	Flying south to north along the treeline
9	22:36 – 22:39	Noctule x1	1	Distant pass, heard only
9/1	22:44	Common pipistrelle x1	1	Distant pass; heard only
1	22:45 – 22:48	Common pipistrelle x1	1	Distant pass; heard only
2	22:50 – 22:53	-	-	-

Transect 4: August

Project: 1820 Peel Hall, Warrington	**Date: 27/08/19**	**Lead Surveyor: LM**	**Surveyor: LC**
Temperature (st-fin): 20 - 17	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 80%-95%**
Survey Start: 19:57	**Survey End: 22:12**	**Sunrise/Sunset Time: 20:12**	**Detector used: Orange**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:57 – 20:18	-	-	-
2	20:18 – 20:21	-	-	-
3	20:22 – 20:25	-	-	-
4	20:30 – 20:33	-	-	-
5	20:35 – 20:38	Noctule x1	1	Heard only
6	20:40 – 20:44	Common pipistrelle x1	2	Quick passes, low by high hedges and trees, passing east to west
6-7	20:45 – 20:47	Soprano pipistrelle x1	Continual	Continuous circling in corner tree; foraging
7	20:50 – 20:53	Common pipistrelle x1	3	Heard only, brief
7-8	20:54	Common pipistrelle x1	1	Heard only, brief
8	20:56 – 20:59	-	-	-
8-9	20:59	Common pipistrelle x1	1	Heard only, brief; possibly on other side of vegetation
9	21:02 – 21:05	-	-	-
1	21:09 – 21:12	-	-	-
1-2	21:13	Noctule x 1	1	Heard only
2	21:14 – 21:17	-	-	-
3	21:19 – 21:22	Common pipistrelle x1	1	Heard only, brief
4	21:25 – 21:28	-	-	-
4-5	21:30	Nathusius pipistrelle x1	1	Heard only, brief
5	21:31 – 21:35	-	-	-
6	21:37 – 21:40	-	-	-
7	21:43 – 21:46	-	-	-
8	21:48 – 21:51	Noctule x1	1	Heard only
9	21:56 – 21:59	Common pipistrelle x1 Noctule x1	2 1	Heard only Heard only
1	22:00 – 22:03	-	-	-
2	22:04 – 22:07	Common pipistrelle x1	1	Heard only
3	22:08 – 22:11	-	-	-
4	22:12 – 22:15	-	-	-

Transect 4: September Dusk

Project: 1820 Peel Hall, Warrington	**Date: 19/09/19**	**Lead Surveyor: LM**	**Surveyor: AC**
Temperature (st-fin): 16-11	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 20% - 0%**
Survey Start: 18:50	**Survey End: 21:16**	**Sunrise/Sunset Time: 19:16**	**Detector used: Orange**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:00 – 19:31	Noctule x1	1	Heard only
2	19:33 – 19:35	-	-	-
3	19:37 – 19:40	-	-	-
4	19:41 – 19:44	Noctule x1 Common pipistrelle x1	2	Heard only
4/5	19:45 – 19:47	Common pipistrelle x1	2	Heard only, commuting
5	19:48 – 19:51	Noctule x1	1	Heard only
5/6	19:51	Common pipistrelle x1	4	Heard only
6	19:54 – 19:57	Common pipistrelle x1	Continual	Foraging, heard only
6/7	19:57 – 19:59	Common pipistrelle x1	4	Foraging, heard only
7	19:59 – 20:02	Common pipistrelle x1	1	Foraging, heard only
7/8	20:05	Common pipistrelle x1	1	Commuted from direction of centre of field and flew towards hedgerow
8	20:09 – 20:12	Common pipistrelle x1	1	Heard only
9	20:13 – 20:19	Common pipistrelle x1 Soprano pipistrelle x1	3 1	Foraging; heard only Heard only
8	20:21 – 20:24	-	-	-
8/7	20:24	Common pipistrelle x1	2	Heard only, very brief
7	20:26 – 20:29	Common pipistrelle x1	3	Foraging; heard only
6	20:30 – 20:33	-	-	-
5	20:36 – 20:39	-	-	-
4	20:40 – 20:43	-	-	-
4/3	20:44	Common pipistrelle x1	2	Foraging; heard only
3	20:45 – 20:48	Common pipistrelle x1	Continual	Most calls heard only & foraging; 1 bat seen foraging along the track
3/2	20:50	Common pipistrelle x1	1	Foraging, heard only
2	20:51 – 20:54	Common pipistrelle x1 Soprano pipistrelle x1	3 1	Foraging, heard only Foraging; heard only
1	20:55 – 20:58	Common pipistrelle x1	Continual	Foraging, heard only
2	21:00 – 21:03	-	-	-
3	21:04 – 21:07	-	-	-

4	21:08 – 21:11	Common pipistrelle x1	1	Heard only, with social calls
5	21:12 – 21:15	-	-	-

Transect 4: September Dawn

Project: 1820 Peel Hall, Warrington	**Date: 20/09/19**	**Lead Surveyor: LM**	**Surveyor: AC**
Temperature (st-fin): 12-10	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 04:20	**Survey End: 06:52**	**Sunrise/Sunset Time: 06:52**	**Detector used: EM Touch**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	04:13 – 04:18	-	-	-
2	04:20 – 04:23	-	-	-
3	04:25 – 04:28	-	-	-
4	04:31 – 04:34	-	-	-
5	04:35 – 04:38	-	-	-
6	04:41 – 04:44	-	-	-
7	04:47 – 04:50	-	-	-
8	04:53 – 04:56	-	-	-
9	04:58 – 05:04	-	-	-
8	05:07 – 05:10	-	-	-
7	05:13 – 05:16	-	-	-
6	05:17 – 05:20	-	-	-
5	05:24 – 05:27	-	-	-
4	05:28 – 05:31	-	-	-
3	05:33 – 05:36	-	-	-
2	05:38 – 05:41	-	-	-
1	05:43 – 05:49	-	-	-
2	05:51 – 05:54	-	-	-
3	05:56 – 05:59	-	-	-
4	06:02 – 06:05	-	-	-
5	06:09 – 06:12	-	-	-
6	06:13 – 06:16	-	-	-
7	06:19 – 06:22	-	-	-
8	06:25 – 06:28	-	-	-
9	06:30 – 06:56	-	-	-

Transect 5: April

Project: 1820 Peel Hall, Warringotn	**Date: 24/04/19**	**Lead Surveyor: LM**	**Surveyor: BH**
Temperature (st-fin): 11 – 11	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 100/100**
Survey Start: 20:10	**Survey End: 22:10**	**Sunrise/Sunset Time: 20:27**	**Detector used: EM Touch**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
Start	20:10 – 20:30	-	-	-
1	20:31 – 20:34	-	-	-
2	20:35 – 20:38	-	-	-
3	20:41 – 20:45	-	-	-
4	20:48 – 20:51	-	-	-
5	20:53 – 20:56	-	-	-
6	20:58 – 21:01	-	-	-
7	21:04 – 21:07	-	-	-
8	21:09 – 21:17	Common pipistrelle x2 Soprano pipistrelle x 1	1 1	Heard and seen flying along hedgerow to south of survey parcel at 21:09 Heard and seen circling trees at the north end of a drainage ditch at 21:12
9	21:20 – 21:24	-	-	-
1	21:27 – 21:30	-	-	-
2	21:31 – 21:34	-	-	-
3	21:38 – 21:41	-	-	-
4	21:42 – 21:45	Common pipistrelle x1	1	Heard and seen flying along hedgerow to south of survey parcel at 21:42
5	21:48 – 21:52	Common pipistrelle x1	Continuous	Heard only
6	21:53 – 21 56	-	-	-
7	21:59 – 22:05	-	-	-
8	22:09 – 22:12		-	-

Transect 5: May

Project: 1820 Peel Hall, Warrington	**Date: 14/05/2019**	**Lead Surveyor: LM**	**Surveyor: BH**
Temperature (st-fin): 15-13	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 20:38	**Survey End: 23:05**	**Sunrise/Sunset Time: 21:02**	**Detector used: Red**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
Start	20:38 – 21:02	-	-	-
1	21:04 – 21:07	-	-	-
2	21:08 – 21:12	-	-	-
3	21:15 – 21:18	Noctule x1	1	Heard only
4	21:21 – 21:24	-	-	-
5	21:27 – 21:30	-	-	-
6	21:31 – 21:34	-	-	-
7	21:37 –21:40	-	-	-
8	21:46 – 21:49	-	-	-
9	21:50 – 21:53	-	-	-
1	21:56 – 21:59	-	-	-
2	22:00 – 22:03	-	-	-
3	22:07 – 22:10	-	-	-
4	22:14 – 22:17	Common pipistrelle x1	1	Flying west along field boundary.
5	22:19 – 22:22	-	-	-
6	22:24 – 22:27	-	-	-
7	22:31 – 22:34	-	-	-
7/8	22:38	Common pipistrelle x1	1	Heard only
8	22:41 – 22:44			
9	22:46 – 22:49			
1	22:53 – 22:56			
2	22:57 – 23:05	Common pipistrelle x1 Noctule x1	2 1	Heard only Heard only

Transect 5: June

Project: 1820 Peel Hall, Warrington	**Date: 25/06/19**	**Lead Surveyor: LM**	**Surveyor: BH**
Temperature (st-fin): 17 - 16	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry - dry**	**Cloud cover (st/fin): 85% - 100%**
Survey Start: 21:28	**Survey End: 23:43**	**Sunrise/Sunset Time: 21:43**	**Detector used: Red**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:31 – 21:52	-	-	-
2	21:53 – 21:56	Noctule x1	3	Heard only
2/3	21:58	Noctule x1	2	Flew from fields to the south-east, over scrub and then back to fields
3	22:00 – 22:03	Noctule x1	2	Flew from fields to the south-east, over scrub and then back to fields
4	22:06 – 22:09	-	-	-
5	22:11 – 22:14	Common pipistrelle x1	2	Heard only
6	22:18 – 22:21	-	-	-
6/7	22:23	Noctule x1	1	Heard only
7	22:25 – 22:28	-	-	-
7/8	22:32	Common pipistrelle x1	1	Heard only
8	22:34 – 22:37	-	-	-
9	22:39 – 22:42	Common pipistrelle x1 Nathusius pipistrelle x1	3 2	Feeding spirals before heading southwest
1	22:47 – 22:50	Common pipistrelle x1	1	Heard only
2	22:52 – 22:55	Common pipistrelle x1	2	Heard only
3	22:58 – 23:01	Common pipistrelle x1	1	Heard only
3/4	23:03	Common pipistrelle x1	1	Heard only
4	23:06 – 23:09	-	-	-
5	23:12 – 23:15	-	-	-
6	23:17 – 23:20	Common pipistrelle x1	1	Heard only
7	23:23 – 23:26	-	-	-
8	23:32 – 23:35	-	-	-
9	23:36 – 23:39	-	-	-
1	23:43 – 23:46	-	-	-

Transect 5: July

Project: 1820 Peel Hall	**Date: 23/07/19**	**Lead Surveyor: LM**	**Surveyor: BH**
Temperature (st-fin): 29-26	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 40%-40%**
Survey Start: 21:01	**Survey End: 22:51**	**Sunrise/Sunset Time: 21:21**	**Detector used: Red**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
Start	21:01 – 21:26		-	-
1	21:28 – 21:31	-	-	-
2	21:32 – 21:35	-	-	-
3	21:38 – 21:41	-	-	-
4	21:45 – 21:48	-	-	-
5	21:50 – 21:53	-	-	-
6	21:55 – 21:58	-	-	-
7	22:02 – 22:05	-	-	-
7/8	22:09	Noctule x1	1	Heard only
8	22:11 – 22:14	-	-	-
9	22:17 – 22:20	-	-	-
1	22:23 – 22:26	Noctule x1	3	Heard only
2	22:28 – 22:31	Noctule x1 Common pipistrelle x1	3 5	Heard only Heard only
3	22:35 – 22:38	Common pipistrelle x1	2	Heard only
3/4	22:41	Noctule x1	1	Heard only
4	22:42 – 22:45	Common pipistrelle x1	2	Heard only
5	22:47 – 22:50	-	-	-
6	22:51 – 22:54	-	-	-

Transect 5: August

Project: 1820 Peel Hall, Warrington	**Date: 27/08/19**	**Lead Surveyor: LM**	**Surveyor: AB**
Temperature (st-fin): 20 - 17	**Wind speed (st-fin): F0-F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 80% - 95%**
Survey Start: 19:57	**Survey End: 22:12**	**Sunrise/Sunset Time: 20:12**	**Detector used: Pink**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:57 – 20:17	-	-	-
2	20:20 – 20:23	-	-	-
3	20:26 – 20:29	Noctule x1	1	Heard only; foraging
4	20:35 – 20:39	Noctule x1	6	Heard only; intermittent foraging
5	20:46 – 20:50	Common pipistrelle x1	1	Heard only; brief pass
6	20:55 – 20:59	-	-	-
7	21:05 – 21:09	Common pipistrelle x1	1	Heard only; brief pass
8	21:11 – 21:15	Common pipistrelle x1	4	Commuting; very brief, heard only
9	21:18 – 21:24	Common pipistrelle x1	2	Commuting; very brief, heard only
8	21:27 – 21:31	Common pipistrelle x1	2	Commuting; very brief, heard only
7	21:34 – 21:38	Common pipistrelle x1	6	Feeding around vegetation
7/6	21:40	Common pipistrelle x1	1	Heard only
6	21:43 – 21:47	Common pipistrelle x1	2	Commuting; very brief, heard only
5	21:49 – 21:53	Common pipistrelle x1	1	Commuting; very brief, heard only
4	21:56 – 22:00	-	-	-
3	22:02 – 22:05	Common pipistrelle x1	1	Heard only
2	22:07 – 22:10	-	-	-
1	22:11 – 22:14	-	-	-

Transect 5: September dusk

Project: 1820 Peel Hall	**Date: 19/09/19**	**Lead Surveyor: LM**	**Surveyor: AB**
Temperature (st-fin): 16 – 11	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 20% - 0% (Mist)**
Survey Start: 19:00	**Survey End: 21:16**	**Sunrise/Sunset Time: 19:16**	**Detector used: EM Touch (Blank)**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:00-19:20	-	-	-
2	19:23-19:26	-	-	-
3	19:30-19:33	Noctule x1	1	Heard only; likely from the south due to info from transect 6
4	19:38-19:41	-	-	-
5	19:52-19:55	Common pipistrelle x1	3	Heard only
5/1	19:57-20:07	Common pipistrelle x1	Continual	Continuous foraging in between two rows of trees
6	20:09-20:12	Common pipistrelle x1	1	Heard only
6/7	20:16	Common pipistrelle x1	1	Heard only
7	20:17-20:20	Common pipistrelle x1	Continual	Foraging between the treeline and a large tree
8	20:24-20:27	-	-	-
9	20:30-20:36	Common pipistrelle x1	1	Very quick pass, heard only
8/9	20:37	Common pipistrelle x1	1	Very quick pass, heard only
8	20:38-20:41	Soprano pipistrelle x1	1	Heard only
8/7	20:43	Common pipistrelle x1	1	Heard only
7	20:44-20:47	Common pipistrelle x1	1	Foraging between the treeline and a large tree; multiple bats
6	20:50-20:53	Common pipistrelle x1	1	Brief pass, heard only
5	20:56-20:59	-	-	-
4	21:02-21:05	-	-	-
3	21:08-21:11	-	-	-
2	21:15-21:18	Common pipistrelle x1	1	Heard only
1	21:19-21:22	-	-	-

Transect 5: September Dawn

Project: 1820 Peel Hall, Warrington	**Date: 20/09/19**	**Lead Surveyor: AB**	**Surveyor: LM**
Temperature (st-fin): 12-10	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 04:28	**Survey End: 06:52**	**Sunrise/Sunset Time: 06:52**	**Detector used: EM Touch (Blank)**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	04:28-04:31	**-**	**-**	-
2	04:33-04:36	**-**	**-**	-
3	04:36-04:39	**-**	**-**	-
4	04:42-04:45	**-**	**-**	-
5	04:47-04:50	**-**	**-**	-
6	04:56-04:59	**-**	**-**	-
7	05:01-05:04	**-**	**-**	-
8	05:05-05:08	**-**	**-**	-
9	05:10-05:16	**-**	**-**	-
8	05:17-05:20	**-**	**-**	-
7	05:22-05:25	**-**	**-**	-
6	05:27-05:30	**-**	**-**	-
5	05:36-05:39	**-**	**-**	-
4	05:41-05:44	**-**	**-**	-
3	05:48-05:51	**-**	**-**	-
2	05:53-05:56	**-**	**-**	-
1	05:59-06:02	**-**	**-**	-
2	06:03-06:06	**-**	**-**	-
3	06:08-06:11	**-**	**-**	-
4	06:12-06:15	**-**	**-**	-
5	06:18-06:25	**-**	**-**	-
6	06:26-06:29	**-**	**-**	-
7	06:31-06:34	**-**	**-**	-
8	06:35-06:38	**-**	**-**	-
9	06:39-06:52	**-**	**-**	-

Transect 6: April

Project: 1820 Peel Hall, Warrington	**Date: 24/04/19**	**Lead Surveyor: LM**	**Surveyor: PB**
Temperature (st-fin): 11 – 11	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 100/100**
Survey Start: 20:10	**Survey End: 22:10**	**Sunrise/Sunset Time: 20:27**	**Detector used: EM3**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
Start	20:10 – 20:27	-	-	-
1	20:30 – 20:33	-	-	-
2	20:35 – 20:39	-	-	-
3	20:43 – 20:46	-	-	-
4	20:50 – 20:53	Common pipistrelle x1	1	One bat looped back along hedgerow to north of transect 5 area
5	20:57 – 21:00	Common pipistrelle x1	1	One bat looped back along hedgerow to north of transect 5 area
6	21:04 – 21:07	Common pipistrelle x1	1	Unseen, briefly detected. Likely over scrub/ditch
7	21:11 – 21:15	Common pipistrelle x1	2	Briefly seen foraging above woodland canopy. Single bat.
7/8	21:17	Common pipistrelle x2	2	Pass close to woods -- unseen
8	21:21 – 21:24	Common pipistrelle x1	2	Single bat foraging above woodland.
9	21:27 – 21:30	-	-	-
1	21:35 – 21:38	-	-	-
2	21:41 – 21:43	-	-	-
2/3	21:45	Common pipistrelle x1	1	
3	21:46 – 21:49	Common pipistrelle x1	1	One bat at canopy height
3/4	21:51	Common pipistrelle x1	1	Pass, faint and unseen
4	21:53 – 21:56	Common pipistrelle x1	Continuous	Constant, very faint calls – unseen. Likely adjacent or above woodland.
5	21:59 – 22:01	-	-	-
6	22:06 – 22:10	-	-	-

Transect 6: May

Project: 1820 Peel Hall, Warrington	**Date: 14/05/2019**	**Lead Surveyor: LM**	**Surveyor: PB**
Temperature (st-fin): 15-13	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 20:38	**Survey End: 23:02**	**Sunrise/Sunset Time: 21:02**	**Detector used: EM3**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
Start	20:38 – 21:02	-	-	-
1	21:02 – 21:05	-	-	-
2	21:07 – 21:10	-	-	-
3	21:12 – 21:15	-	-	-
3/4	21:17	Noctule x1	1	Walking between 3&4: Noctule seen but not echolocating. Commuting.
4	21:18 – 21:21	-	-	-
5	21:24 – 21:27	-	-	-
5/6	21:28	Noctule x1	1	Foraging; brief call
6	21:32 – 21:35	-	-	-
7	21:38 – 21:41	-	-	-
8	21:46 – 21:49	-	-	-
9	21:51 – 21:54	-	-	-
1	21:58 – 22:01	Common pipistrelle x1	1	Foraging; feeding buzzes; brief and unseen
2	22:05 – 22:08	Common pipistrelle x1 Noctule x1	2 1	Common pipistrelle: Foraging at hedge canopy height (~4m) Noctule: Single pass, unseen
3	22:09 – 22:12	Common pipistrelle x1 Soprano pipistrelle x1	1 1	Common pipistrelle: Seen along woods to southwest, flying along the hedge feature. Soprano pipistrelle: Heard only
4	22:18 – 22:21	-	-	-
4/5	22:23	Common pipistrelle x2	1	Two pipistrelles, heard only; nature of calls suggests chasing behaviour
5	22:25 – 22:28	-	-	-
6	22:33 – 22:36	Common pipistrelle x1	3	Heard only; occasional foraging. Likely a single bat up and down the ditch feature.
7	22:40 – 22:43	-	-	-
8	22:48 – 22:51	-	-	-
9	22:53 – 22:56	-	-	-
1	23:00 -23:02	-	-	-

Transect 6: June

Project: 1820 Pell Hall, Warrington	**Date: 25/06/19**	**Lead Surveyor: LM**	**Surveyor: PB**
Temperature (st-fin): 17 - 16	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 85-100%**
Survey Start: 21:23	**Survey End: 23:47**	**Sunrise/Sunset Time: 21:43**	**Detector used: EM3**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
Start	21:23 – 21:43	-	-	-
1	21:47 – 21:50	-	-	-
2	21:57 – 22:00	Noctule x1	Continual	Single bat foraging high with swifts, circling over vegetation then left east towards Radley Woods
3	22:02 – 22:05	Noctule x1	Continual	Foraging above grassland in circles. Single bat diving to grass height with feeding buzzes.
3/4	22:07	Noctule x1	Continual	Feeding buzzes and diving to grass height; large loops at woodland edge and over grassland
4	22:10 – 22:13	Common pipistrelle x1	4	Single bat foraging along woodland edge, looping and flying east to west along edge
4/5	22:15	Common pipistrelle x1	3	Foraging up and down hedgerow
5	22:16 – 22:19	-	-	-
5/6	22:22	Common pipistrelle x1	3	Commuting and foraging up and down hedgerow; single bat.
6	22:24 – 22:27	Common pipistrelle x1	3	Foraging along the ditch at low height; single bat
7	22:32 – 22:35	Common pipistrelle x1	4	Heard only; likely above tree canopy
7/8	22:38	Common pipistrelle x1	1	Foraging along ditch and over grassland in a loop
8	22:41 – 22:44	-	-	-
9	22:46 – 22:49	Common pipistrelle x1	2	Foraging along track south/north and a second bat foraging west/east
1	22:54 – 22:57	-	-	-
1/2	22:58	Common pipistrelle x1	3	Heard only
2	22:59 – 23:02	Common pipistrelle x2	3	2 bats foraging along woodland edge, up and down
2/3	23:03	Common pipistrelle x1	1	Commuting and foraging; distant passes heard only
3	23:04 – 23:07	Common pipistrelle x1 Natterer x1	4 1	Single bat foraging along woodland edge, up and down Commuting; distant pass heard only
3/4	23:10	Common pipistrelle x1	2	Commuting east to west; very brief pass
4	23:12 – 23:15	-	-	-
5	23:19 – 23:22	-	-	-
6	23:26 – 23:29	-	-	-
7	23:31 – 23:34	-	-	-
8	23:38 – 23:41	-	-	-
9	23:43 – 23:47	-	-	-

Transect 6: July

Project: 1820 Pell Hall, Warrington	**Date: 23/07/19**	**Lead Surveyor: LM**	**Surveyor: PB**
Temperature (st-fin): 29 - 25	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 40 – 40%**
Survey Start: 21:01	**Survey End: 23:06**	**Sunrise/Sunset Time: 21:21**	**Detector used: EM3**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
Start	21:01 – 21:21	-	-	-
1	21:26 – 21:30	-	-	-
2	21:34 – 21:39	-	-	-
3	21:39 – 21:42	-	-	-
4	21:48 – 21:51	Common pipistrelle x1	6	Flew to & fro north south between woods & field, then flew in circles over woods.
5	21:56 – 21:59	Noctule x1	1	Distant pass heard only
6	22:04 – 22:07	-	-	-
6/7	22:08 – 22:10	Noctule x1	4	Regular but very faint calls; heard only
7	22:11 – 22:14	Common pipistrelle x1	3	Foraging behaviour in large circles over scrub
7/8	22:17 – 22:20	Noctule x1	Continual	Continual foraging high above the field in large circles with buzzes and dives
8	22:23 – 22:27	Noctule x1	Continual	Continual foraging high above the field in large circles with buzzes and dives
8/9	22:31	Noctule x1	3	Faint passes, heard only
9	22:32 – 22:35	Noctule x1	Continual	Continual foraging over field, roughly along the tree edge
9/1	22:37	Noctule x1	3	Faint passes, heard only
1	22:42 – 22:45	-	-	-
2	22:49 – 22:53	Common pipistrelle x1	1	Feeding along the woodland with one pass out of the woods and then back in
3	22:57 – 23:01	-	-	-
4	23:03 – 23:06	-	-	-

Transect 6: August

Project: 1820 Pell Hall, Warrington	**Date: 27/08/19**	**Lead Surveyor: LM**	**Surveyor: PB**
Temperature (st-fin): 20-17	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry - Dry**	**Cloud cover (st/fin): 80-95%**
Survey Start: 19:57	**Survey End: 22:12**	**Sunrise/Sunset Time: 20:12**	**Detector used: EM3**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:57 – 20:17	-	-	-
2	20:19 – 20:22	-	-	-
3	20:24 – 20:27	Noctule x1	Continuous	Very faint calls, heard only
4	20:29 – 20:32	Noctule x1	Continuous	Feeding buzz, flying at height. Flew in a loop and then flew NE across field and woods
5	20:34 – 20:37	Noctule x2	1 pass each	One flew east to west; the other flew east and curved over field to north
6	20:40 – 20:43	Noctule x1	1	Heard only; very brief
7	20:47 – 20:50	Noctule x1	1	Faint, one pass with regular calls for around 20 seconds
8	20:53 – 20:56	Common pipistrelle x1	1	Flew from north to south in a curved loop towards Radley Woods
9	20:57 – 21:03	-	-	-
8	21:04 – 21:07	Common pipistrelle x1	2	Flew from Radley Woods in a loop north and then back south, foraging over the tall ruderal
7	21:09 – 21:12	-	-	-
7/6	21:15	Common pipistrelle x1	3	Heard only
6	21:17 – 21:20	Common pipistrelle x1	4	Single pipistrelle foraging low above tall ruderal in wide circles before flying south
5	21:24 – 21:27	Common pipistrelle x1	1	Single brief pass, heard only
4	21:29 – 21:32	Common pipistrelle x1	1	Seen briefly over tall ruderal
3	21:34 – 21:37	-	-	-
2	21:39 – 21:42	Common pipistrelle x2	1 pass each	Single bat foraging low over tall vegetation in a loop going north-south. Joined by a 2nd bat, both circling stop point in tight circles; chasing behaviour and social calls
1	21:45 – 21:51	Common pipistrelle x1	1	Feeding buzzes, south along ditch
2	21:52 – 21:55	-	-	-
2/3	21:56	Common pipistrelle x1	1	East along the path, low flying and commuting along ditch
3	21:57 – 22:00	Common pipistrelle x1	1	Heard only
4	22:02 – 22:05	-	-	-
5	22:07 – 22:12	-	-	-

Transect 6: September Dusk

Project: 1820 Peel Hall, Warrington	**Date: 19/09/19**	**Lead Surveyor: LM**	**Surveyor: PB**
Temperature (st-fin): 16 – 11	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 20% - 0% (Mist)**
Survey Start: 19:00	**Survey End: 21:16**	**Sunrise/Sunset Time: 19:16**	**Detector used: EM3 Echo 1**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:00-19:23	-	-	-
2	19:23-19:27	-	-	-
3	19:28-19:31	Noctule x1	Constant	Seen, not heard. Arrow NUMBER on map. Picked up by AB
4	19:33-19:36	-	-	-
5	19:38-19:41	-	-	-
5/6	19:43-19:46	Noctule x1	1	Commuting across field. See map.
6	19:45-1948	-	-	-
7	19:49-19:52	-	-	-
8	19:54-19:57	-	-	-
9	19:59-20:05	Common pipistrelle x2	2	Two common pipistrelles chasing behaviour
8	20:06-20:09	-	-	Fox seen
7	20:12-20:15	-	-	-
6	20:16-20:19	-	-	-
5	20:20-22:25	-	-	-
4	20:27-20:30	-	-	-
3	20:31-20:34	-	-	-
2	20:36-20:39	-	-	-
1	20:42-20:48	-	-	-
2	20:50-20:53	-	-	-
3	20:54-20:57	-	-	-
4	20:59-21:02	-	-	-
5	21:03-21:07	-	-	-
6	21:10-21:13	-	-	-
7	21:14-21:17	-	-	-

Transect 6: September Dawn

Project: 1820 Peel Hall, Warrington	**Date: 20/09/19**	**Lead Surveyor: LM**	**Surveyor: PB**
Temperature (st-fin): 12-10	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 04:30	**Survey End: 06:52**	**Sunrise/Sunset Time: 06:52**	**Detector used: EM3 Echo 1**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	04:30-04:33	**-**	**-**	-
2	04:35-04:38	**-**	**-**	-
3	04:40-04:43	**-**	**-**	-
4	04:45-04:48	**-**	**-**	-
5	04:50-04:53	**-**	**-**	-
6	04:56-04:59	**-**	**-**	-
7	05:00-05:03	**-**	**-**	-
8	05:05-05:08	**-**	**-**	-
9	05:09-05:15	**-**	**-**	-
8	05:19-05:22	**-**	**-**	-
7	05:24-05:27	**-**	**-**	-
6	05:30-05:33	**-**	**-**	-
5	05:34-05:37	**-**	**-**	-
4	05:37-05:40	**-**	**-**	-
3	05:41-05:44	**-**	**-**	-
2	05:44-05:47	**-**	**-**	-
1	05:47-05:53	**-**	**-**	-
2	05:54-05:57	**-**	**-**	-
3	05:59-06:02	**-**	**-**	-
4	06:03-06:08	**-**	**-**	-
5	06:10-06:14	**-**	**-**	-
6	06:17-06:21	**-**	**-**	**-**
7	06:22-06:25	**-**	**-**	**-**
8	06:25-06:27	**-**	**-**	**-**
9	06:30-06:52	**-**	**-**	**-**

Transect 7: April

Project: 1820 Peel Hall, Warrington	**Date: 24/04/19**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 11 – 11	**Wind speed (st-fin): F2 – F1**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 100/100**
Survey Start: 20:10	**Survey End: 22:10**	**Sunrise/Sunset Time: 20:27**	**Detector used: EM Touch**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:10 – 20:30	-	-	-
2	20:35 – 20:39	Noctule x1	5	Heard only
3	20:44 – 20:48	Common pipistrelle x 1	3	Foraging around woodland edge
4	20:51 – 20:54	-	-	-
5	20:58 – 21:03	-	-	-
6	21:07 – 21:10	-	-	-
7	21:14 – 21:17	-	-	-
8	21:21 – 21:25	-	-	-
9	21:28 – 21:31	-	-	-
1	21:35 – 21:38	-	-	-
2	21:41 – 21:44	Common pipistrelle x2 Soprano pipistrelle x1	Multiple Multiple	Bats seen flying along the woodland edge, foraging and in spirals. Likely feeding at ponds and near trees.
3	21:47 – 21:50	-	-	-
4	21:52 – 21:55	-	-	-
5	21:57 – 22:00	Common pipistrelle x2	Continual	Feeding passes made around trees near cottage
6	22:02 – 22:05	-	-	-
7	22:07 – 22:10	-	-	-

Transect 7: May

Project: 1820 Peel Hall, Warrington	**Date: 14/05/2019**	**Lead Surveyor: LM**	**Surveyor: SW**
Temperature (st-fin): 15-13	**Wind speed (st-fin): F1-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 20:45	**Survey End: 23:02**	**Sunrise/Sunset Time: 21:02**	**Detector used: Green**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	20:45-21:05	-	-	-
2	21:06-21:09	-	-	-
3	21:16-21:22	Noctule x1 Nathusius pipistrelle x1	1 1	Not echolocating; seen flying in circles near pond Heard only
3/4	21:23-21:25	Common pipistrelle x 1	1	Heard only
4	21:25-21:29	-	-	-
5	21:32-21:36	-	-	-
6	21:38-21:42	Noctule x1	1	Heard only
7	21:45-21:48	Common pipistrelle x 1	1	Heard only
7/8	21:48-21:50	Common pipistrelle x 1	1	Heard only
8	21:54-21:57	Common pipistrelle x 1	1	Heard only
9	21:58-22:00	Common pipistrelle x 1	1	Flying northwest to southeast along scrub line.
9/1	22:00-22:03	Common pipistrelle x 1 Soprano pipistrelle x1	Continual	Constant foraging in spirals over ponds. Constant foraging in spirals over ponds.
1	22:08-22:14	Common pipistrelle x 1 Soprano pipistrelle x1	Continual Continual	Foraging spirals around trees Foraging spirals around trees
1/2	22:14-22:18	Common pipistrelle x 1	1	Foraging spiral over ponds
2	22:18-22:22	Common pipistrelle x 1	Continual	Foraging spirals over ponds
3	22:25-22:28	Common pipistrelle x 2 Nathusius pipistrelle x1	1 1	Heard only Heard only
4	22:32-22:36	-	-	-
4/5	22:36-22:39	Common pipistrelle x 1	1	Heard only
5	22:39-22:43	Common pipistrelle x 1	1	Heard only
6	22:44-22:48	-	-	-
7	22:50-22:54	-	-	-
8	22:57-23:01	Noctule x1	1	Heard only
9	23:02-23:05	-	-	-

Transect 7: June

Project: 1820 Peel Hall, Warrington	**Date: 25/06/19**	**Lead Surveyor: LM**	**Surveyor: AC**
Temperature (st-fin): 17-16	**Wind speed (st-fin): F2-F1**	**Precipitation (st-fin): Dry-Dry**	**Cloud cover (st/fin): 85%-100%**
Survey Start: 21:28	**Survey End: 23:43**	**Sunrise/Sunset Time: 21:43**	**Detector used: Blue Smiley EM Touch**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
5	21:27 – 21:50	-	-	-
4	21:52 – 21:55	-	-	-
3	22:00 – 22:03	Noctule x1	1	Commuting from direction of woodland behind stop point
2	22:10 – 22:13	Noctule x1 Common pipistrelle x1	2 4	Noctule : Heard only Common pipistrelle: Foraging passes at woodland ponds
2/1	22:15	Common pipistrelle x1	Constant	Heard only; foraging – social calls occasional
1	22:18 – 22:21	Common pipistrelle x1	Constant	Heard only; foraging – Social calls occasional
1/9	22:22	Noctule x1	1	Distant pass, heard only
1/9	22:23 – 22:24	Common pipistrelle x1	Constant	Commuting and foraging passes; heard only
9	22:25 – 22:28	Common pipistrelle x2 Noctule x1	Constant 1	Common pipistrelle: Heard only; foraging and commuting with social calls occasional Noctule: Distant pass, heard only
8	22:35 – 22:38	Soprano pipistrelle x1 Common pipistrelle x1	1 2	Both: Distant pass, heard only.
7	22:43 – 22:46	Common pipistrelle x1 Soprano pipistrelle x1	3 1	Common pipistrelle: Heard only; commuting Soprano pipistrelle: Heard only; commuting and social calls
7/6	22:47-51	Common pipistrelle x1	5+	Several passes over 4 minutes. Heard only.
6	22:52 – 22:55	Common pipistrelle x1	2	Heard only; foraging along road
6/5	22:56-57	Common pipistrelle x1	1	Heard only; commuting
5	22:59 – 23:02	-	-	-
4	23:06 – 23:10	Common pipistrelle x1	1	Heard only; commuting
3	23:12 – 23:15	-	-	-
3/2	23:18	Common pipistrelle x3	3	Heard only; commuting
2	23:20 – 23:23	Common pipistrelle x1	1	Distant pass, heard only
2/1	23:24 – 23:29	Common pipistrelle x1	2	Heard only
1	23:33 – 23:33	Common pipistrelle x1	1	Distant pass, heard only
9	23:37 – 23:40	-	-	-
9/8	23:43	Common pipistrelle x1 Soprano pipistrelle x1	1 3	Common pipistrelle: Distant pass, heard only Soprano pipistrelle: Heard only, feeding and commuting

Transect 7: July

Project: 1820 Peel Hall, Warrington	**Date: 23/07/19**	**Lead Surveyor: LM**	**Surveyor: AH**
Temperature (st-fin): 29-26	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 40%-40%**
Survey Start: 21:01	**Survey End: 23:06**	**Sunrise/Sunset Time: 21:21**	**Detector used: Green**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	21:01 – 21:26	-	-	-
2	21:30 – 21:33	Noctule x1	3	Heard only
2/3	21:35	Noctule x1	1	Heard only
3	21:39 – 21:42	-	-	-
4	21:46 – 21:49	-	-	-
4/5	21:51 – 21:53	Noctule x1	Continuous	Heard only
5	21:54 – 21:57	Noctule x1	1	Heard only
5/6	21:59	Common pipistrelle x1	1	Heard only
6	22:00 – 22:03	Noctule x1 Common pipistrelle x1	1 1	Heard only Heard only
7	22:08 – 22:11	Noctule x1	Continuous	Foraging 5m above the scrub area
8	22:16 – 22:20	Noctule x1 Common pipistrelle x1	1 Continuous	Distant pass, heard only Foraging behaviour above the scrub
9	22:22 – 22:25	Noctule x1	Continuous	Heard only
1	22:32 – 22:35	Noctule x1 Common pipistrelle x1	3 1	Heard only Heard only
2	22:38 – 22:41	Noctule x1	Continuous	With social calls right overhead
2/3	22:43 – 22:45	Noctule x1	Continuous	Foraging calls approximately 20m from southern border
3	22:46 – 22:49	Common pipistrelle x1	1	Heard only
4	22:51 – 22:54	-	-	-

Transect Form: Transect 7, August

Project: 1820 Peel Hall, Warrington	**Date: 23/07/19**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 20 - 17	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 40%-40%**
Survey Start: 19:57	**Survey End: 22:12**	**Sunrise/Sunset Time: 20:12**	**Detector used: iPhone**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:57 – 20:20	-	-	-
2	20:28 – 20:32	-	-	-
2/3	20:36 20:41	Noctule x1 Noctule x1	1 1	Heard only Heard only
3	20:42 – 20:45	-	-	-
4	20:47 – 20:51	Common pipistrelle x1	1	Heard only
5	20:58 – 21:02	Noctule x1	2	Heard only
6	21:07 – 21:10	Common pipistrelle x1 Soprano pipistrelle x1	1 2	Flying up and down road Flying up and down road
6/7	21:12	Soprano pipistrelle x1	1	Heard only
7	21:15 – 21:18	-	-	-
8	21:23 – 21:27	Common pipistrelle x1	1	Heard only
9	21:30 – 21:34	Noctule x1 Common pipistrelle x1 Soprano pipistrelle x1	1 1 2	Heard only Heard only Heard only
1	21:37 – 21:41	Noctule x1 Common pipistrelle x1 Soprano pipistrelle x1	1 2 2	Heard only Heard only Heard only
2	21:46 – 21:51	Common pipistrelle x1	Continuous	Stayed to watch flight path; circling between trees and ponds up and down path feeding
2/3	21:56	Common pipistrelle x1	1	Heard only
3	21:58 – 22:02	Common pipistrelle x1 Natterer x1	3 1	Heard only Heard only
4	22:04 – 22:07	Common pipistrelle x1	3	Heard only; with social calls
5	22:09 – 22:12	Common pipistrelle x1	3	Heard only
5/6	22:12	Soprano pipistrelle x1	1	Heard only

Transect 7: September Dusk

Project: 1820 Peel Hall	**Date: 19/09/19**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 16 – 11	**Wind speed (st-fin): F0 – F0**	**Precipitation (st-fin): Dry/Dry**	**Cloud cover (st/fin): 20% - 0% (Mist)**
Survey Start: 19:09	**Survey End: 21:16**	**Sunrise/Sunset Time: 19:16**	**Detector used: EM Touch (iPhone)**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	19:09-19:27	-	-	-
2	19:29-19:34	-	-	-
3	19:37-19:40	-	-	-
4	19:46-19:51	-	-	-
4/5	19:55	Common pipistrelle x1	3	Feeding circles on road
5	19:57-20:01	Common pipistrelle x2	Continual	Commuting and feeding up and down road, often in pairs and chasing
6	20:05-20:09	Common pipistrelle x2 Soprano pipistrelle x1	Continual	Commuting and feeding up and down road, often in pairs and chasing
7	20:13-20:18	-	-	-
8	20:22-20:26	Common pipistrelle x1	Continual	Heard only; pattern of calls sounds like feeding spirals
9	20:28-20:32	-	-	-
9/1	20:33-20:36	Common pipistrelle x1	Continual	Commuting and feeding passes around woodland edge
1	20:37-20:41	Common pipistrelle x1	1	Heard only, commuting
2	20:45-20:49	Common pipistrelle x1	1	Heard only, commuting
3	20:52-20:56	-	-	No bats; fox heard barking for several minutes
3/4	21:00	Common pipistrelle x1	2	Heard only
4	21:03-21:07	Common pipistrelle x1	2	Heard only
5	21:12-21:16	Noctule x1	1	Heard only

Transect 7: September Dawn

Project: 1820 Peel Hall, Warrington	**Date: 20/09/19**	**Lead Surveyor: LM**	**Surveyor: LM**
Temperature (st-fin): 12-10	**Wind speed (st-fin): F0 - F0**	**Precipitation (st-fin): Dry-dry**	**Cloud cover (st/fin): 0%-0%**
Survey Start: 04:20	**Survey End: 06:52**	**Sunrise/Sunset Time: 06:52**	**Detector used: EM Touch (iPhone)**

Stop Point	Time	Species	No. Passes	Notes on behaviour, i.e. emergence/re-entry, foraging, commuting, etc
1	04:20-04:24	**-**	**-**	-
2	04:26-04:32	**-**	**-**	-
3	04:34-04:38	**-**	**-**	-
4	04:42-04:47	**-**	**-**	-
5	04:52-04:58	**-**	**-**	-
6	05:01-05:06	**-**	**-**	-
7	05:10-05:14	**-**	**-**	-
8	05:19-05:22	**-**	**-**	-
9	05:27-05:31	**-**	**-**	-
1	05:34-05:38	**-**	**-**	-
2	05:42-05:46	**-**	**-**	-
3	05:49-05:52	**-**	**-**	-
4	05:58-06:02	**-**	**-**	-
5	06:08-06:12	**-**	**-**	-
6	06:14-06:17	**-**	**-**	-
7	06:20-06:23	**-**	**-**	-
8	06:26-06:29	**-**	**-**	-
9	06:31-06:52	**-**	**-**	-

ECOLOGY

ECO 12 2019 Breeding Bird Survey

APP 1: Map 1: Peel Hall – Breeding Bird Survey Map - Visit 1

Map 2: Peel Hall - Breeding Bird Survey Map - Visit 2

SITE AT PEEL HALL, WARRINGTON

For

SATNAM MILLENIUM LTD

ECO 12:
BREEDING BIRD SURVEY

APRIL - MAY 2019

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Landscape Architecture • Ecology • Environmental Planning & Assessment • Arboriculture

BREEDING BIRD SURVEY 2019

LAND AT PEEL HALL WARRINGTON

LAND AT PEEL HALL WARRINGTON

BREEDING BIRD SURVEY 2019

A Report for:

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Ian Ryding
January 2020

TABLE OF CONTENTS

CONTENTS **PAGE NO.**

PART 1 INTRODUCTION:

1.1 REASONS FOR SURVEY:

Pennine Ecological have been commissioned by Appletons, to undertake an updated breeding bird survey and evaluation of land at Peel Hall, Warrington.

Surveys were initially undertaken on the site in 2013, which was re-evaluated further in 2015. In 2017, at the request of the Local Planning Authority's advisors on ecology, Greater Manchester Ecology Unit (GMEU), full site surveys were repeated.

Full surveys were recommissioned again and undertaken in 2019 to provide up to date baseline information on the breeding bird populations at Peel Hall.

1.2 SURVEY OBJECTIVES:

The objective of the survey is to obtain up to date baseline data on the breeding bird interest of the Peel Hall site. The survey information will be used to evaluate the site in respect of the effects of the proposed development, and to inform an appropriate level of mitigation to be applied to the site in respect of breeding birds.

1.3 LOCATION:

The survey focussed on a large area of abandoned farmland and adjacent woodlands next to the M62 on the north-eastern edge of Warrington, Cheshire. The site also includes two recreation areas, one on the eastern side of the site off Ballater Drive, and one to the south off Grasmere Avenue.

The site is known as Peel Hall and is located immediately west of Houghton Green.

See Maps 1 and 2 in the appendix for the extent of survey.

1.4 CONSTRAINTS:

The bird survey was undertaken on the 11th April and 15th May 2019, which is within the main nesting season of bird at Peel Hall. Survey conditions were good throughout both survey visits with no major constraint to survey.

PART 2 SURVEY RESULTS:

2.1 DESK BASED STUDY:

A request for ecological data from RECORD the Biodiversity Information System for Cheshire, Halton, Warrington and Wirral was undertaken in 2019. The extent of the data search area is shown on The RECORD data search plan. See Fig. 1 below.

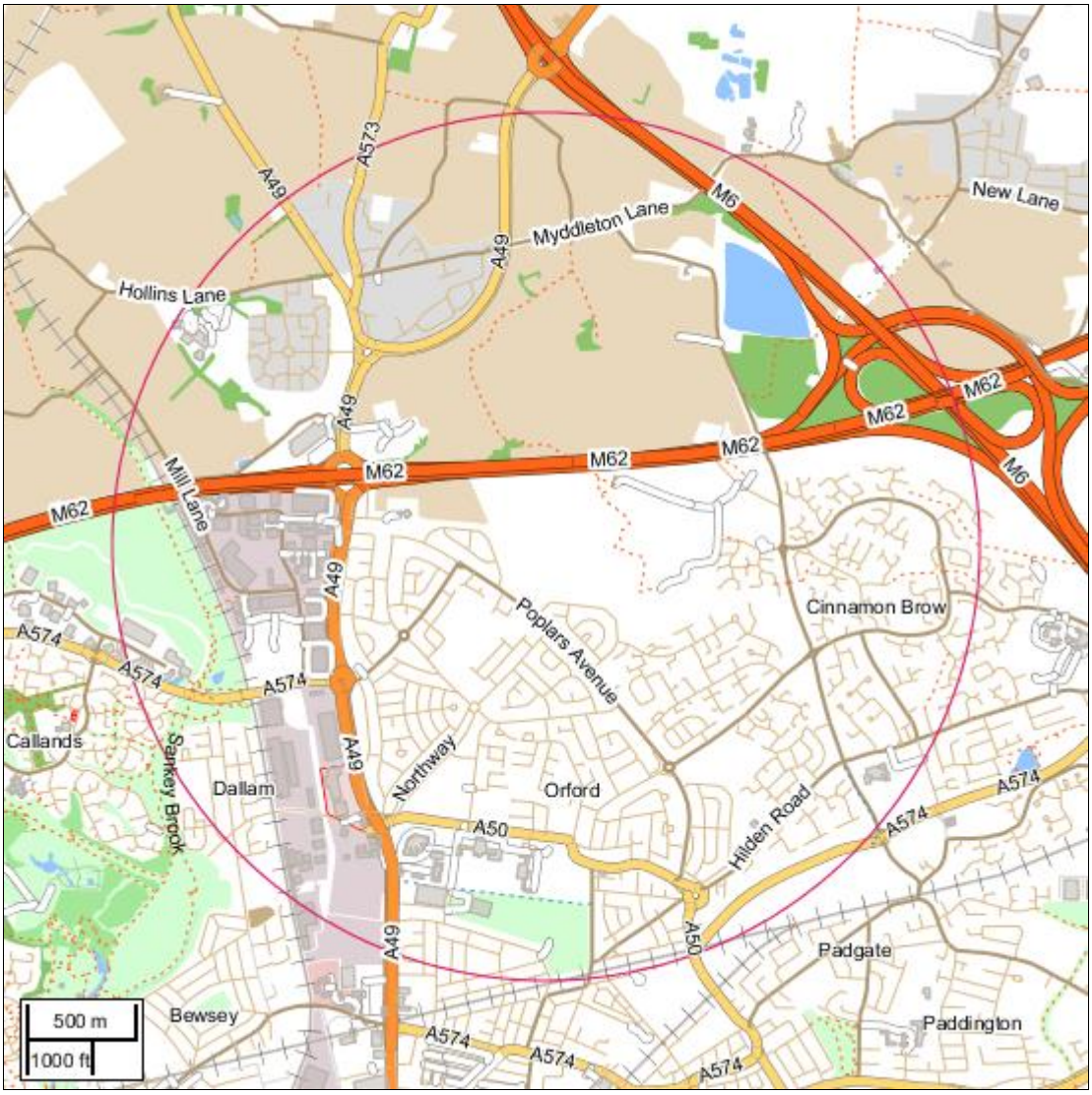

Fig. 1: RECORD Data Search Plan.

2.1.1 Results of Data Search:

The data search returned an extensive list of bird species from the search area specified. Most of the records are specific to single 1km grid squares only, with squares SJ6091,l SJ6191 and SJ6291 forming part of the site.

However, out of all the species records returned, a total of two species were attributable to the site by means of a site-specific grid reference.

Another fifteen species records related to the 1km square SJ6191 which covers most of the site but also includes extensive areas of land outside of the site boundary.

In addition, excluding species recorded in other grid squares, a further eight species were recorded in SJ6291. This square contains a very small proportion of the site only.

No species records were returned from SJ6091.

The species records returned from the site and the 1km grid squares overlapping the study are listed on Table 1 below.

Table 1: Data Search Species Records:

Species:	Grid Ref:	Year:	Source:	Designation:
Kestrel	SJ615918	2011	RECORD	Amber List
Kestrel	SJ61639189	2013	RECORD	Amber List
Kestrel	SJ6191	2014	RECORD	Amber List
Kestrel	SJ6291	2008	RECORD	Amber List
Lapwing	SJ61729199	2011	RECORD	S41 NERC Act. Red List.
Lapwing	SJ6291	2008	RECORD	S41 NERC Act. Red List.
Lesser black-backed gull	SJ6191	2014	RECORD	Amber List
Meadow pipit	SJ6191	2014	RECORD	Amber List
Dunnock	SJ6191	2014	RECORD	S41 NERC Act
Dunnock	SJ6291	2008	RECORD	S41 NERC Act
Mistle thrush	SJ6191	2014	RECORD	Red List.
Mistle thrush	SJ6291	2008	RECORD	Red List.
House sparrow	SJ6191	2014	RECORD	S41 NERC Act. Red List.
Bullfinch	SJ6291	2008	RECORD	Amber List
Bullfinch	SJ6191	2014	RECORD	Amber List
Corn bunting	SJ6191	2014	RECORD	S41 NERC Act. Red List.
Reed bunting	SJ6291	2008	RECORD	S41 NERC Act. Amber List
Starling	SJ6191	2014	RECORD	S41 NERC Act. Red List.
Starling	SJ6291	2008	RECORD	S41 NERC Act. Red List.
Swallow	SJ6291	2008	RECORD	
Swallow	SJ6191	2014	RECORD	
Swift	SJ6191	2014	RECORD	Amber List
Swift	SJ6291	2008	RECORD	Amber List
Skylark	SJ6191	2014	RECORD	S41 NERC Act. Red List.
Whitethroat	SJ6191	2014	RECORD	
Whitethroat	SJ6291	2008	RECORD	
Song thrush	SJ6191	2014	RECORD	S41 NERC Act. Red List.
Song thrush	SJ6291	2008	RECORD	S41 NERC Act. Red List.
Willow warbler	SJ6191	2014	RECORD	
Willow warbler	SJ6291	2008	RECORD	
Canada goose	SJ6291	2008	RECORD	
Herring gull	SJ6191	2014	RECORD	S41 NERC Act. Red List.
Herring gull	SJ6291	2008	RECORD	S41 NERC Act. Red List.
Great black-backed gull	SJ6291	2008	RECORD	Amber List
Black-headed gull	SJ6291	2008	RECORD	Amber List
Grey partridge	SJ6291	2008	RECORD	S41 NERC Act. Red List.
Mallard	SJ6291	2008	RECORD	Amber List

Key Table 1:

S41 NERC Act - Section 41 Species of Principal Importance in England Natural Environment and Rural Communities (NERC) Act 2006

Red List – Birds of Conservation Concern 4 Red List Birds (BoCC4).

Amber List – Birds of Conservation Concern 4 Amber List Birds (BoCC4).

2.1.2 Evaluation of RECORD Data:

Most of the species recorded are common throughout the county and beyond, and the following designations apply.

Section 41 Species (NERC Act):

Lapwing
Dunnock
House sparrow
Corn bunting
Reed bunting
Starling
Skylark
Song thrush
Herring gull
Grey partridge

Red List BoCC4:

Lapwing
House sparrow
Corn bunting
Reed bunting
Starling
Skylark
Song thrush
Herring gull
Grey partridge

Amber List BoCC4:

Kestrel
Lesser black-backed gull
Greater black-backed gull
Black-headed gull
Meadow pipit
Dunnock
Bullfinch
Reed bunting
Swift
Mallard

Wildlife & Countryside Act 1981 (as amended):

All bird species are offered varying levels of protection under the Wildlife & Countryside Act. None of the species listed above are listed on Schedule 1 of the said act.

2.2 BREEDING BIRD SURVEY:

2.2.1 Survey Methodology:

The breeding bird survey method was adapted from the British Trust for Ornithology (BTO) Common Bird Census and Breeding Bird Survey methodologies.

Two visits were undertaken during the early morning of 11th April and 15th May 2019.

The site was surveyed on foot with transect routes designed to allow full survey coverage of the site in order to detect all bird activity on the site.

On each visit the site was surveyed using similar predetermined transects and listening points, from which all bird activity was recorded. This information was plotted on to a site map, a separate map was produced for each of the site visits. See Maps 1 and 2 in the Appendix.

Criteria to determine whether birds were breeding or not follows 'The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991.

The criteria are as follows:

Present: Birds observed, or heard, but with no evidence of breeding.

Recorded in potential breeding habitat in the breeding season.

Male bird singing.

Breeding: Birds proved to be breeding and those likely to be breeding although proof was lacking.

A bird or pair of birds apparently holding territory.

Courtship display.

Visiting possible nest site.

Nest building.

Adults agitated suggesting probably presence of nest or young.

Used nest or shells found.
Distraction display.

Recently fledged young.

Adults indicating occupied nest.

Adults carrying food, young or faecal sac.

Nest with eggs or young seen or heard.

Bird sitting.

2.2.2 Survey Results:

A brief account of each site visit detailing survey conditions and comments is provided below.

Summary of Bird Survey Visits:

The following section outlines each site visit, recording time and date of survey, general weather conditions and general comments on birds recorded.

Visit 1: 11.04.2019 – 6.30am - 9.05am:

Survey Conditions: Clear with no wind and a light ground frost which thawed quickly.

Bird activity largely centred around potential passerine nesting habitats in scrub, hedgerow and woodland areas. Open grasslands are rank but had been mown which improved ground-nesting bird potential and a single male skylark was observed singing on territory. Woodpigeon and magpie are very common and foraging in both grassland and woodland/scrub areas.

Common passerines prominent including blackbird, robin, dunnock and wren. Migrants noted include willow warbler, chiffchaff and blackcap.

Visit 2: 16.05.2019 – 6.15am - 8.55am:

Survey Conditions: Clear, calm and bright with low wind (2-3 mph).

Common songbirds present in suitable nesting habitat as before and at similar density. Continued presence of woodpigeon and large numbers of magpie often in non-breeding family groups. Two pairs of skylark present in the grassland apparently holding territory.

Similar migrant warbler activity as on Visit 1 with the addition of several pairs of whitethroat.

2.2.3 Summary of Survey Results:

The bird survey provided records for a number of breeding species. Tables 2 and 3 below list all birds recorded during the survey. Those found to be breeding are also indicated.

Table 2: Bird Species Recorded During the Survey:

Species	Visit 1	Visit 2	Species Accounts
Blackbird	*	*	Many, mostly male birds observed in suitable habitat throughout the site. Activity often included agitated males on territory indicative of breeding. Estimated 10 breeding pairs at least.
Song thrush		*	Single birds observed in/adjacent to immature woodland next to the Ballater Drive playing field, and in scrub in the core site area. Nothing to indicate breeding and probably breeding in adjacent gardens.
Mistle thrush		*	Single foraging bird observed in one area of the site only. Possibly breeding but no evidence.
Robin	*	*	Birds singing in the woodland/scrub at Peel Hall Farm and in woodland/ scrub throughout the site. Activity indicates breeding with an estimated 10 pair at least present.
Dunnock	*	*	Single males singing in linear scrub near Spa Brook and in woodland near Ballater Drive playing field. Possibly breeding but nothing to indicate such other than in suitable habitat during the breeding season. Four pairs estimated.

Table 2 Continued.

Species	Visit 1	Visit 2	Species Accounts
Wren	*	*	Birds widespread and singing in suitable habitat on all visits throughout the site. Estimated 10 pairs breeding.
Goldcrest	*	*	Aural registrations of birds in woodland by Peel Hall Farm. Breeding status not known but possibly breeding off-site in dense conifers at Peel Hall Farm.
Blue tit		*	Very few birds observed foraging in reed beds by Spa Brook. Breeding status not known but probably not breeding on site due to a lack of tree holes.
Great tit	*	*	Birds singing and foraging in habitats near Birch Avenue, Spa Brook and Peel Hall Farm. Breeding status not known but probably not breeding on site due to a lack of tree holes.
House sparrow	*	*	Birds foraging in small groups in habitats adjacent to Ballater Drive, Birch Avenue and Grasmere Avenue. Not breeding due to absence of suitable habitat.
Chiffchaff	*	*	Birds singing in woodland and scrub habitats adjacent to Peel Hall Farm, in woodlands on the southern boundary and Ballater Drive. Probably breeding but nothing to confirm other than singing in suitable habitat.
Blackcap	*	*	Male bird singing in scrub by Spa Brook and woodland/scrub by Peel Hall Farm. Possibly four pairs breeding but nothing to confirm other than singing in suitable habitat.
Whitethroat		*	Extensive territorial activity observed in scrub habitats south/west of Peel Hall Farm. Six pairs estimated to be breeding.
Willow warbler	*	*	Two singing males in scrub east of Newhaven Road and at the playing field off Ballater Drive. Probably breeding but no evidence.
Woodpigeon	*	*	Ubiquitous species foraging frequently observed throughout site. Breeding and several nest sites located in woodland.
Skylark	*	*	Singing male on territory on Visit 1, two pairs on Visit 2. At least one pair breeding.
Chaffinch	*	*	Singing males observed in woodland and scrub habitats adjacent to Peel Hall Farm. Estimated 2 breeding pairs.
Bullfinch	*	*	Pair observed foraging in scrub mosaic south-east of Peel Hall Farm and woodland edge near Radley Plantation. Breeding status not known.
Goldfinch	*		Foraging birds present in shrubs on the playing fields at Grasmere Drive and Ballater Drive. No evidence of breeding.
Reed Bunting	*	*	Male birds singing on territory in ditch-side habitats. Estimated two pairs breeding.
Starling	*	*	Groups of birds foraging in derelict fields and playing fields. Not breeding
Magpie	*	*	Many foraging birds observed, including non-breeding family groups, some possibly from last season. Nest at Ballater Drive and in peripheral woodlands.
Carrion crow	*	*	Foraging birds in low numbers, pair breeding west of Peel Hall Farm.
Jackdaw	*	*	Several birds foraging occasionally. Not breeding.
Swift		*	Several birds foraging over playing field. Not breeding.
Swallow		*	These birds were observed in varying numbers foraging over the site. No attempt was made to record all registrations due to the highly mobile nature of the species and the fact that they are not breeding on site.

Key to Table 2: * = Recorded on visit.

Twenty six bird species were recorded during the survey, Table 3 on the following page shows those considered to be breeding, those present in suitable habitat but with no evidence of breeding, and those not breeding.

It should be noted that some birds registered during the survey as present in suitable habitat but with no evidence of breeding, have been included as breeding species based upon the surveyors evaluation of the species concerned.

Table 3: Breeding Status of Birds Recorded in 2019:

Birds Recorded as Breeding	**Birds Present (no evidence of breeding)**	**Birds not Breeding (no suitable habitat, foraging/flying over or passage migrant)**
Blackbird Robin Dunnock S41‡ Wren Chiffchaff Blackcap Whitethroat Skylark S41*† Woodpigeon Chaffinch Reed bunting S41‡† Magpie	Mistle thrush* Song thrush S41*† Blue tit Great tit Willow warbler Bullfinch S41‡† Goldfinch Goldcrest	Carrion crow Jackdaw Swift‡ Swallow Starling S41*† House sparrow S41*†
Total: 12	**Total: 8**	**Total: 6**

Key to Table 3:

S41 = Section 41: Species of Principal Importance in England NERC Act 2006.
*Red List - Birds of Conservation Concern 4 (BoCC4)
‡ Amber List - Birds of Conservation Concern 4 (BoCC4)
† Cheshire Local Biodiversity Action Plan (BAP)

Estimated Number of Pairs of Breeding Species in 2019:

The following figures are based on the number of nest sites located and an estimation of breeding pairs based on observations made in the field. It should be noted that the 'actual' number of breeding pairs might differ from the figure given, in addition, other species recorded in column two of Table 3 might also possibly breed on site although activity to indicate/suggest breeding may have been absent or not observed during the survey.

Blackbird - 10 estimate
Robin - 10 estimate
Dunnock - 4 estimate
Wren - 10 estimate
Chiffchaff - 2 estimate
Blackcap - 4 estimate
Whitethroat - 6 estimate
Skylark - 2 estimate
Woodpigeon - 6 estimate
Chaffinch - 2 estimate
Reed bunting - 2 estimate
Magpie - 2 confirmed

Reference to the study undertaken in 2015 identified a natural trend that the site had become increasingly rank/coarse through seral succession since the original survey in 2013. The survey in 2017 showed that this trend had continued with notable increases in rankness and the development of scrub communities, thus making the site less suitable for those species which require shorter open grassland habitats for nesting, such as skylark and meadow pipit.

Consequently no ground-nesting species were recorded during the survey in 2017.

However, the 2019 survey revealed that the grassland areas had been cut which reduced the immediate rankness and temporarily arrested the succession to scrub as noted previously.

As a result of this management, suitability for ground-nesting species improved and an estimated two pairs of skylark were recorded as breeding on the site.

For the other species recorded on site in 2019, the site remains as suitable as it was in 2013 and 2017.

A broad comparison has been made between the species recorded during the 2013 survey and those recorded in 2017. Species estimated to be breeding and those confirmed as breeding have been treated as being a breeding species on the site during both years. See Table 4 below.

Table 4: Breeding Status Comparison Table:

Bird Species	2013 (including number of pairs)	2017 (including number of pairs)	2019 (including number of pairs)
Skylark	2	Species not recorded	2
Meadow pipit	1	Species not recorded	Species not recorded.
Reed bunting	2	Species not recorded	2
Blackbird	1	12	10
Song thrush	1	1	Species not recorded as breeding
Robin	1	5	10
Dunnock	Species not recorded as breeding	3	4
Wren	Species not recorded as breeding	14	10
Chiffchaff	1	2	2
Blackcap	1	Species not recorded as breeding.	4
Whitethroat	1	10	6
Sedge warbler	Species not recorded	2	Species not recorded
Willow warbler	Species not recorded	2	Species not recorded as breeding
Woodpigeon	3	8	6
Chaffinch	2	2	2
Moorhen	2	1	Species not recorded
Magpie	Species not recorded as breeding	2	2
Total Number of Species	**12**	**13**	**12**

Overall, the number of species breeding on the site hasn't changed significantly with twelve, thirteen and twelve species considered to be breeding on site in 2013, 2017 and 2019 respectively.

However, the range of species has changed as well as the number of registered territories (estimated). The return of skylark as a breeding species is attributed to the mowing of the grassland which has provided an open grass sward habitat which is more suitable for ground-nesting species.

Blackcap was also recorded as a breeding species in 2019 despite it being recorded on only a single visit in 2017. In addition, reed bunting has returned as a breeding species after its absence in 2017.

The reasons why blackcap and reed bunting have returned to the site to breed is not clear, as there has been no significant change in the extent of suitable nesting habitat for these species on the site. Consequently this change is attributed to ‘natural variation’ in the distribution of the population locally.

Increases in the numbers of the more 'ubiquitous' species such as wren and blackbird was reported in 2017, and this increase was attributed as much to the earlier survey season which had improved the chances of registrations, as to any increase in available suitable habitat.

In 2019 the survey was undertaken at an optimum period and the numbers of pairs of these species recorded remain relatively stable.

The number of pairs of whitethroat recorded as breeding in 2017 was ten, in comparison to the six pairs recorded in 2019. Whilst the scrub habitats on the site have been retained, the mowing of the site's grassland has changed the general structure of the site resulting in less tall grassland cover, and less tall grass/scrub interface which is one of the preferred nesting habitats of this species.

The change in habitat might have influenced numbers, but general variation in the population locally might also be a significant influencing factor.

The absence of song thrush and sedge warbler cannot be attributed to management or any on-site natural trend as the extent of suitable nesting habitat available for those species hasn't significantly changed.

PART 3 ECOLOGICAL EVALUATION & RECOMMENDATIONS:

3.1 EVALUATION OF SURVEY FINDINGS:

3.1.1 Evaluation - Birds:

The survey has shown that site supports a range of common nesting birds, including several species that use the site for foraging but nest off site. These birds include seven species listed in Section 41 (NERC Act 2006), five of which are Red-listed in BoCC4, and seven Amber-listed in BoCC4.

Based upon the 2019 survey the bird fauna of the site is considered to be of **local-district** value.

This concurs with the evaluation provided following survey in 2013 and 2017.

The seven S41 bird species recorded during the 2019 survey include skylark, reed bunting and dunnock as breeding species, song thrush and bullfinch recorded in suitable habitat but no evidence of breeding, and starling and house sparrow present but no suitable nesting habitat present.

3.1.2 Cheshire Biodiversity Action Plan Habitats & Species - Birds:

Six species recorded on the site are included in the Cheshire Local BAP. These include skylark, reed bunting, house sparrow, bullfinch, starling, and song thrush. Of those, only skylark and reed bunting were recorded as breeding species on site.

3.1.3 Local Wildlife Sites - Birds:

In addition to the above, the Local Wildlife Site (LWS) selection criteria was referred to in respect of the sites status under section S2 Birds.*

Using the criteria for selection it can be confirmed that the site fails to meet the required criteria for selection based upon the number of species recorded over the two survey visits.

**See Local Wildlife Site Selection Criteria for the Cheshire region. Covering the districts of Cheshire West and Chester, Cheshire East, Wirral, Halton and Warrington* (November 2012 Updated February 2014)

3.1.4 Barn Owl:

Specific surveys for barn owl were not undertaken as the site had been evaluated in 2015 and found to be clearly unsuitable for sustainable barn owl occupation.

There are no nest sites on-site and the main nesting areas are in the buildings within the farmsteads in the agricultural land north of the M62. The kestrel nest box identified in 2015 on the property on Radley lane offers limited potential and there are no other potential nest sites on land adjacent to the site that are not separated by continuous urban development or hazardous motorway barriers.

In addition, the bat foraging surveys undertaken at dusk in 2015 and 2019 returned no record of barn owl activity.

Whilst there is there is potentially suitable foraging habitat on the site, the combined presence of the M62 and the general absence of nest sites south of the motorway, has effectively removed any reasonable possibility that a resident population of barn owls on the site is sustainable, despite the presence of potentially suitable foraging habitat.

3.2 RECOMMENDATIONS:

The following section considers any measures or future survey required in light of the findings of this survey, these are outlined below.

3.2.1 Birds:

The surveys undertaken in 2019 were undertaken during the main nesting season of the birds present at Peel Hall, and the results of the surveys are considered to be representative of the range of breeding birds present during 2019. No further formal surveys are recommended.

As precautionary measures the following actions are recommended.

- All trees and shrubs scheduled for removal must be felled outside of the breeding season i.e. within the period September-February inclusive.

- All brash must be chipped on site or removed before the onset of the breeding season to prevent secondary colonisation by breeding birds.

- All stands of common reed requiring removal must be mown to ground level during September-February inclusive to avoid impacting on breeding warblers.

- If it is not possible to remove the trees, shrubs and reedbeds outside of the breeding season, then these features must be inspected by an ecologist prior to their removal.

- If breeding birds are found, then a minimum buffer zone of 5m around the nest site must be implemented to prevent disturbance until the young have fledged and left the nest. The buffer zone must be fenced off temporarily until the nest is unoccupied. The trees/shrubs containing the nest site can only be felled once the ecologist has declared the site clear of nesting birds.

In addition to the above, it is recommended that to maintain and enhance the bird population at the site, substantial areas of bird habitat including woodland, hedgerows, ditches/streams and ponds should be retained.

These areas should be enhanced further by extensive tree/shrub planting, new ponds and the enhancement/creation of existing/new linear wildlife corridors/links.

In regard to barn owl, the observations made during the bat surveys in 2017 and 2019 and subsequent evaluation are sufficient to inform any recommendations for the site. Therefore no further surveys are recommended.

In line with the Barn Owl Trust's guidance, **no provision for barn owls must be made due to the close proximity of the M62 which is a serious hazard to barn owl survival**.

PART 4 REFERENCES:

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Land at Peel Hall - Update of Ecological Survey 2015. (Appletons 2015)

Land at Peel Hall - 2017 Breeding Bird Survey. (Appletons 2017)

APPENDIX 1:

Map 1: Peel Hall – Breeding Bird Survey Map - Visit 1
Map 2: Peel Hall - Breeding Bird Survey Map - Visit 2

REVISIONS

Project PEEL HALL, WARRINGTON	
Title Red Edge Plan	
Client Satnam Millennium Ltd	
Date MAY 2016	Scale 1:2,500@A1
Drawn SW/ DS	Drawing No. 1820_27
Checked DA/ DS	Revision -

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Landscape Institute Registered practice

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PEEL HALL, WARRINGTON

BREEDING BIRD SURVEY MAP - VISIT 1 (11th April 2019)

Key: Standard BTO Species Codes:

B.	Blackbird
BC	Blackcap
BF	Bullfinch
BT	Blue tit
C.	Carrion crow
CC	Chiffchaff
CH	Chaffinch
D.	Dunnock
GC	Goldcrest
GO	Goldfinch
GT	Great tit
HS	House sparrow
JD	Jackdaw
MG	Magpie
MT	Mistle thrush
R.	Robin
RB	Reed bunting
S.	Skylark
SI	Swift
ST	Song thrush
SG	Starling
SL	Swallow
WH	Whitethroat
WP	Woodpigeon
WR	Wren
WW	Willow warbler

Key; Broad Habitat Types:

- Woodland/scrub/trees/shrubs
- Dry reedbeds
- GR — Coarse grassland (mown)
- TH — Tall ruderal herb (mown)
- A — Amenity grassland

PEEL HALL, WARRINGTON

BREEDING BIRD SURVEY MAP - VISIT 2 (15th MAY 2019)

REVISIONS		

Project: PEEL HALL, WARRINGTON	
Title: Red Edge Plan	
Client: Satnam Millennium Ltd	
Date: MAY 2016	Scale: 1:2,500@A1
Drawn: SW/ DS	Drawing No.: 1820_27
Checked: DA/ DS	Revision: -

Landscape Institute Registered practice

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ECOLOGY

ECO 13 2019 Barn Owl Habitat Suitability Assessment

SITE AT PEEL HALL, WARRINGTON

For

SATNAM MILLENIUM LTD

ECO 13:
BARN OWL ASSESSMENT

METHODOLOGIES AND RESULTS ONLY

APRIL – SEPTEMBER 2019

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Landscape Architecture • Ecology • Environmental Planning & Assessment • Arboriculture

CONTENTS:

The current report comprises the methodologies and survey data of barn owl survey work only. Barn owl desk study data, an overview of results, an impact assessment of proposals in relation to barn owl are included in Chapter 6 of the Environmental Statement (March 2020).

1.0 METHODOLOGIES

1.1 An evaluation of barn owl activity/potential was undertaken using a combination of a survey for potential on and off-site nesting locations, the findings of the 2019 breeding bird survey, the 2019 dusk/dawn bat activity surveys and an overall assessment of site suitability. The timing of the bird and bat surveys coincides with when barn owls, if present and/or using the site, would be expected to be active and observable.

1.2 The 2019 breeding bird survey was undertaken in April – May, with two early morning site visits by two surveyors between 06.15 and 09.15 on each visit. Conditions were good on each visit. All bird activity heard and seen was recorded including any barn owl.

1.3 The bat activity surveys included one dawn and six dusk survey visits between the 24th April and 20th September 2019. Survey time for each visit was ~2hrs. A team of seven surveyors was deployed relative to the location, size and nature of the site. Surveyors initially adopted static strategic positions across the site before walking transect that, collectively between the surveyors, covered the entire study area. Surveyors were instructed to note down any barn owl activity as well as bat.

Survey Constraints

1.4 In relation to assessing off-site properties for barn owl nesting potential, no direct inspections were undertaken. This was not considered a significant constraint owing to the general suboptimal nature of surrounding structures for barn owl, and the overriding effect of the M62 on predicting barn owl presence/likely absence.

2.0 RESULTS

Bird Survey

2.1 No barn owls were observed or heard on site in the two early morning visits during the bird survey in 2019. In addition, the extensive bat survey work undertaken at dusk during the barn owl breeding season, returned no aural or visual records of barn owl activity on the site throughout 14 hours of dusk/dawn observation. The timing, level and extent of survey applied at the site are considered sufficient to be able to identify barn owl activity, if the species was present on the site.

Foraging Areas

2.2 The site potentially provides areas of good foraging habitat for barn owls in the form of open coarse grasslands with good small mammal populations. The site is undergoing seral succession from grassland through to scrub, which has over time decreased the area of potential foraging habitat by increasing the level of dense ruderal herb vegetation and bramble scrub on the site.

Nest Site Search On-Site

2.3 In conjunction with the Phase 1 Habitat Survey visits and Ground Level Bat Roost Assessment of Trees, the whole of the site was walked over to identify any feature that might possibly be used as a nest site by barn owls. The survey revealed that there are no potential nest sites on the site.

Nest Site Search Off-Site

2.4 Whilst the search for potential nest sites in the study area revealed an absence of any building that barn owl might use for nesting, the presence of potentially suitable habitat on the site means that properties off site also need to be considered in respect of their value to barn owls.

2.5 Examination of online aerial images and a site visit revealed no potentially suitable buildings adjacent to the site area to the south of the motorway.

2.6 The land to the south, west and east of the site is extensively urban/residential and therefore it was not feasible to inspect all of those properties. Therefore, a general evaluation was made from the roadsides locally, combined with the examination of online aerial images. Based on the evaluation outlined above, these residential areas to the south, east and west of the site, provide no features traditionally used by breeding barn owl.

2.7 The land to the north is largely agricultural and composed of arable land and grass leys with associated occasional farmsteads. The farms were not visited but it is assumed that at least some of the buildings are potentially suitable to some degree for nesting barn owl, confirmed by records of barn owl ~0.7km north of the site identified the ecological desk study search (See Chapter 6.3 of ES).

Barrier and Hazard Effects

2.8 The M62 forms the entire northern boundary of the site, with extensive residential areas present east, west and south of the site, apart from a linear golf course beyond which lies the M6/M62 interchange. Therefore the site is isolated from any barn owl population that might occur off site.

2.9 The M62 represents a very serious hazard to barn owls attempting to cross it due to the high risk of collision. The adverse effect of such features on barn owls through collision with vehicles is well documented, with the Barn Owl Trust the leading organisation issuing advice in respect of development and the species.

2.10 The 15-year research project undertaken by Ramsden,D.R. for the Barn Owl Trust (2015) provides the following statement:

'*Major roads cause the complete absence of breeding Barn Owls within 0.5 km either side of the road, severe depletion of their population within 0.5 - 2.5 km of the road and some depletion within 2.5 - 8 km of the road. It is not until 25 km from a road that no effect of its presence on Barn Owl populations can be detected.*'

2.11 The M62 section adjacent to Peel Hall doesn't have a continuous screen along both sides of the road, and much of the road is more or less at the same level as the surrounding land. (See Photograph below)

Therefore for any barn owl population present in the farms north of the road to use the Peel Hall site, a very hazardous barrier would have to be crossed.

2.12 The more dependant owls are on the site, the more times they would have to cross the road to forage due to an absence of potential nest sites south of the M62. Therefore the risk of collision rises to such a degree that sustainability of any barn owl population locally is considered to be remote.

3.0 COMPARISON WITH PREVIOUS SURVEY DATA

3.1 A barn owl survey was undertaken at the site in 2015 following the same methodologies, including a review of the 2013 breeding bird survey and the 2015 dusk bat activity surveys.

3.2 As was recorded by the 2019 survey effort, no barn owl activity was recorded throughout the 2013 or 2015 survey work, and no suitable nesting features were identified within or adjacent to the site.

3.3 One kestrel box was identified, however dismissed as unsuitable owing to likely high levels of disturbance as the box was located directly above a well-used residential garden.

3.4 The overall conclusion remains unaltered that the presence of the M62 combined with the absence of appropriate nest sites south of the motorway, effectively removes any reasonable possibility that a resident population of barn owls on the site is sustainable, despite the presence of potentially suitable foraging habitat.

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ECOLOGY

ECO 14 2019 Water Vole Survey

APP 1: Appletons Drawing 1820-T6-01: Water vole survey plan & results