



Ecological Impact Assessment  
**Land at Duck's Nest, Arborfield**  
For

**David Wilson Homes**

Project No.: DWH001-020-008/001/001

September 2024

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## 1. Summary and Recommendations

### 1.1 Summary

- 1.1.1** David Wilson Homes is submitting a hybrid planning application for a site in Arborfield known as land at Duck's Nest. The application includes a full application for the change of use of land, from agricultural land to provide an area of Suitable Alternative Natural Green Space (SANG) with details of associated landscaping, tree planting, drainage measures, parking, walking routes and other works associated to the creation of the SANG. In addition, an outline application will be submitted with all matters reserved other than access into the site for a residential development of up to 135 dwellings, open space, internal accesses and parking, drainage measures, landscaping and all other associated works.
- 1.1.2** Ecological baseline assessments of the proposed development site and surrounding area were undertaken between 2022 and 2024. This included surveys for bats, [REDACTED] reptiles, hazel dormouse, birds and great crested newt (GCN). A habitat survey was undertaken using the UK Habitat Classification System (UKHab) and condition of habitats was recorded to enable calculation of a baseline biodiversity metric for the site using the Natural England Statutory Metric. An ecological desk study was undertaken in 2024.
- 1.1.3** The desk study found two statutory designated sites for nature conservation within the study area, these were Longmore Bog Site of Special Scientific Interest (SSSI), 1.6km away, and the Thames Basin Heaths Special Protection Area, 3km from the site. A further 15 non-statutory local wildlife sites are within 2km of the proposed development, the closest of which is 0.07km from the site. The desk study provided results of protected species within 1km, which included schedule 1 birds, reptiles, stag beetle, bats, hedgehog [REDACTED]
- 1.1.4** During the field survey the dominant habitats on site were found to be modified grassland. Other habitats present included hedgerows, other neutral grassland and a small parcel of broadleaved woodland.
- 1.1.5** The site has suitable foraging and commuting habitat for bats and nine species of bat were recorded during the activity surveys. Four trees were identified as having potential to support roosting bats, and three trees were identified as requiring further assessment. All trees with potential to support roosting bats are proposed to be retained as part of the development.
- 1.1.6** During reptile surveys, grass snakes and slow worm were recorded to be present. The suitable reptile habitat on site comprises the edge habitats adjacent to the hedgerows and scrub areas on site, with most of this habitat retained as part of the SANG or other landscaping proposals.
- 1.1.7** Forty-one species of bird were recorded on site during the breeding bird surveys. The species recorded on site are considered common and widespread across the country.
- 1.1.8** No hazel dormouse or evidence of hazel dormouse was recorded on site.
- 1.1.9** Three waterbodies adjacent to the site were assessed to have excellent suitability for GCN. The eDNA survey returned a negative result for GCN from P1 and P3 (P2 was dry at the time of the survey), in 2022. However, the site falls within the amber and red risk zones under the NatureSpace District Level Licence.

## 1.2 Main Recommendations

- 1.2.1 On the basis of these ecological surveys, the following measures are recommended to reduce the likelihood of significant negative effects on features of nature conservation importance:

### *Detailed Design Stage*

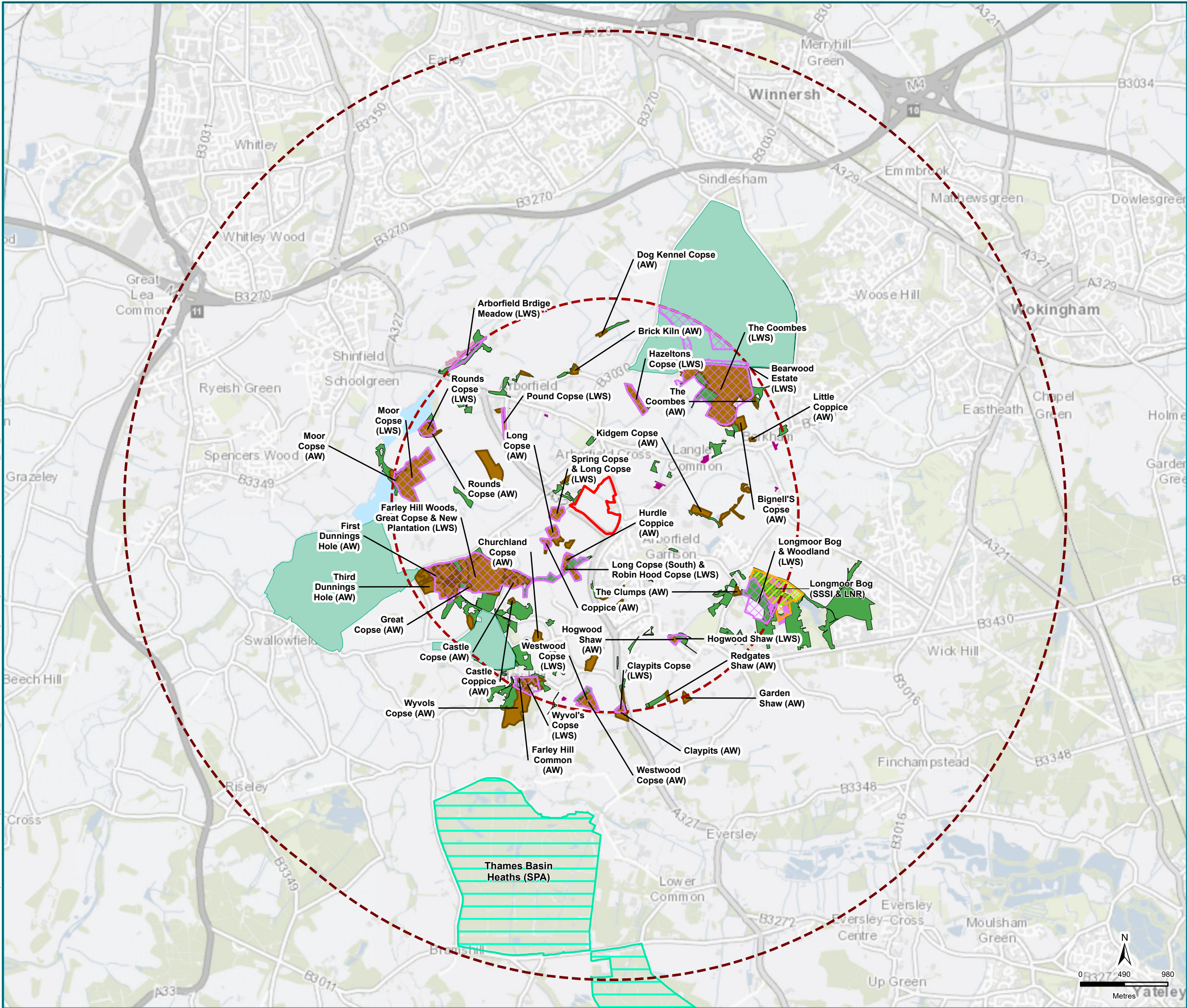
- Production of a Construction Environmental Management Plan, Landscape Environmental Management Plan and Biodiversity Enhancement Plan, to be submitted to Wokingham Borough Council, ahead of commencement of development.
- An area of SANG will be incorporated into the development proposals in order to mitigate any potential impact on the Thames Basin Heaths SPA;
- Artificial lighting, including lighting associated with houses and street lighting, should be directional and away from commuting and foraging habitat and any trees with bat potential. Dark zones will be implemented on key habitats;
- Where planting is proposed, a range of native species with different flowering periods should be considered to promote insect (bats primary food source) diversity on site;
- Log and brash piles should be created using removed vegetation for hedgehog with routes established throughout the site to promote connectivity;
- Areas of habitat created as part of the development should be designed to offer nesting opportunities for birds, this can be achieved through the provision of bird boxes and/or the creation and retention of areas of dense woody vegetation such as scrub, woodland or trees;
- The northern boundary of the SANG will not have a fence, and instead the hedgerows will act as a barrier to allow off-leash exercise for dogs.

### *Construction Phase*

- Enquiry submitted to NatureSpace about registering the site under a District Level Licence;
- Install protective fencing to prevent pollution and dust impacting retained priority habitat;
- Collect contaminated water (for example, run-off or water pumped out of excavations) in a system where it can be recycled or treated, such as a settlement tank or lagoon
- Activities involving potential pollutants, such as concrete or fuel, should be carried out in dedicated areas which are designed so that spills, leaks, drips and contaminated run-off can be captured and properly disposed of;
- Protect stockpiles (for example soil, sand, or hardcore) so that materials are not blown or washed away;
- Any excavations should be covered over at night or a suitable means of escape (i.e. a ramp) for mammals provided;
- The use of chemical pesticides and herbicides should be avoided wherever possible;
- Arising should be removed from site and not stockpiled;

- A mitigation method statement, informed by further surveys closer to the construction date (if necessary) should be produced detailing how reptiles will be protected during the development;
- Vegetation clearance should be undertaken outside of the breeding bird season (March - September) or as a last resort following a check for nesting birds;
- Vegetation clearance in areas of scrub and grassland should adhere to a two-stage cut following a fingertip search to displace or remove any reptiles from affected areas;
- Hibernacula and refugia should be dismantled by hand by and ECoW to allow hedgehog and reptiles to leave of their own accord;
- [REDACTED]  
[REDACTED]
- Prior to construction, updated GCN eDNA surveys should be conducted to confirm that GCN remain likely absent;
- Himalayan balsam should be removed by a specialist contractor; and
- Use of artificial lighting should be directional and avoid illuminating areas of retained vegetation.

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Legend

- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Local Wildlife Site (LWS)
- Ancient Woodland (AW)
- Wood Pasture and Parkland
- Coastal and floodplain grazing marsh
- Deciduous Woodland
- Lowland fens
- Lowland heathland
- Traditional orchard
- 2km Study Area Buffer
- 5km Study Area Buffer
- Site Boundary

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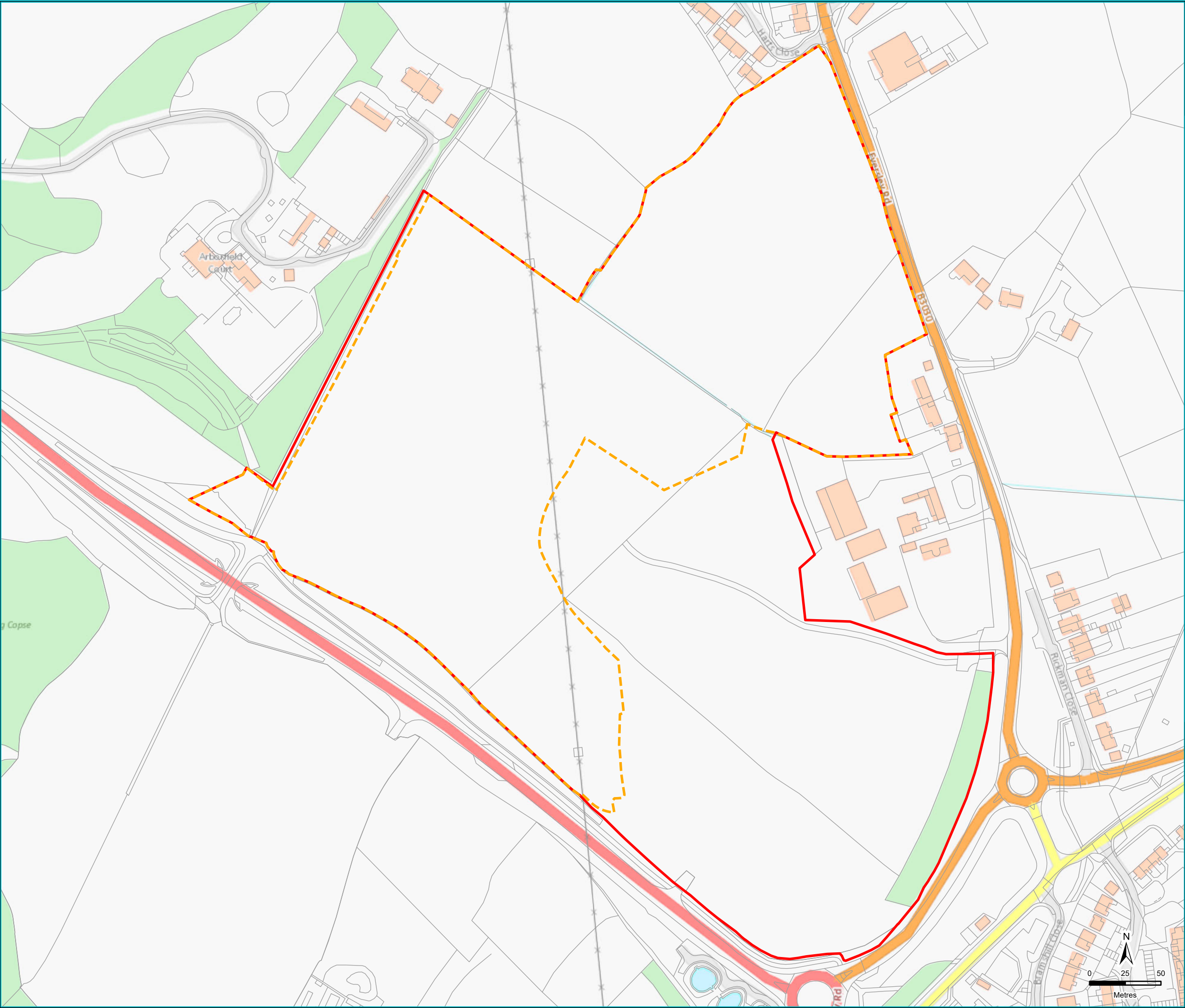
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Figure Number  
1

Figure Title  
Site Location, Study Areas  
and Desk Study Results  
2024

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- Legend
- SANG Boundary
  - Site Boundary

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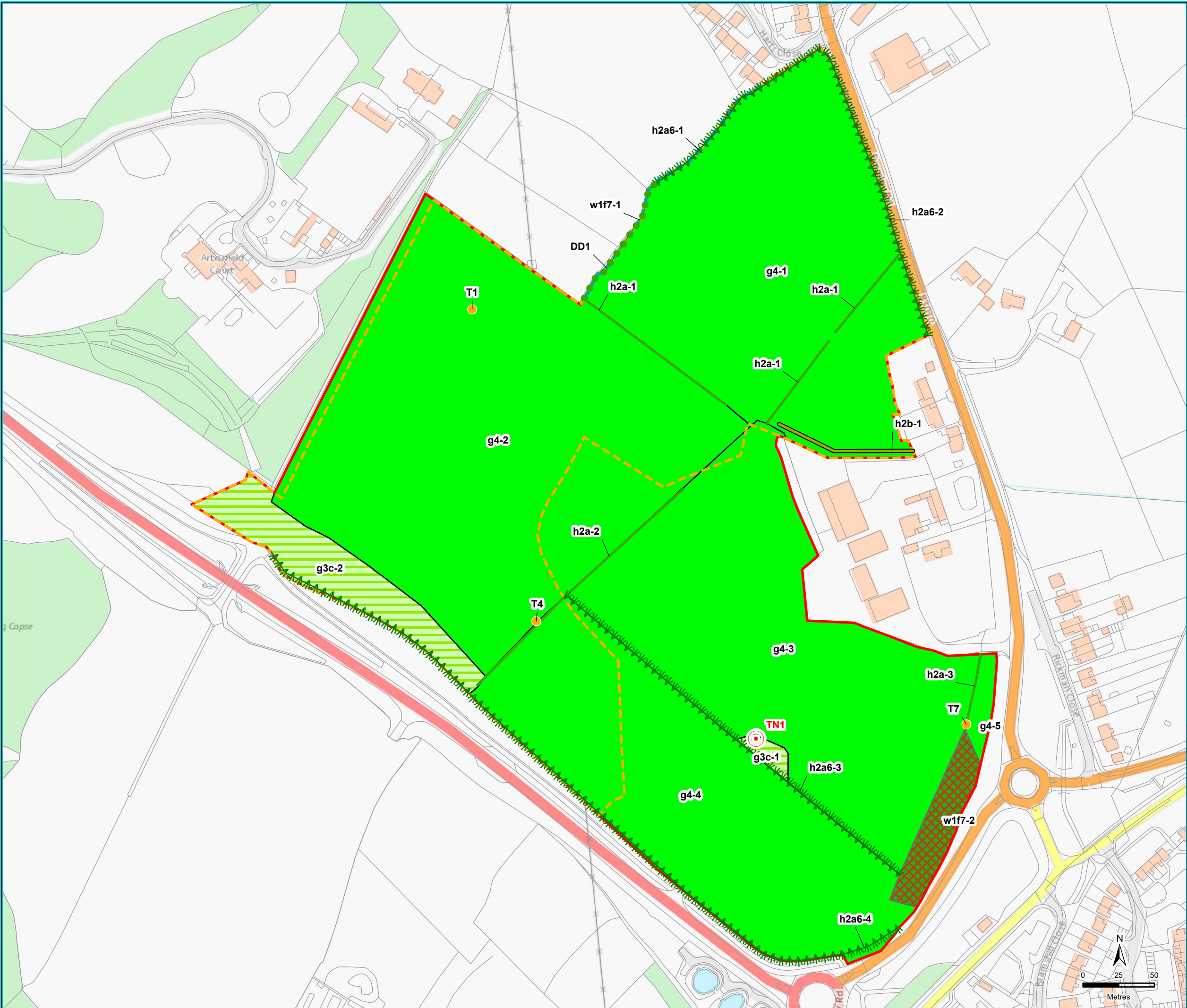
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Figure Number  
2

Figure Title  
Development Boundary and  
SANG boundary

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Legend

- Target Note
- Rural Tree
- DD - Dry Ditch
- h2a - Native Hedgerow
- h2a6 - Other Native Hedgerow
- h2b - Non-native and Ornamental Hedgerow
- w1f - Lowland Mixed Deciduous Woodland
- g3c - Other Neutral Grassland
- g4 - Modified Grassland
- w1f7 - Other Lowland Mixed Deciduous Woodland
- SANG Site Boundary
- Site Boundary

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Figure Number  
3

Figure Title  
Extended UK Habitat  
Classification Survey Results  
2024



Photograph 1:  
Parcel g3c-1 located in the south of the site



Photograph 2:  
Himalayan balsam located within parcel g3c-1



Photograph 3:  
Parcel g3c-2 located in the north west of the site



Photograph 4:  
Parcel g4-1 located in the north east of the site

|               |                              |      |                        |            |                                                                                                                                           |
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| Figure Title  | Photographs of the Site 2024 |      | Drawn                  | Checked    |                                                                                                                                           |
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Photograph 5:  
Parcel g4-4 located in the south west of the site



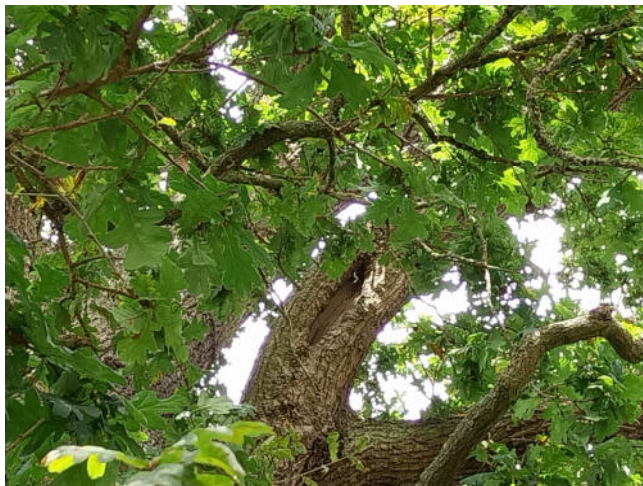
Photograph 6:  
Hedgerow h2a6-1 which is located in the north east of the site. A dry ditch is associated with the hedge



Photograph 7:  
Hedgerow h2a6-3 which runs centrally through the south of the site



Photograph 8:  
T1 which is located within grassland g4-2



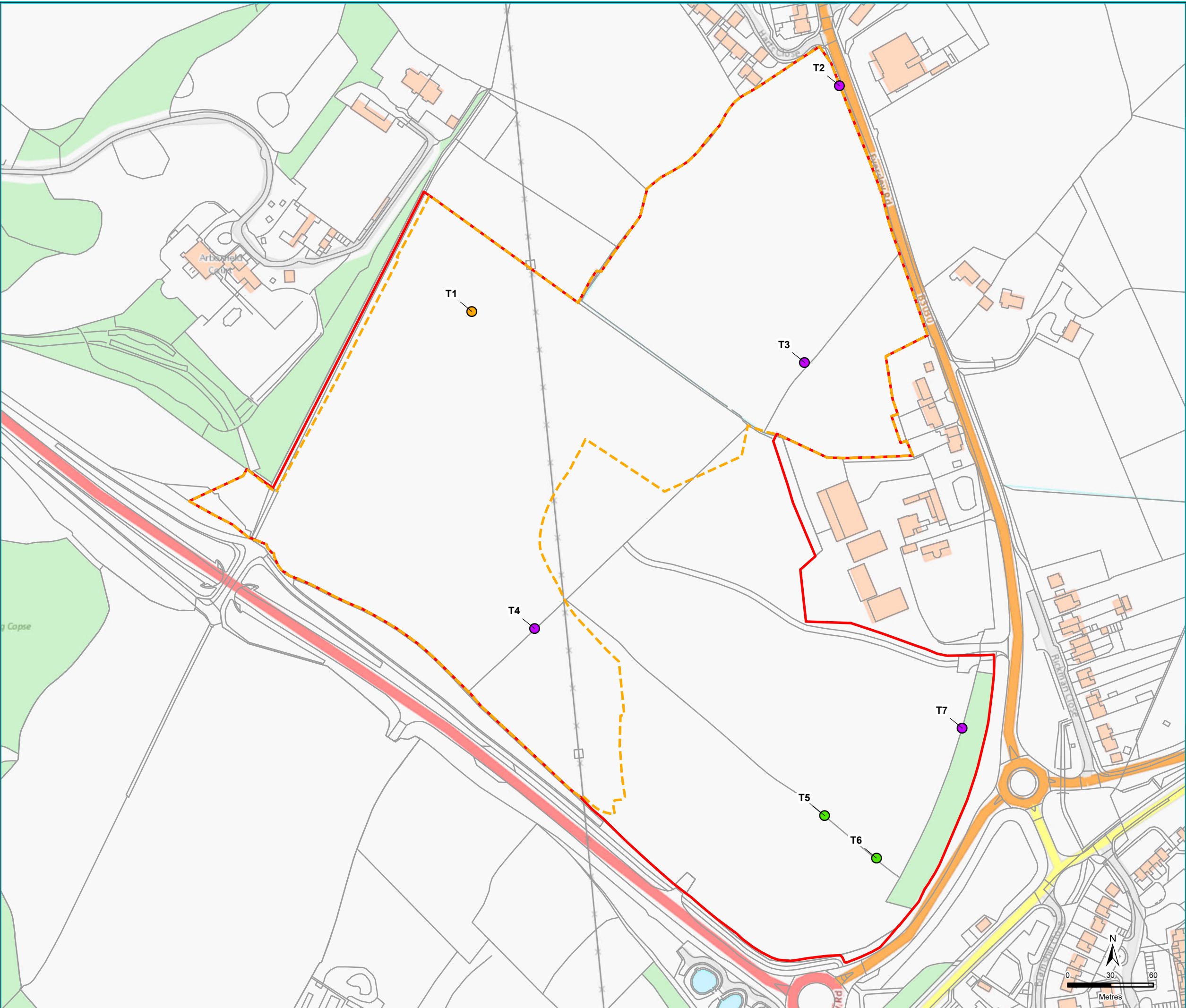
Photograph 9:  
A potential roost feature that is located on T1.



Photograph 10:  
A mammal run that runs north to south through g4-2

|               |                              |                                       |               |                                                                                                                  |
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- Legend
- Overall Suitability of Tree to Support Roosting Bats**
- FAR
  - PRF
  - PRF-M
  - SANG Boundary
  - Site Boundary

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Figure Title  
Ground Level Tree  
Assessment Results 2024

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Legend

Transect Leg Results

CP *Pipistrellus pipistrellus*

SP *Pipistrellus pygmaeus*

Stopping Point Results

SP *Pipistrellus pygmaeus*

Static Monitoring Location

Stopping Point

Transect Route

SANG Boundary

Survey Extent

Site Boundary

Map Centre Grid Reference: 476032E 166414N

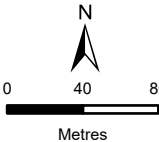
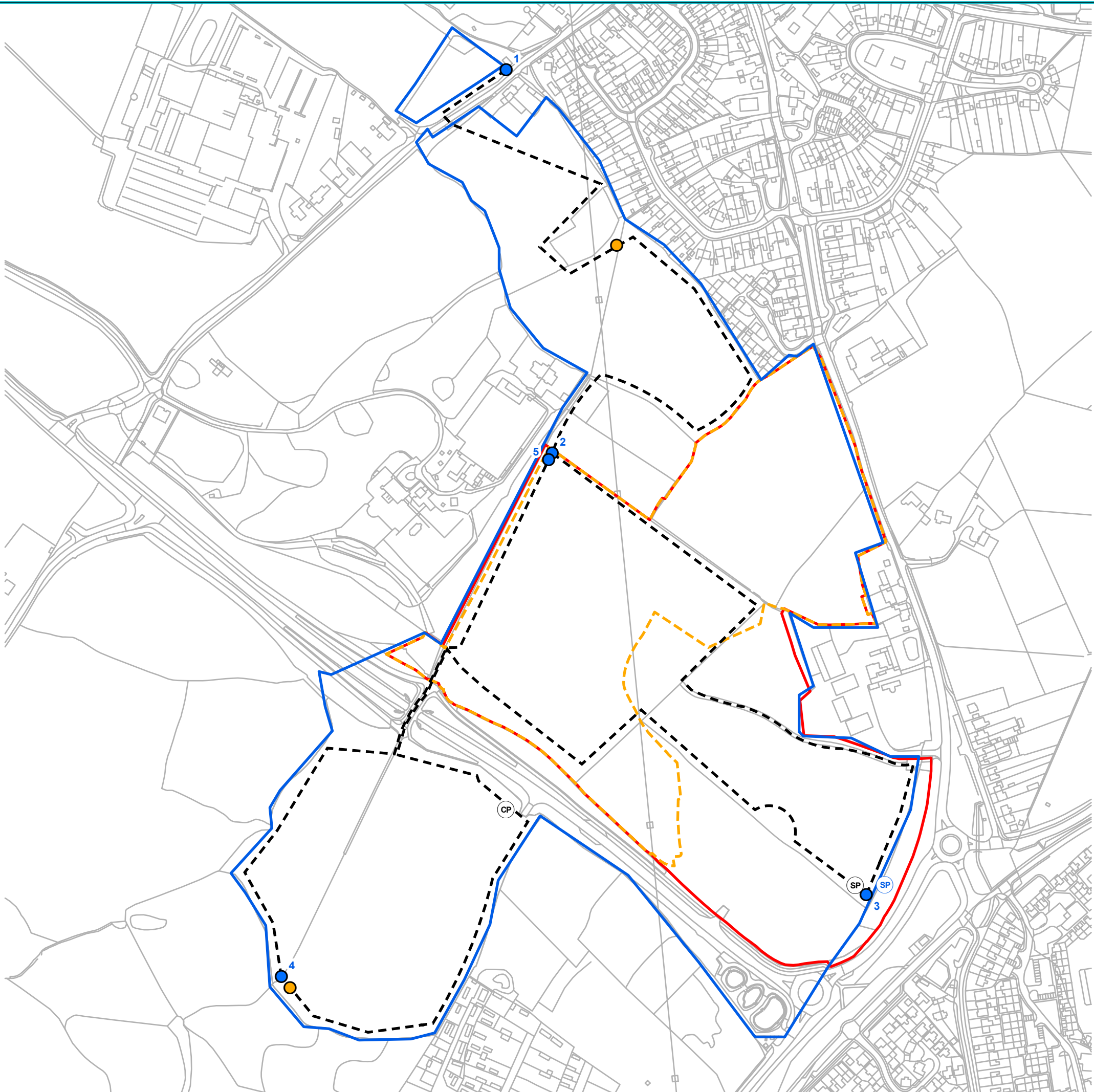
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Figure Title

Bat Activity Transect Results 2022  
(Dusk 27th April 2022)



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Legend

**Transect Leg Results**

(N) *Nyctalus noctula*

(CP) *Pipistrellus pipistrellus*

(SP) *Pipistrellus pygmaeus*

**Stopping Point Results**

(N) *Nyctalus noctula*

(CP) *Pipistrellus pipistrellus*

● Static Monitoring Location

● Stopping Point

- - Transect Route

▭ SANG Boundary

▭ Survey Extent

▭ Site Boundary

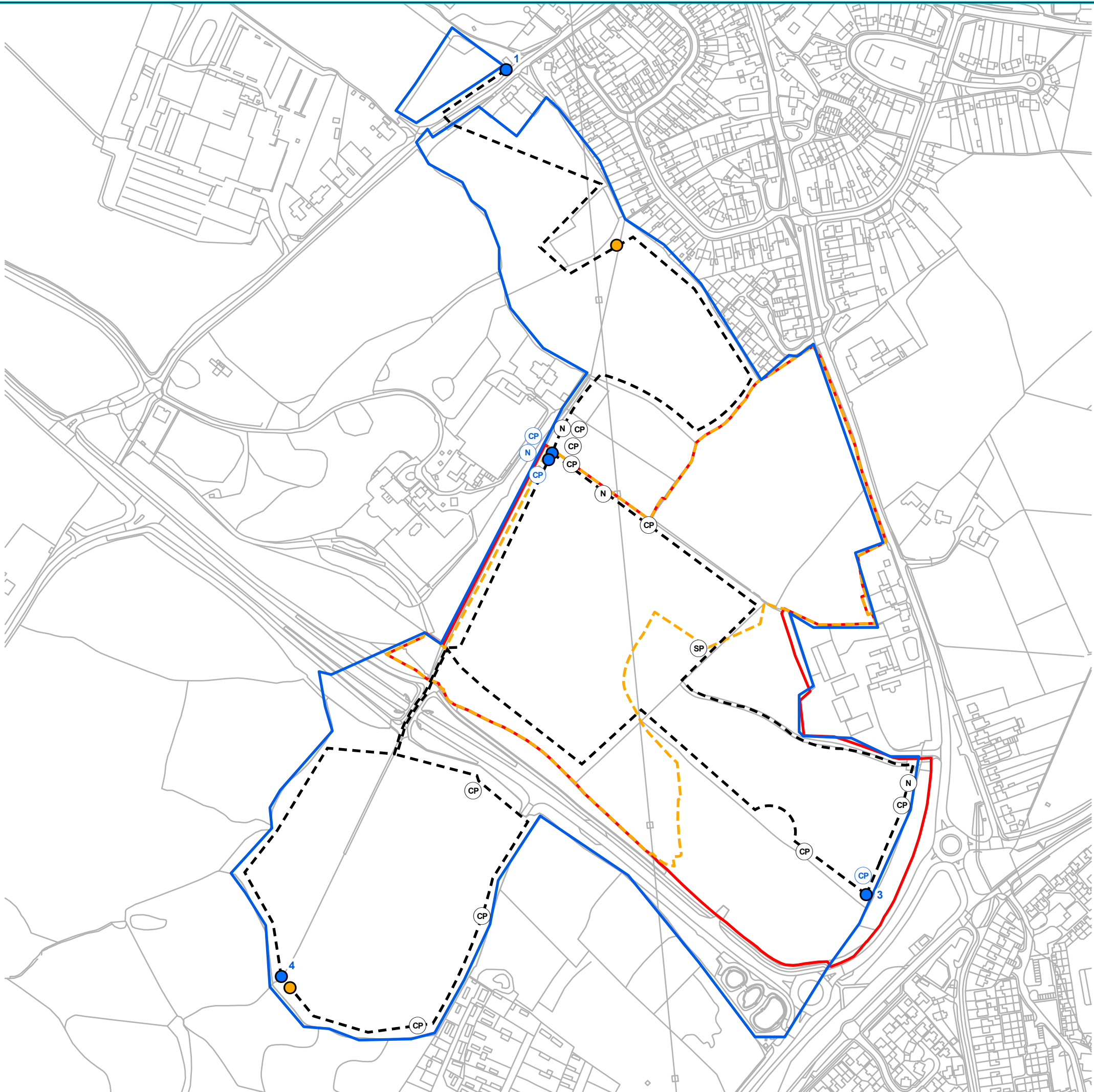
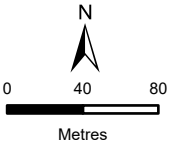
Map Centre Grid Reference: 476032E 166414N

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| Date<br>27/09/2024                 | Date<br>27/09/2024 |
| Client<br>David Wilson Homes       |                    |
| Figure Number<br>6b                |                    |
| Figure Title                       |                    |

Bat Activity Transect Results 2022  
(Dusk 18th May 2022)



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Legend

**Transect Leg Results**

CP *Pipistrellus pipistrellus*

SP *Pipistrellus pygmaeus*

**Stopping Point Results**

N *Nyctalus noctula*

CP *Pipistrellus pipistrellus*

Static Monitoring Location

Stopping Point

Transect Route

SANG Boundary

Survey Extent

Site Boundary

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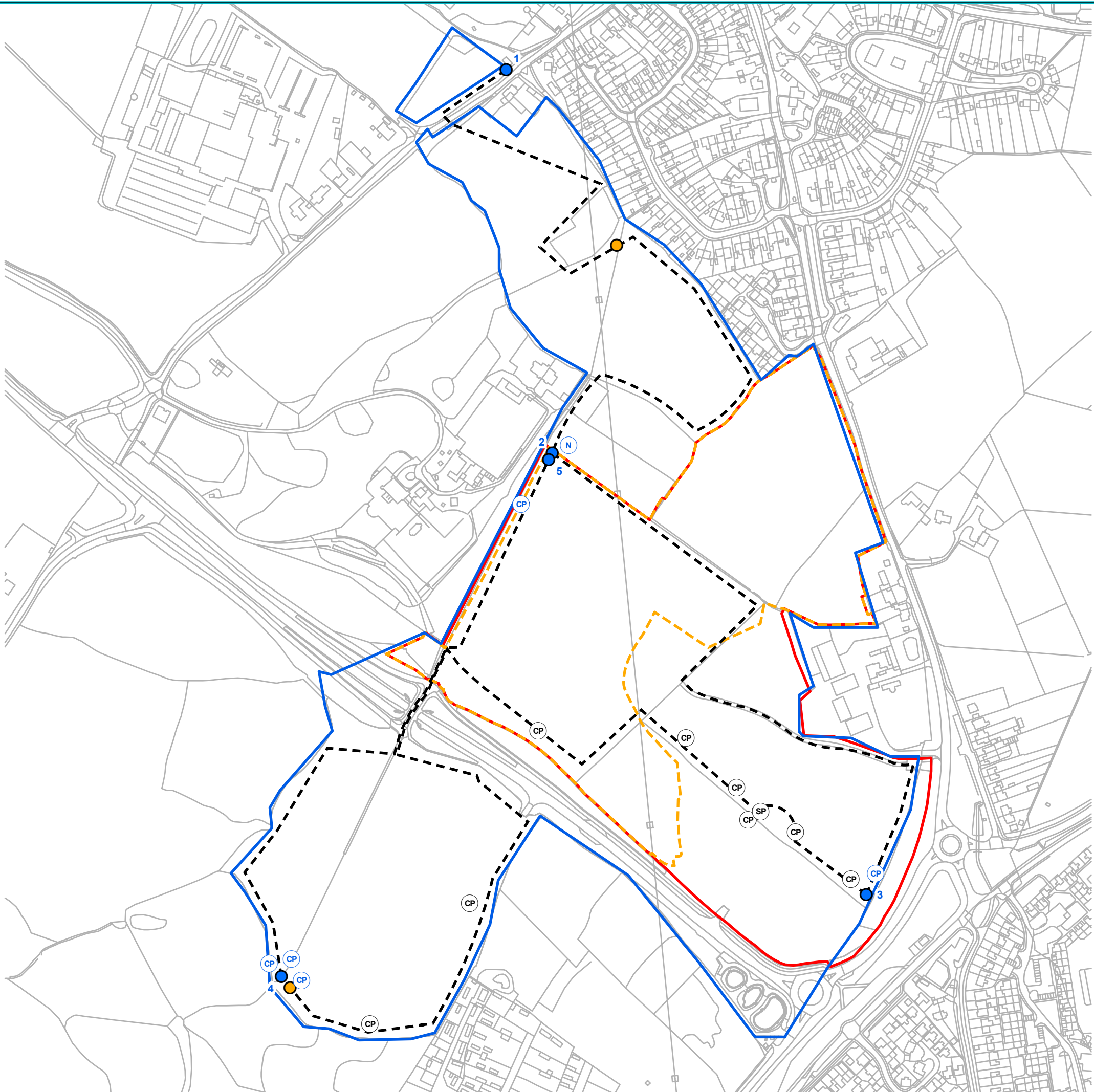
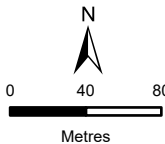
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| Drawn<br>KC        | Checked<br>AS      |
| Date<br>27/09/2024 | Date<br>27/09/2024 |

Client  
David Wilson Homes

Figure Number  
6c

Figure Title  
Bat Activity Transect Results 2022  
(Dusk 13th June 2022)



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Legend

Transect Leg Results

- P

Pipistrellus sp.
- CP

Pipistrellus pipistrellus
- SP

Pipistrellus pygmaeus

Stopping Point Results

- P

Pipistrellus sp.
- CP

Pipistrellus pipistrellus
- Static Monitoring Location
- Stopping Point
- Transect Route
- SANG Boundary
- Survey Extent
- Site Boundary

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Scale at A3  
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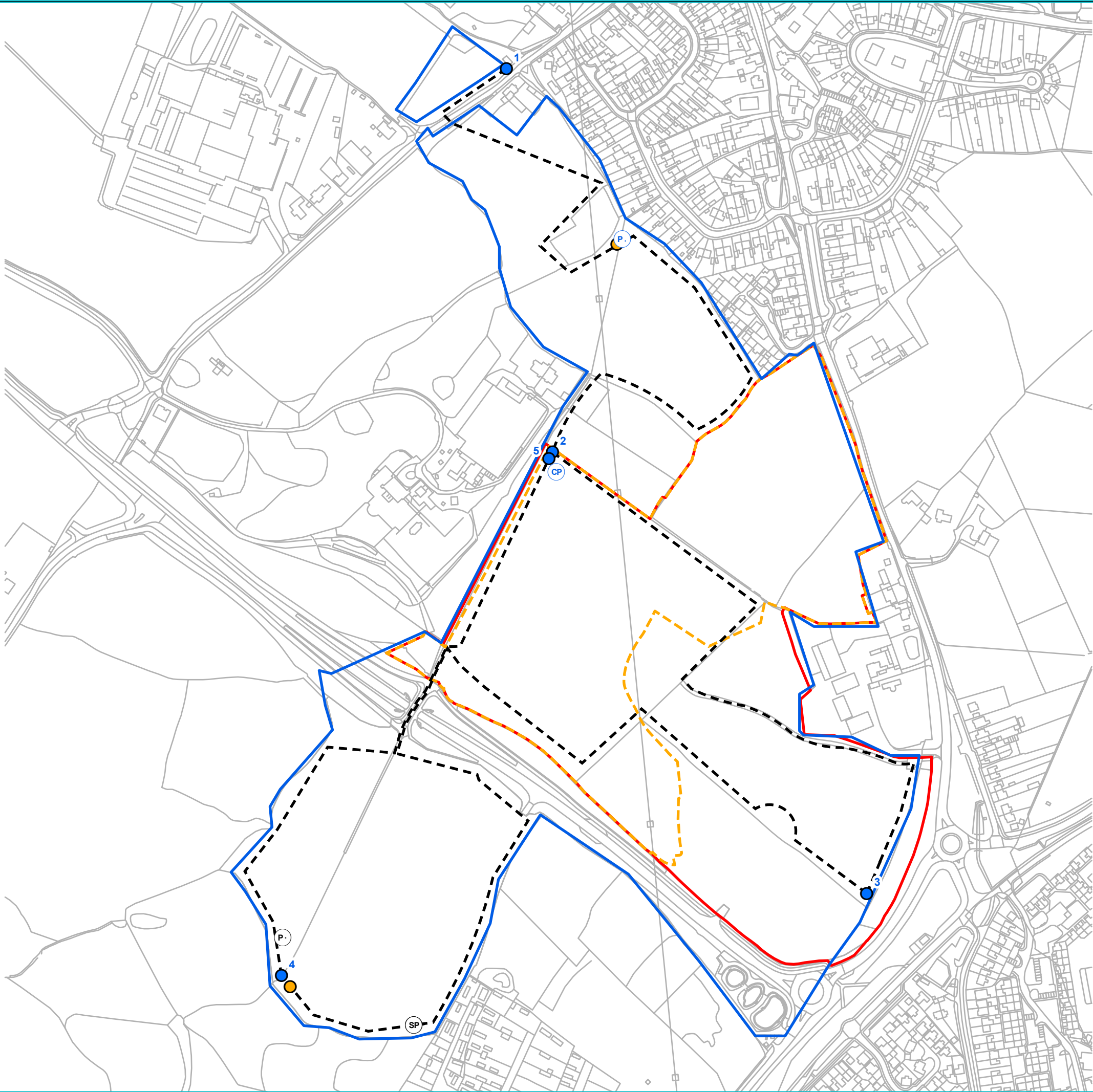
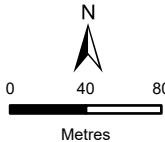
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| KC         | AS         |
| Date       | Date       |
| 27/09/2024 | 27/09/2024 |

Client  
David Wilson Homes

Figure Number  
6d

Figure Title

Bat Activity Transect Results 2022  
(Dusk 18th July 2022)



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Legend

**Transect Leg Results**

CP *Pipistrellus pipistrellus*

SP *Pipistrellus pygmaeus*

**Stopping Point Results**

M. *Myotis sp.*

CP *Pipistrellus pipistrellus*

SP *Pipistrellus pygmaeus*

Static Monitoring Location

Stopping Point

Transect Route

SANG Boundary

Survey Extent

Site Boundary

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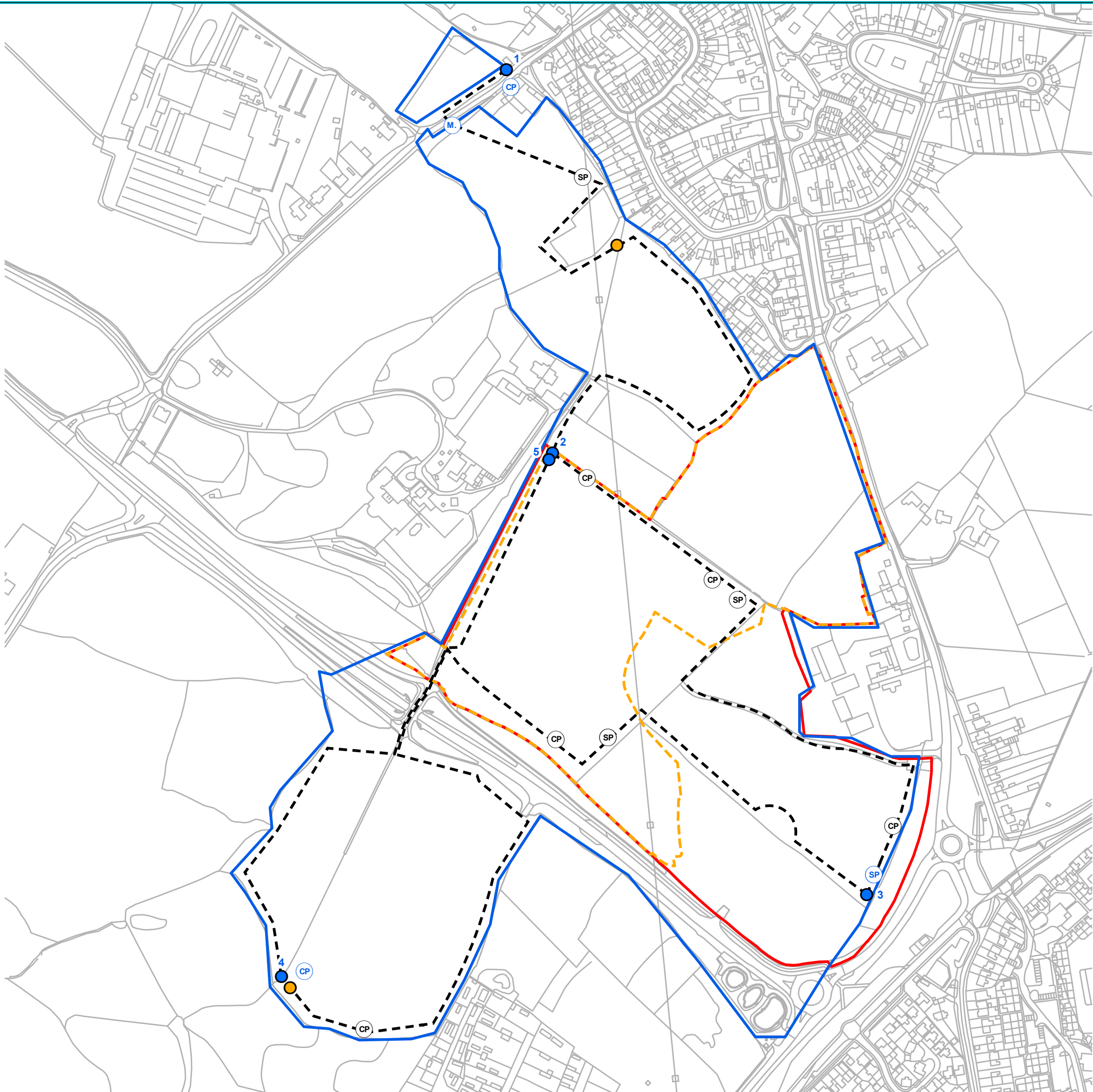
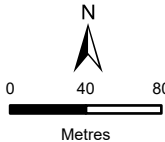
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| Date<br>27/09/2024 | Date<br>27/09/2024 |

Client  
David Wilson Homes

Figure Number  
6e

Figure Title  
Bat Activity Transect Results 2022  
(Dawn 19th July 2022)



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Legend

Transect Leg Results

CP *Pipistrellus pipistrellus*

SP *Pipistrellus pygmaeus*

Stopping Point Results

CP *Pipistrellus pipistrellus*

Static Monitoring Location

Stopping Point

Transect Route

SANG Boundary

Survey Extent

Site Boundary

Map Centre Grid Reference: 476032E 166414N

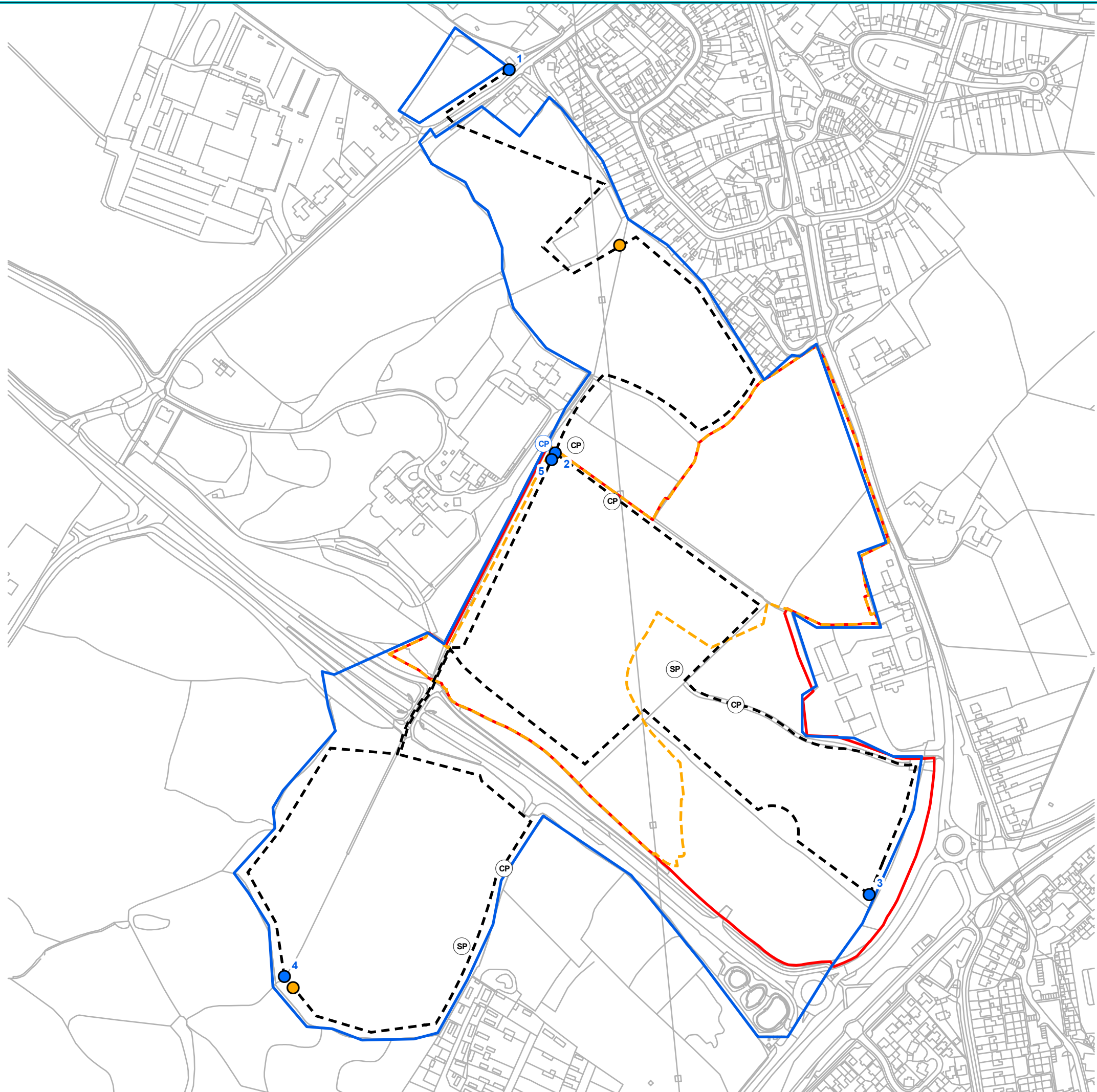
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| Date                | Date       |
| 27/09/2024          | 27/09/2024 |
| Client              |            |
| David Wilson Homes  |            |
| Figure Number       |            |
| 6f                  |            |

Figure Title

Bat Activity Transect Results 2022  
(Dusk 15th August 2022)



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Legend

Transect Leg Results

- B

*Barbastella barbastellus*
- M.

*Myotis sp.*
- L

*Nyctalus leisleri*
- N

*Nyctalus noctula*
- P.

*Pipistrellus sp.*
- CP

*Pipistrellus pipistrellus*
- SP

*Pipistrellus pygmaeus*
- Static Monitoring Location
- Stopping Point
- Transect Route
- SANG Boundary
- Survey Extent
- Site Boundary

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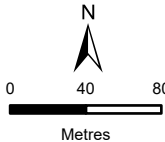
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| Drawn      | Checked    |
| KC         | AS         |
| Date       | Date       |
| 27/09/2024 | 27/09/2024 |

Client  
David Wilson Homes

Figure Number  
6g

Figure Title  
Bat Activity Transect Results 2022  
(Dusk 12th September 2022)



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Legend

**Transect Leg Results**

L

Nyctalus leisleri

P.

Pipistrellus sp.

CP

Pipistrellus pipistrellus

SP

Pipistrellus pygmaeus

**Stopping Point Results**

CP

Pipistrellus pipistrellus

SP

Pipistrellus pygmaeus

Static Monitoring Location

Stopping Point

--

Transect Route

SANG Boundary

Survey Extent

Site Boundary

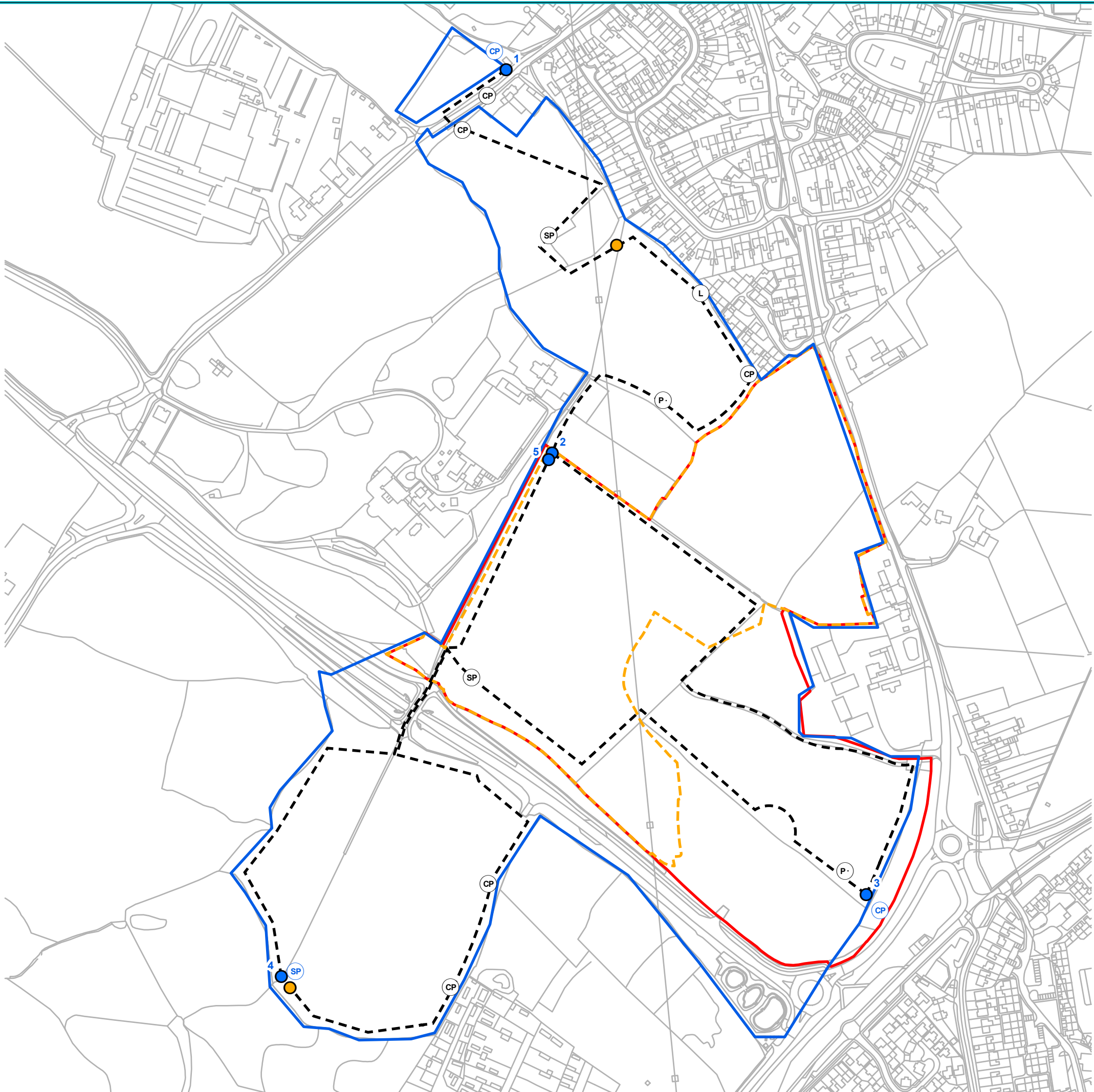
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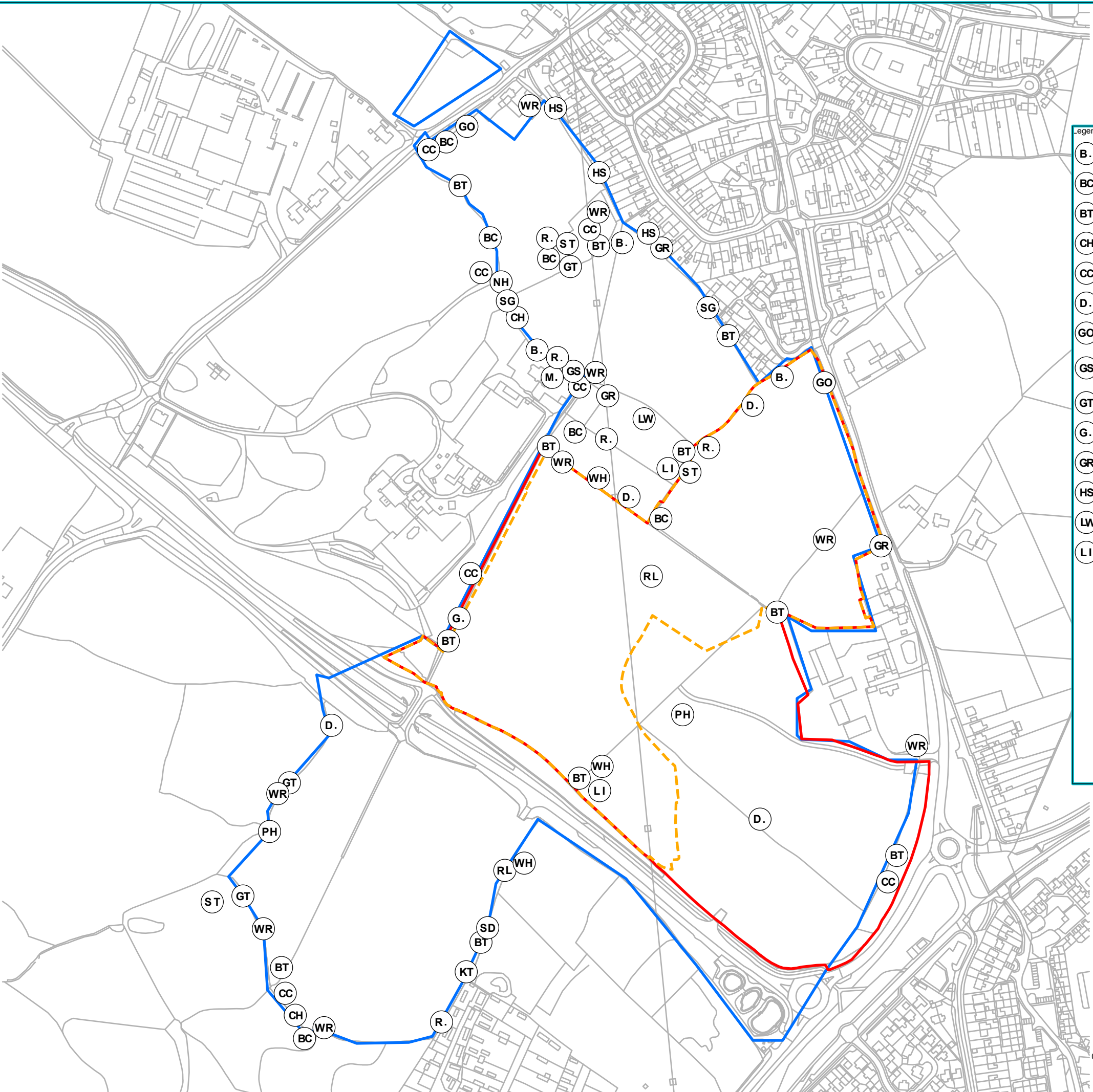
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| Date                | Date       |
| 27/09/2024          | 27/09/2024 |
| Client              |            |
| David Wilson Homes  |            |
| Figure Number       |            |
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| Figure Title        |            |

Bat Activity Transect Results 2022  
(Dusk 3rd October 2022)

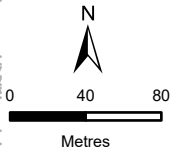




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- Legend
- |                                         |                              |
|-----------------------------------------|------------------------------|
| <b>B.</b> Blackbird (B.)                | <b>M.</b> Mistle Thrush (M.) |
| <b>BC</b> Blackcap (BC)                 | <b>NH</b> Nuthatch (NH)      |
| <b>BT</b> Blue Tit (BT)                 | <b>PH</b> Pheasant (PH)      |
| <b>CH</b> Chaffinch (CH)                | <b>KT</b> Red Kite (KT)      |
| <b>CC</b> Chiffchaff (CC)               | <b>RL</b> Red-legged         |
| <b>D.</b> Dunnock (D.)                  | <b>R.</b> Robin (R.)         |
| <b>GO</b> Goldfinch (GO)                | <b>ST</b> Song Thrush (ST)   |
| <b>GS</b> Great Spotted Woodpecker (GS) | <b>SG</b> Starling (SG)      |
| <b>GT</b> Great Tit (GT)                | <b>SD</b> Stock Dove (SD)    |
| <b>G.</b> Green Woodpecker (G.)         | <b>WH</b> Whitethroat (WH)   |
| <b>GR</b> Greenfinch (GR)               | <b>WR</b> Wren (WR)          |
| <b>HS</b> House Sparrow (HS)            | SANG Boundary                |
| <b>LW</b> Lesser Whitethroat (LW)       | Survey Extent                |
| <b>LI</b> Linnet (LI)                   | Site Boundary                |



Drawing Ref  
DWH001-020/406085/1

Scale at A3  
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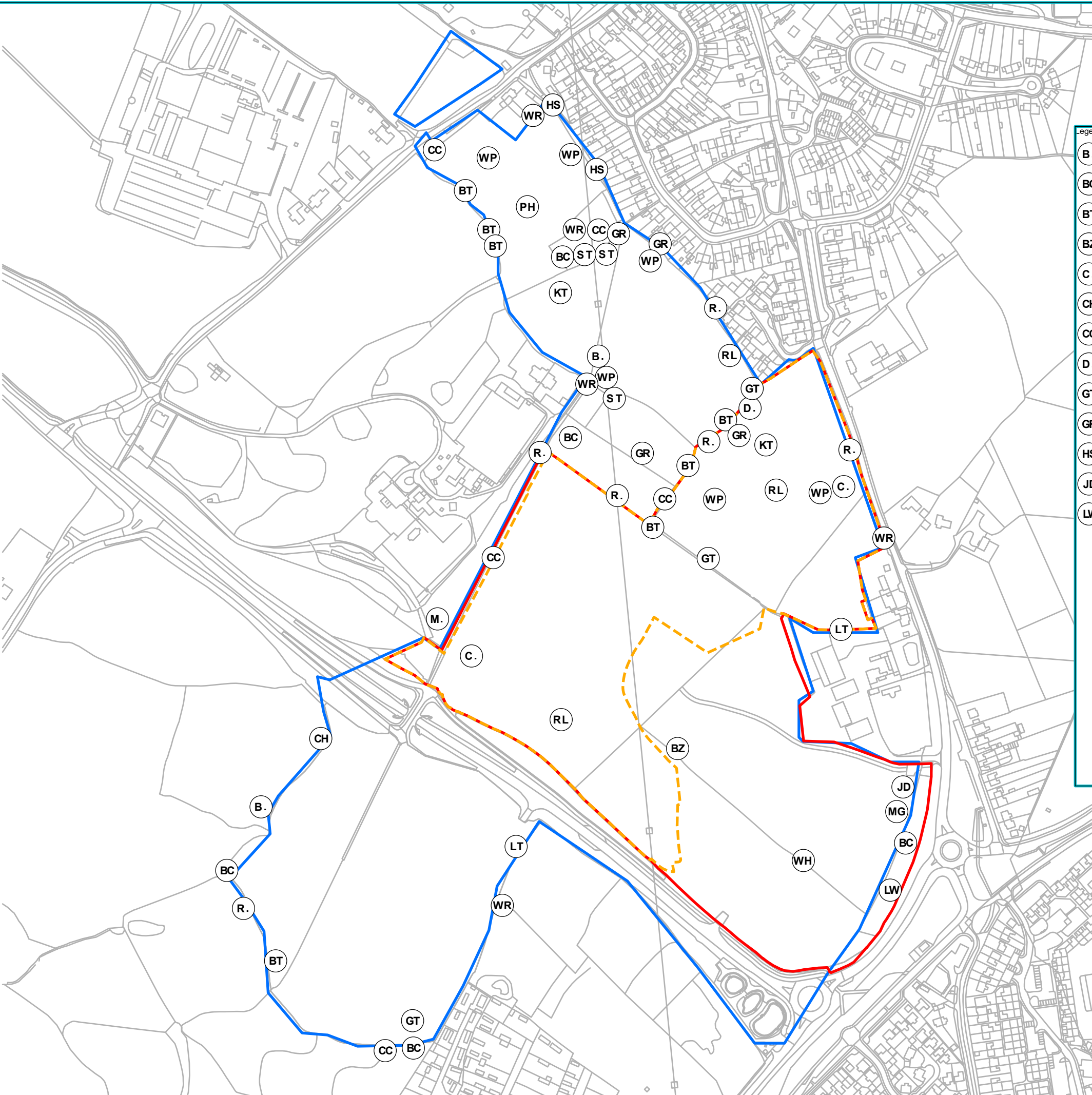
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| Date<br>27/09/2024 | Date<br>27/09/2024 |
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Client  
David Wilson Homes

Figure Number  
9a

Figure Title  
Breeding Bird Survey  
Results 2022  
(27/04/2022)

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- Legend
- |                                   |                                |
|-----------------------------------|--------------------------------|
| <b>B.</b> Blackbird (B.)          | <b>LT</b> Long-tailed Tit (LT) |
| <b>BC</b> Blackcap (BC)           | <b>MG</b> Magpie (MG)          |
| <b>BT</b> Blue Tit (BT)           | <b>M.</b> Mistle Thrush (M.)   |
| <b>BZ</b> Buzzard (BZ)            | <b>PH</b> Pheasant (PH)        |
| <b>C.</b> Carrion Crow (C.)       | <b>KT</b> Red Kite (KT)        |
| <b>CH</b> Chaffinch (CH)          | <b>RL</b> Red-legged           |
| <b>CC</b> Chiffchaff (CC)         | <b>R.</b> Robin (R.)           |
| <b>D.</b> Dunnock (D.)            | <b>ST</b> Song Thrush (ST)     |
| <b>GT</b> Great Tit (GT)          | <b>WH</b> Whitethroat (WH)     |
| <b>GR</b> Greenfinch (GR)         | <b>WP</b> Wood Pigeon (WP)     |
| <b>HS</b> House Sparrow (HS)      | <b>WR</b> Wren (WR)            |
| <b>JD</b> Jackdaw (JD)            | <b>SANG Boundary</b>           |
| <b>LW</b> Lesser Whitethroat (LW) | <b>Survey Extent</b>           |
|                                   | <b>Site Boundary</b>           |

Drawing Ref  
DWH001-020/406085/1

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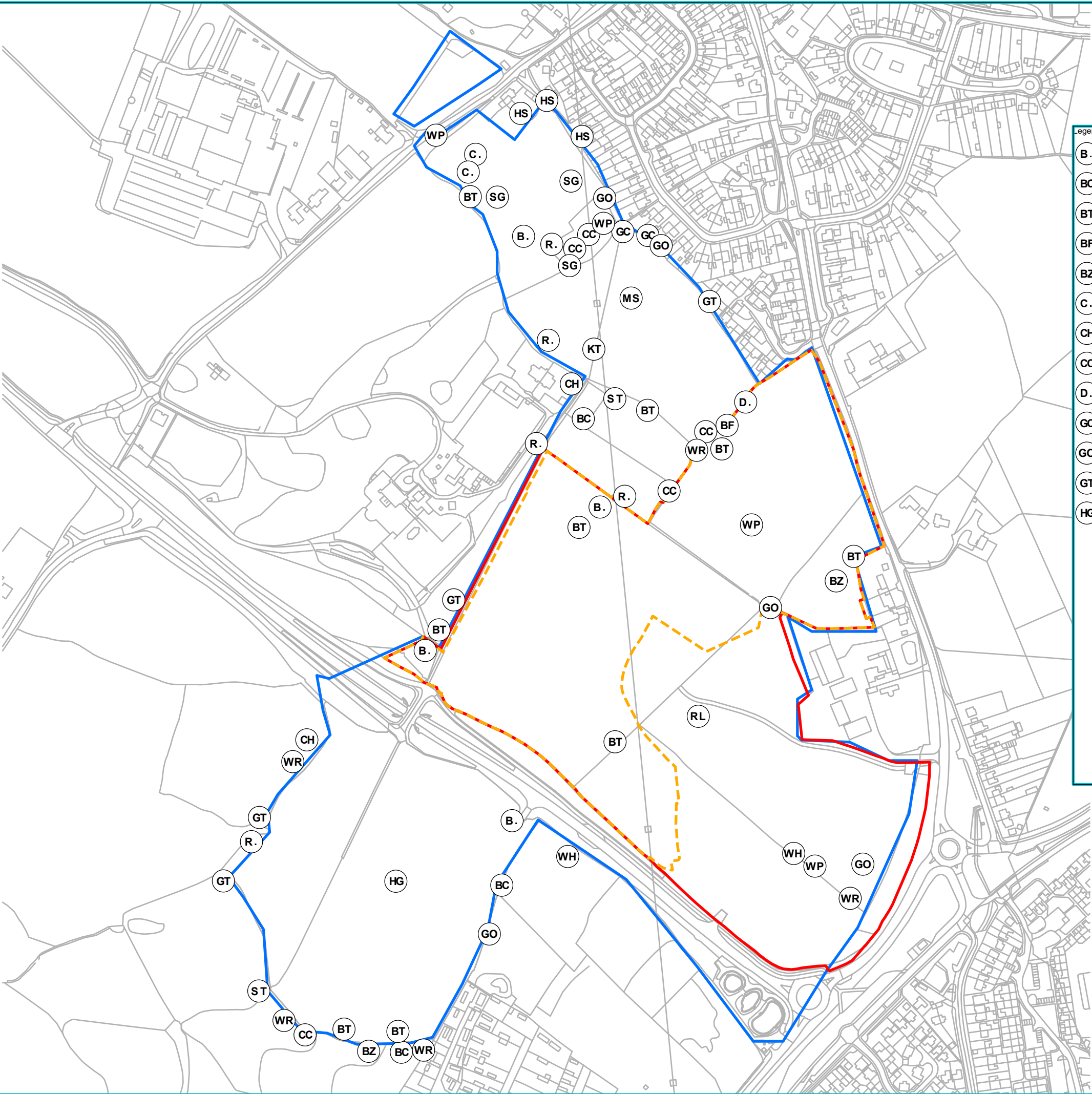
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Client  
David Wilson Homes

Figure Number  
9b

Figure Title  
Breeding Bird Survey  
Results 2022  
(12/05/2022)

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| Legend    |                    |
|-----------|--------------------|
| <b>B.</b> | Blackbird (B.)     |
| <b>BC</b> | Blackcap (BC)      |
| <b>BT</b> | Blue Tit (BT)      |
| <b>BF</b> | Bullfinch (BF)     |
| <b>BZ</b> | Buzzard (BZ)       |
| <b>C.</b> | Carrion Crow (C.)  |
| <b>CH</b> | Chaffinch (CH)     |
| <b>CC</b> | Chiffchaff (CC)    |
| <b>D.</b> | Dunnock (D.)       |
| <b>GC</b> | Goldcrest (GC)     |
| <b>GO</b> | Goldfinch (GO)     |
| <b>GT</b> | Great Tit (GT)     |
| <b>HG</b> | Herring Gull (HG)  |
| <b>HS</b> | House Sparrow (HS) |
| <b>MS</b> | Mute Swan (MS)     |
| <b>KT</b> | Red Kite (KT)      |
| <b>RL</b> | Red-legged         |
| <b>R.</b> | Robin (R.)         |
| <b>ST</b> | Song Thrush (ST)   |
| <b>SG</b> | Starling (SG)      |
| <b>WH</b> | Whitethroat (WH)   |
| <b>WP</b> | Wood Pigeon (WP)   |
| <b>WR</b> | Wren (WR)          |
|           | SANG Boundary      |
|           | Survey Extent      |
|           | Site Boundary      |

Drawing Ref  
DWH001-020/406085/1

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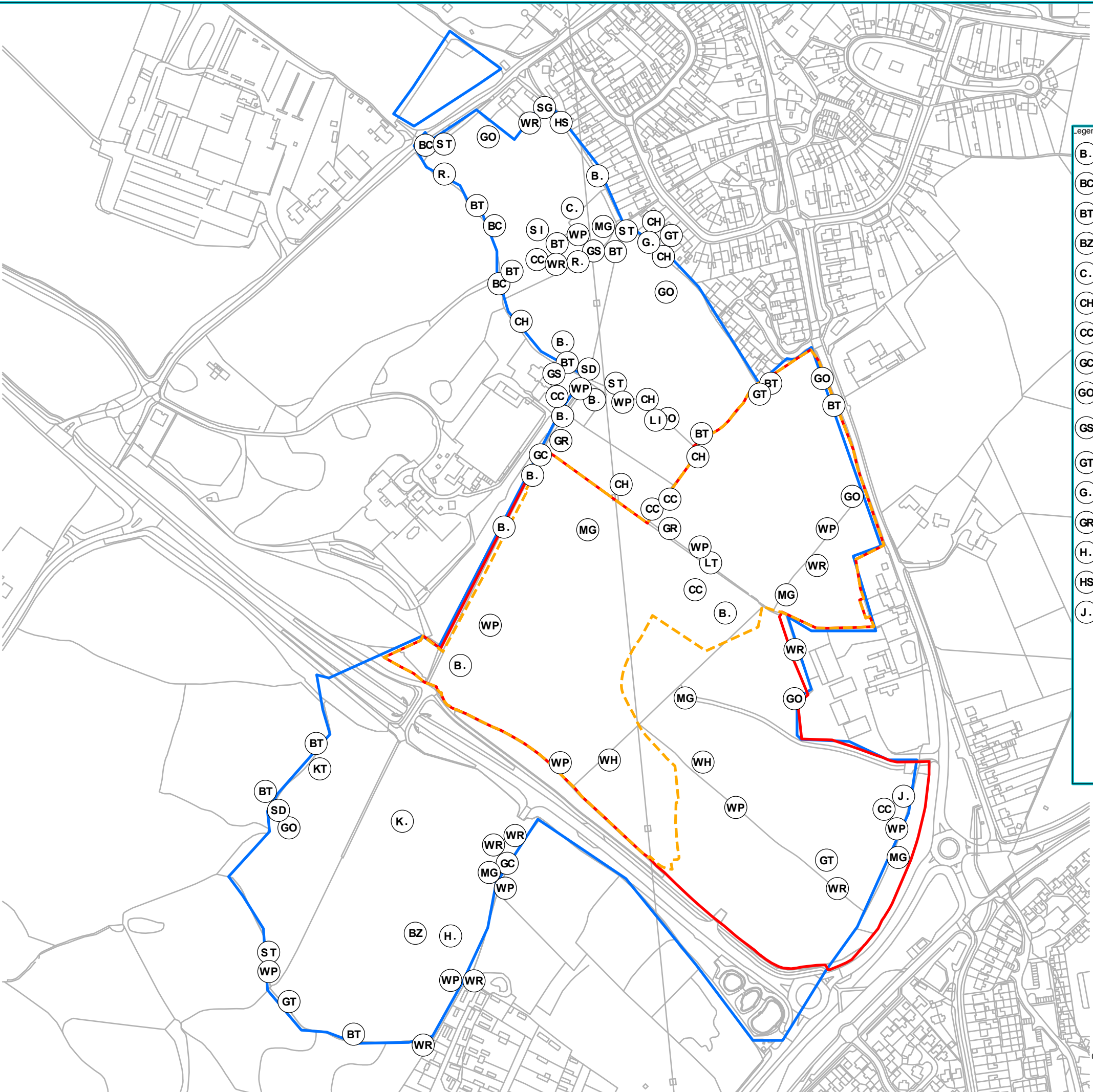
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Client  
David Wilson Homes

Figure Number  
9c

Figure Title  
Breeding Bird Survey  
Results 2022  
(25/05/2022)

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- Legend
- |                                         |                                |
|-----------------------------------------|--------------------------------|
| <b>B.</b> Blackbird (B.)                | <b>K.</b> Kestrel (K.)         |
| <b>BC</b> Blackcap (BC)                 | <b>LI</b> Linnet (LI)          |
| <b>BT</b> Blue Tit (BT)                 | <b>LT</b> Long-tailed Tit (LT) |
| <b>BZ</b> Buzzard (BZ)                  | <b>MG</b> Magpie (MG)          |
| <b>C.</b> Carrion Crow (C.)             | <b>KT</b> Red Kite (KT)        |
| <b>CH</b> Chaffinch (CH)                | <b>R.</b> Robin (R.)           |
| <b>CC</b> Chiffchaff (CC)               | <b>ST</b> Song Thrush (ST)     |
| <b>GC</b> Goldcrest (GC)                | <b>SG</b> Starling (SG)        |
| <b>GO</b> Goldfinch (GO)                | <b>SD</b> Stock Dove (SD)      |
| <b>GS</b> Great Spotted Woodpecker (GS) | <b>SI</b> Swift (SI)           |
| <b>GT</b> Great Tit (GT)                | <b>WH</b> Whitethroat (WH)     |
| <b>G.</b> Green Woodpecker (G.)         | <b>WP</b> Wood Pigeon (WP)     |
| <b>GR</b> Greenfinch (GR)               | <b>WR</b> Wren (WR)            |
| <b>H.</b> Grey Heron (H.)               | SANG Boundary                  |
| <b>HS</b> House Sparrow (HS)            | Survey Extent                  |
| <b>J.</b> Jay (J.)                      | Site Boundary                  |

Drawing Ref  
DWH001-020/406085/1

Scale at A3  
1:4,000

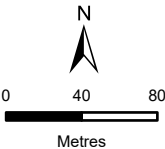
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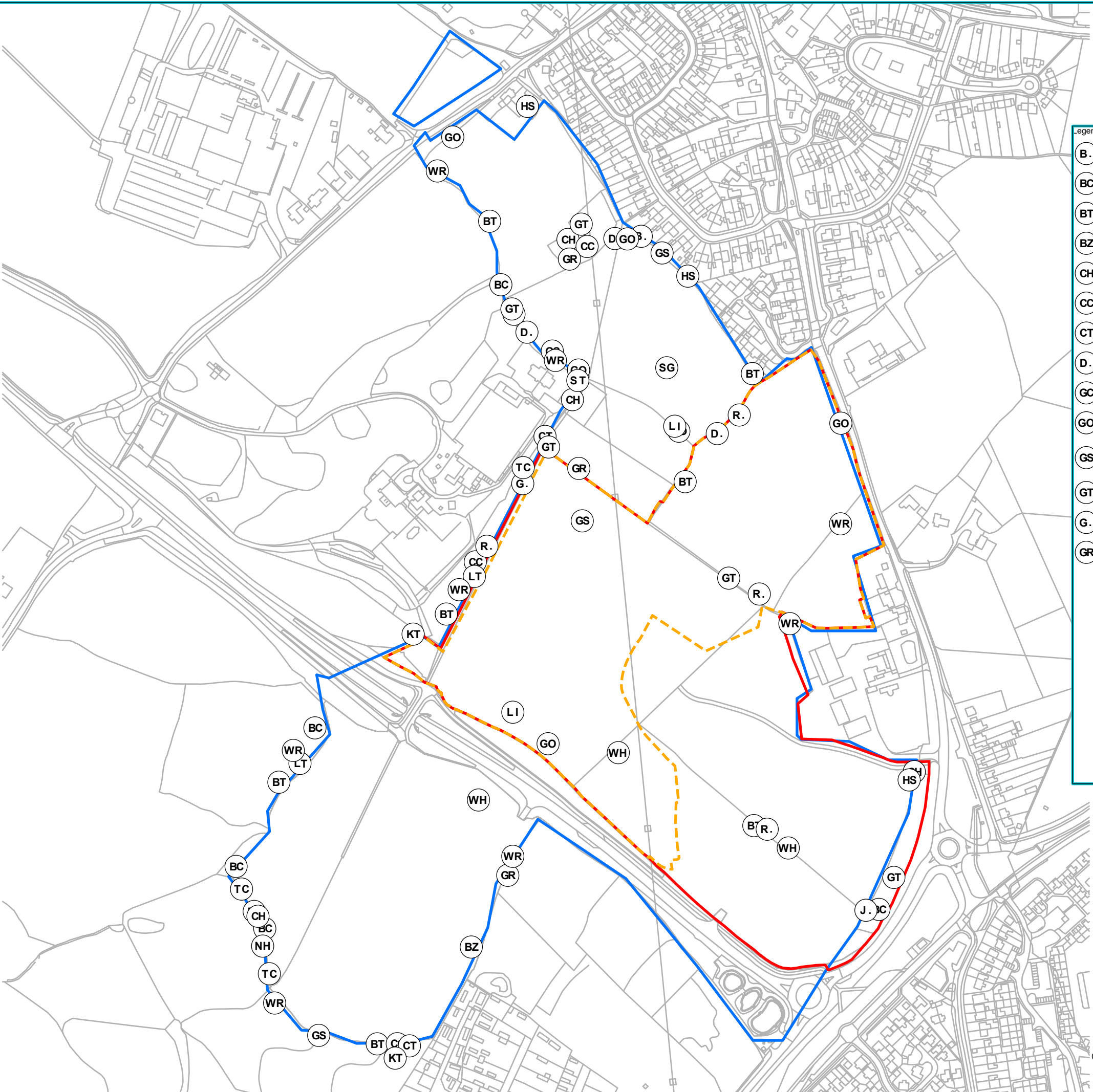
Client  
David Wilson Homes

Figure Number  
9d

Figure Title  
Breeding Bird Survey  
Results 2022  
(07/06/2022)



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| Legend    |                               |
|-----------|-------------------------------|
| <b>B.</b> | Blackbird (B.)                |
| <b>BC</b> | Blackcap (BC)                 |
| <b>BT</b> | Blue Tit (BT)                 |
| <b>BZ</b> | Buzzard (BZ)                  |
| <b>CH</b> | Chaffinch (CH)                |
| <b>CC</b> | Chiffchaff (CC)               |
| <b>CT</b> | Coal Tit (CT)                 |
| <b>D.</b> | Dunnock (D.)                  |
| <b>GC</b> | Goldcrest (GC)                |
| <b>GO</b> | Goldfinch (GO)                |
| <b>GS</b> | Great Spotted Woodpecker (GS) |
| <b>GT</b> | Great Tit (GT)                |
| <b>G.</b> | Green Woodpecker (G.)         |
| <b>GR</b> | Greenfinch (GR)               |
| <b>HS</b> | House Sparrow (HS)            |
| <b>J.</b> | Jay (J.)                      |
| <b>LI</b> | Linnet (LI)                   |
| <b>LT</b> | Long-tailed Tit (LT)          |
| <b>NH</b> | Nuthatch (NH)                 |
| <b>KT</b> | Red Kite (KT)                 |
| <b>R.</b> | Robin (R.)                    |
| <b>ST</b> | Song Thrush (ST)              |
| <b>SG</b> | Starling (SG)                 |
| <b>TC</b> | Treecreeper (TC)              |
| <b>WH</b> | Whitethroat (WH)              |
| <b>WR</b> | Wren (WR)                     |
|           | SANG Boundary                 |
|           | Survey Extent                 |
|           | Site Boundary                 |

Drawing Ref  
DWH001-020/406085/1

Scale at A3  
1:4,000

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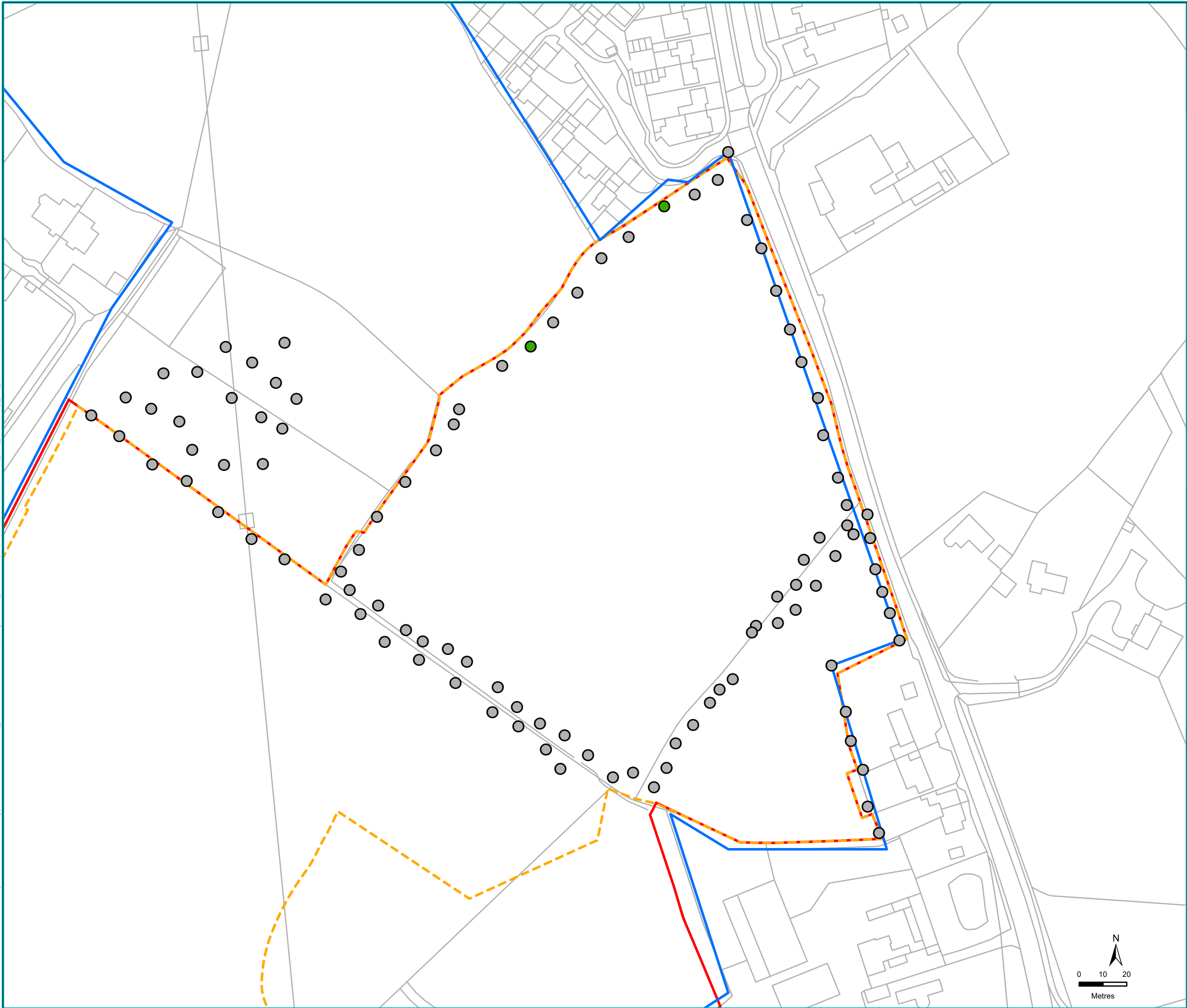
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Client  
David Wilson Homes

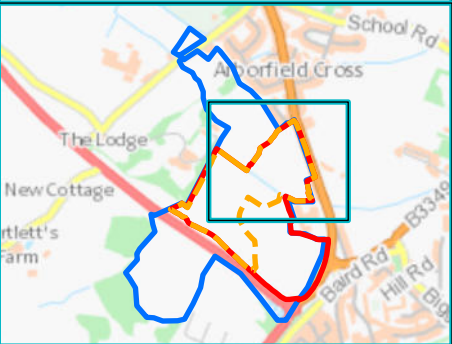
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Figure Title  
Breeding Bird Survey  
Results 2022  
(14/06/2022)

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- Legend
- Reptile Refugia Check Results**
- No Reptiles Seen
  - Slow Worm
  - Grass Snake
  - ▭ SANG Site Boundary
  - ▭ Survey Extent
  - ▭ Site Boundary



Map Centre Grid Reference: 476210E 166476N

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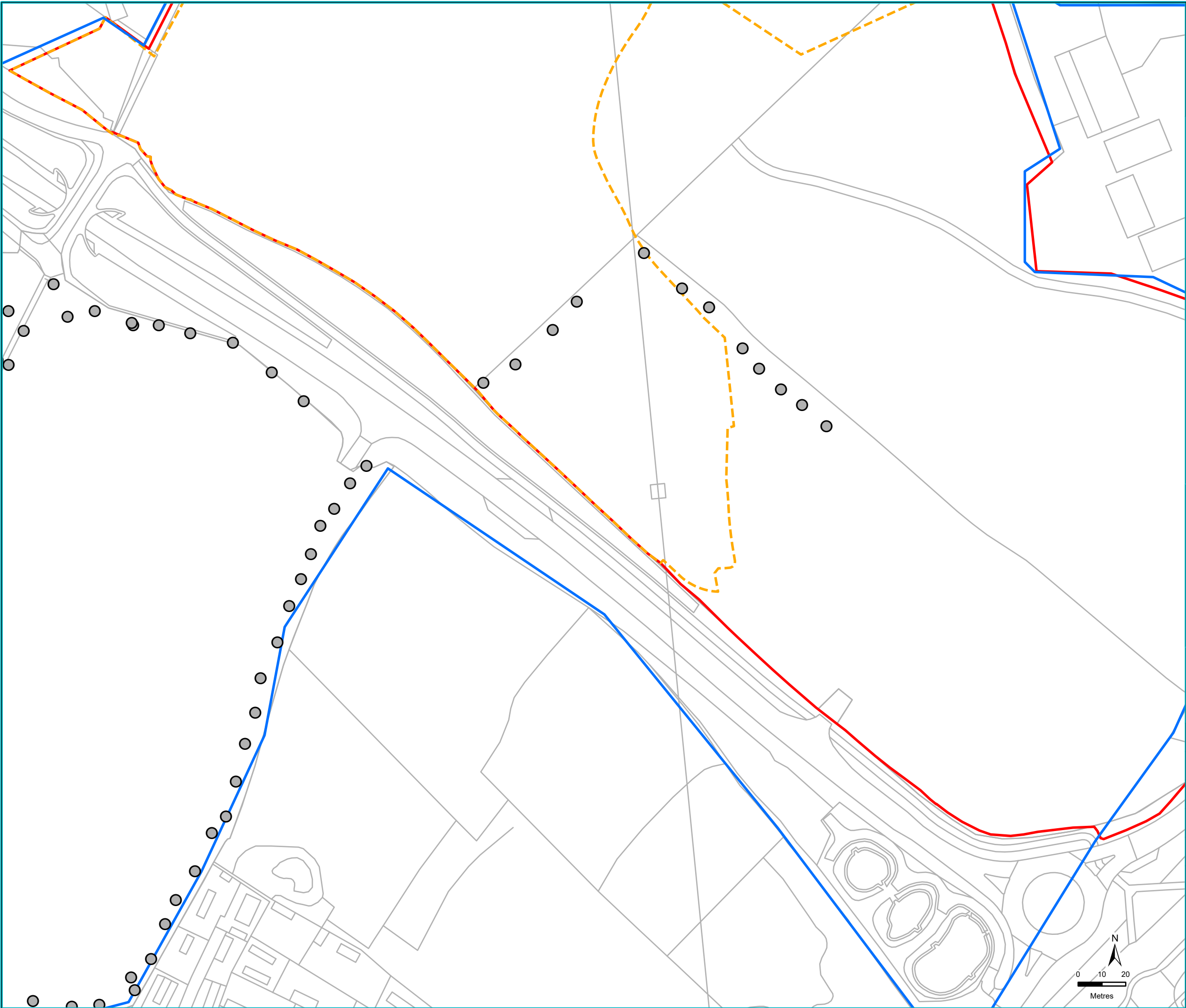
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Client  
David Wilson Homes

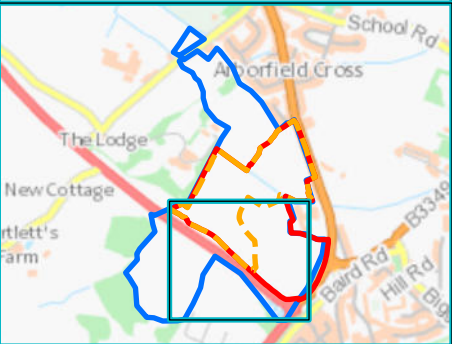
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Figure Title  
Reptile Survey Results  
2022

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- Legend
- Reptile Refugia Check Results**
- No Reptiles Seen
  - Slow Worm
  - Grass Snake
  - ▭ SANG Site Boundary
  - ▭ Survey Extent
  - ▭ Site Boundary



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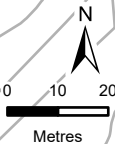
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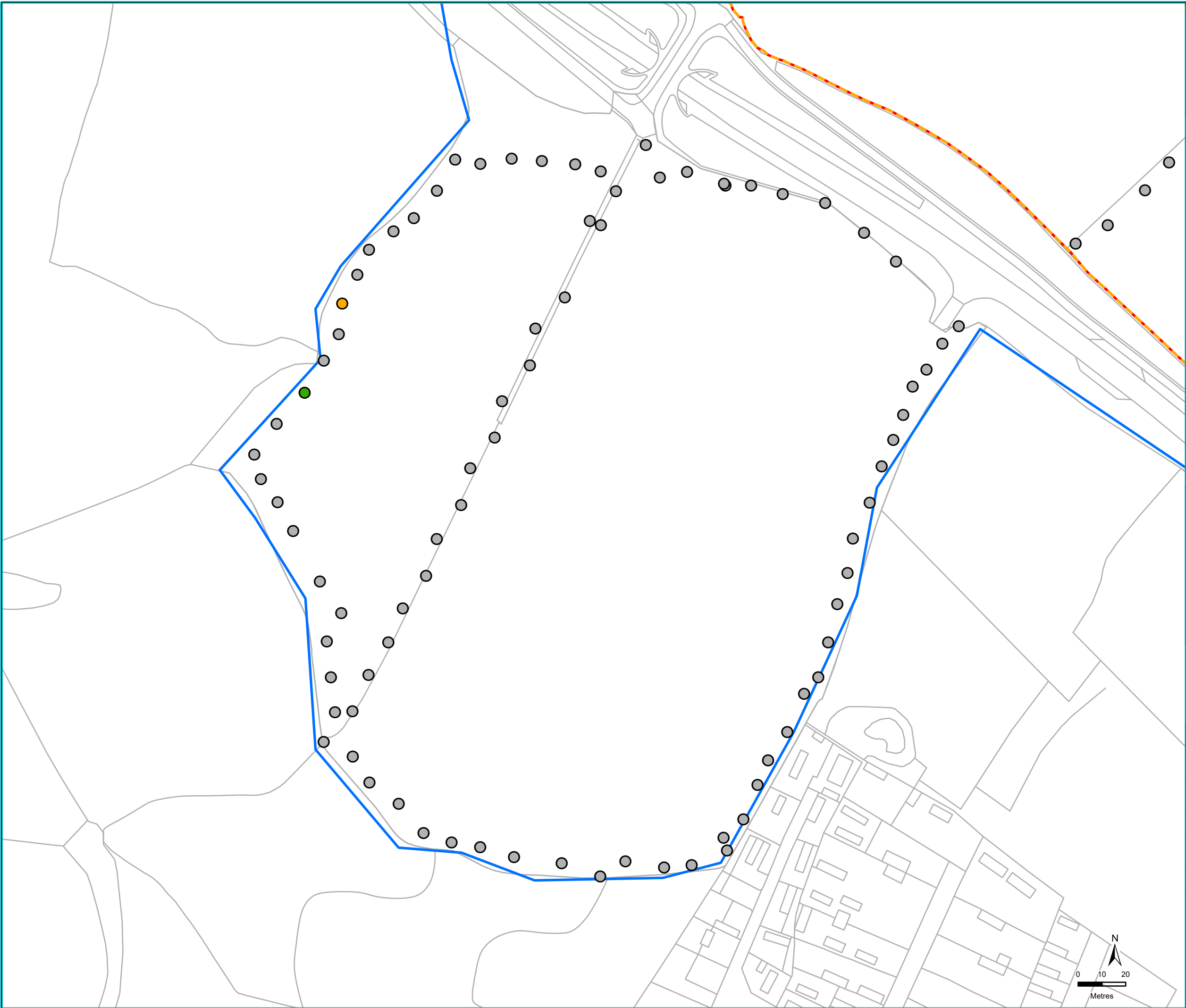
Client  
David Wilson Homes

Figure Number  
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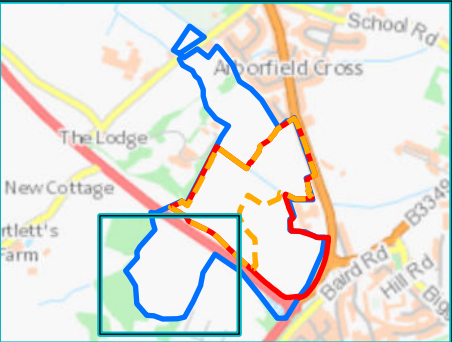
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Reptile Survey Results  
2022



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- Legend
- Reptile Refugia Check Results**
- No Reptiles Seen
  - Slow Worm
  - Grass Snake
  - SANG Site Boundary
  - Survey Extent
  - Site Boundary



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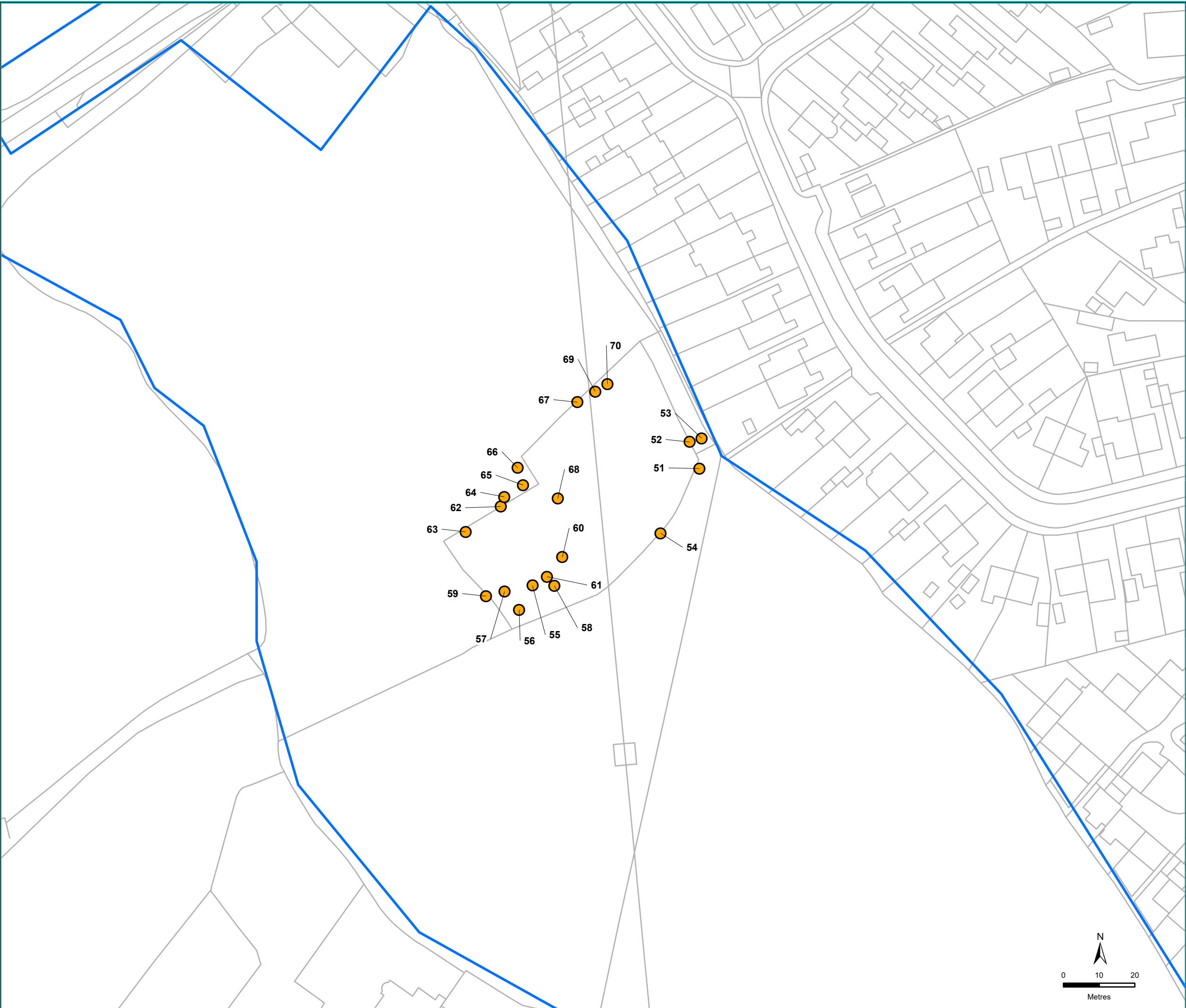
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Client  
David Wilson Homes

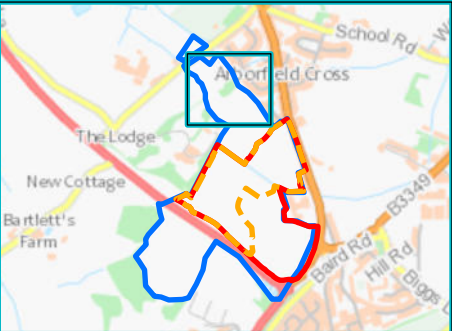
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Figure Title  
Reptile Survey Results  
2022

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- Legend
- Dormouse Tube Location
  - SANG Boundary
  - Survey Extent
  - Site Boundary



Map Centre Grid Reference: 476036E 166740N

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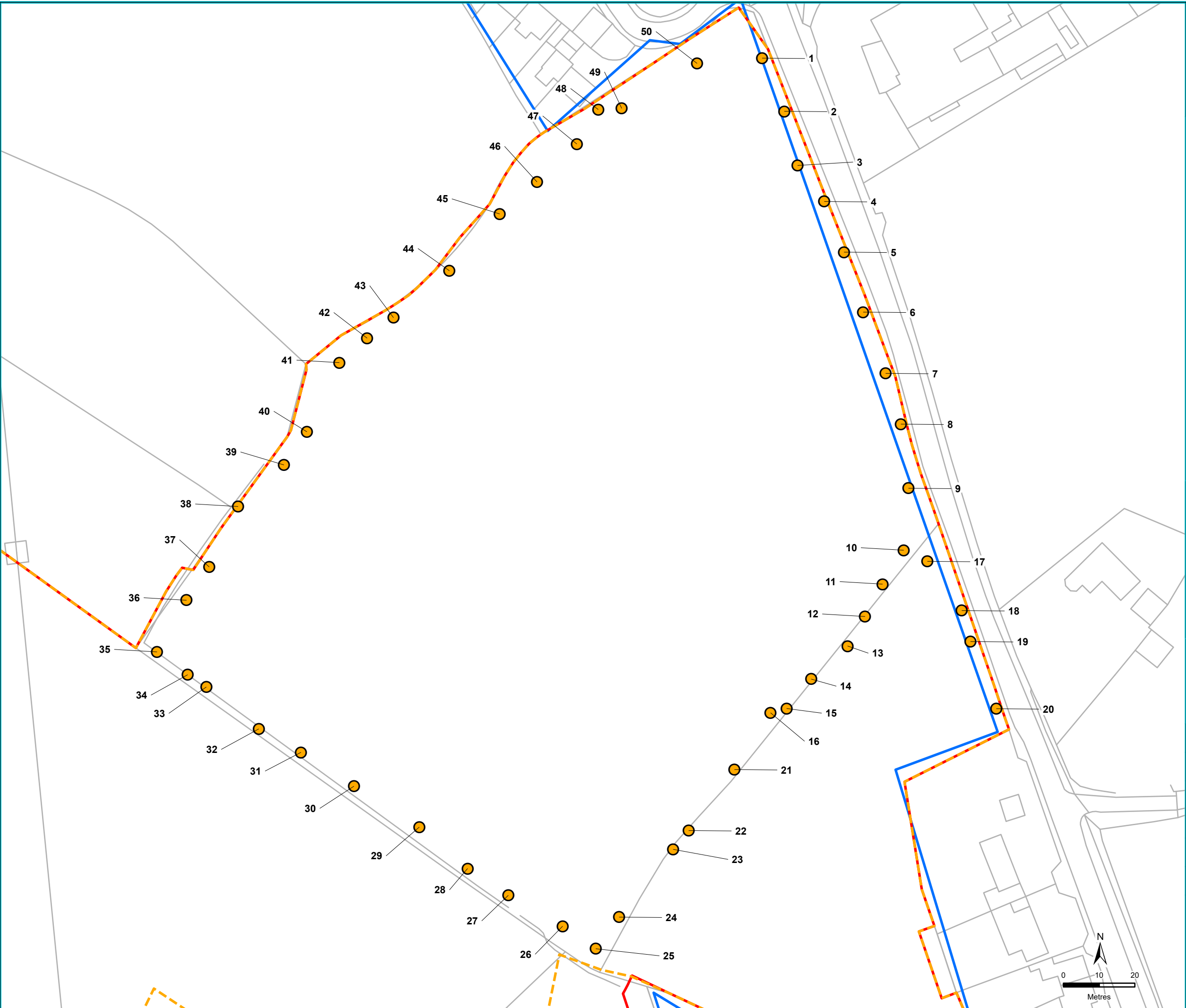
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Client  
David Wilson Homes

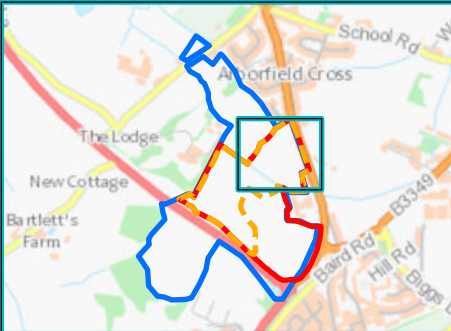
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Figure Title  
Dormouse Survey Results  
2022

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- Legend
- Dormouse Tube Location
  - SANG Boundary
  - Survey Extent
  - Site Boundary



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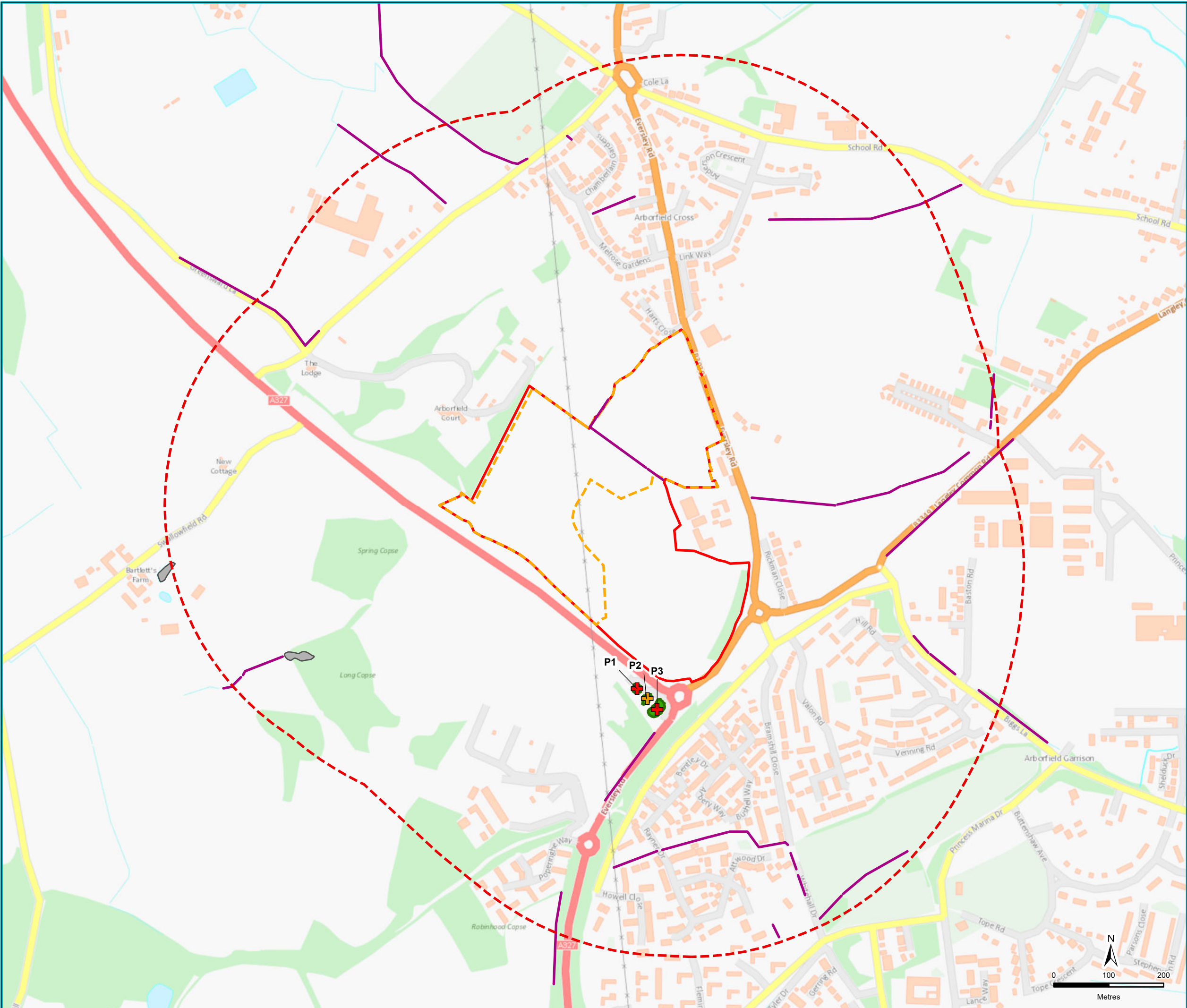
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Client  
David Wilson Homes

Figure Number  
10

Figure Title  
Dormouse Survey Results  
2022

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Legend

eDNA Result

- Negative
- Waterbody Dry
- Scoped Out

HSI Category (Pond Suitability)

- Excellent
- No Access
- 500m Study Area Buffer
- SANG Site Boundary
- Site Boundary

Map Centre Grid Reference: 476108E 166301N

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Scale at A3  
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| Date<br>24/09/2024 | Date<br>24/09/2024 |

Client  
David Wilson Homes

Figure Number  
11

Figure Title  
GCN Survey Results

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Service Layer Credits: OS Open Background Tile Layer: Contains OS data © Crown Copyright and database right 2020  
World Imagery: Maxar, Microsoft



- Legend
- Overall Suitability of Tree to Support Roosting Bats**
- FAR
  - PRF
  - PRF-M
  - RPAs
  - Key Dark Zones
  - SANG Boundary
  - Site Boundary

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| Date  | 27/09/2024 | Date    | 27/09/2024 |

Client  
David Wilson Homes

Figure Number  
12

Figure Title  
Key Dark Zones

## 2. Introduction

### 2.1 Development Background

2.1.1 David Wilson Homes is submitting a hybrid planning application to Wokingham Borough Council for a site known as Ducks Nest, Arborfield. The application comprises of:

- A full application for the change of use of land from agricultural land to provide an area of Suitable Alternative Natural Greenspace (SANG), including the details of associated landscaping, planting, drainage measures, parking, walking routes and other works associated with the creation of the SANG.
- An outline application with all matters reserved other than access into the site for a residential development of up to 135 dwellings, open space, internal accesses and parking, drainage measures, landscaping and all other associated works.

2.1.2 The proposals described above are hereafter referred to collectively as 'the development'.

2.1.3 The development will be located on an area of farmland (Grid Reference SU760664), south of Arborfield Cross with the A327 running adjacent to the western boundary. This will hereafter be referred to as 'the site' and is shown on Figure 1 the proposed locations of the residential development and the SANG are shown on Figure 2.

### 2.2 Ecology Background

2.2.1 David Wilson Homes commissioned Thomson Environmental Consultants in 2022 to undertake a range of ecological assessments of the proposed development site and surrounding area. A Preliminary Ecological Appraisal was undertaken to gather baseline ecological data for the site. The habitat survey was undertaken using the UK Habitat Classification System (UKHab) and condition of habitats was recorded to enable calculation of a baseline biodiversity metric for the site using the Natural England Biodiversity Metric 3.1. Habitat suitability assessments for bats, reptiles and hazel dormouse (*Muscardinus avellanarius*) were also undertaken during the field survey, [REDACTED] (Thomson Environmental Consultants, 2022a). Subsequently, surveys for bats, reptiles, birds, hazel dormouse and great crested newt (GCN) (*Triturus cristatus*) were conducted.

2.2.2 Thomson Environmental Consultants produced an Ecological Impact Assessment (EclA) in line with CIEEM guidelines (informed by the results of the above surveys), which was submitted as part of a planning application to Wokingham Borough Council (planning reference 230532) (Thomson Environmental Consultants, 2022b). The planning application was ultimately withdrawn, due to non-ecological reasons.

2.2.3 The ecology officer at Wokingham Borough Council provided comments on the proposal, including protected species, ecological permeability of the site, Biodiversity Net Gain (BNG) and the Habitats Regulation Assessment (HRA) (Wokingham Borough Council, 2023). The comments made, have been addressed and where relevant incorporated into this updated EclA.

2.2.4 The survey data is over two years old, and in accordance with the CIEEM guidance note on the lifespan of ecological surveys (CIEEM, 2019), a site visit was conducted in 2024 to determine the validity of the survey data. Survey data that was updated in 2024, is included in the

Methodology section as '2024 Updates', and 2022 data considered valid is outlined in the Methodology section under '2022 Surveys'. Surveys updated in 2024 were: ecological desk study, habitat survey, [REDACTED] bat ground level tree assessments and GCN habitat suitability assessment,

## 2.3 The Brief and Objectives

2.3.1 David Wilson Homes commissioned Thomson Environmental Consultants on 9<sup>th</sup> September 2024 to undertake the following:

- A habitat survey of the site, using the UK Habitat Classification methodology (V2), to include an assessment of the potential for any changes in habitats on site to support protected species and species of conservation concern. [REDACTED]  
[REDACTED]  
[REDACTED] A condition assessment of each on-site habitat parcel using DEFRA's statutory biodiversity metric methodology in order to collect data to inform Biodiversity Net Gain calculations.
- A ground level inspection of all trees within the red line boundary, with the aim of the survey to estimate (as far as can be achieved from ground level) which trees are suitable for roosting bats,
- An updated Habitat Suitability Index (HSI) Assessment of the three ponds that were surveyed in 2022, located in the south of the proposed development site;
- An update of the existing EcIA for the site (report reference: DWH001-020-001/004/002) to include; an updated desk study, as the validity of the previous desk study has expired, the methodology and results of the updated surveys, any information requested from the ecologist from Wokingham Borough Council, during the previous planning application (230532); and any updates to legislation or planning policy.

2.3.2 Also commissioned were updates to the Biodiversity Net Gain Assessments for the site, but this is addressed in a separate report (Thomson Environmental Consultants, 2024).

2.3.3 The objective of this report is to identify and describe all potentially significant ecological effects associated with the proposed development. This is needed in order to set out the mitigation measures required to ensure compliance with nature conservation legislation and to identify how mitigation measures will be secured; to provide an assessment of the significance of any residual effects; to identify appropriate enhancement measures; and to set out the requirements for post-construction monitoring.

## 2.4 Surveyors

2.4.1 Details of the dates and surveyors carrying out the various surveys undertaken to inform this report can be found in Appendix 1.

### 3. Legal and Policy Context

**3.1.1** Protected sites, habitats and species, that are relevant to the development are covered by a range of legislation and policy which is described in Table 1.

**Table 1: Legislation Applicable to the Development**

| Feature                  |                                            | Legislation/Policy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Designated Sites</b>  | Special Protection Area (SPA)              | <p>Special Protection Areas (SPAs) are protected areas for birds in the UK classified under the Conservation of Habitats and Species Regulations 2017 (as amended)</p> <p>As part of the Thames Basin Heaths (TBH) avoidance strategy set out in Core Strategy Policy CP8 of the Adopted Core Strategy Development Plan Document and Policy NRM6 of the South East Plan, any net residential developments within 5km of the site will require a Suitable Alternative Natural Greenspace (SANG) provision. The SANG provision will be at a minimum of 8ha/1000 population (calculated at a rate of 2.4 persons per household).</p>                                     |
|                          | Site of Special Scientific Interest (SSSI) | <p>SSSIs are designated under the Wildlife and Countryside Act, 1981 (as amended) by the relevant nature conservation bodies as areas of special interest for fauna, flora, geological, geomorphological or physiogeographical features.</p>                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | Local Nature Reserve (LNR)                 | <p>LNRs are designated under the National Parks and Access to the Countryside Act 1949 by principal local authorities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                          | Local Wildlife Sites (LWS)                 | <p>Biodiversity policy CP7 of Wokingham Borough Council's Core Strategy states that development "<i>which may harm county designated sites (Local Wildlife Sites in Berkshire), whether directly or indirectly will be only permitted if it has been clearly demonstrated that the need for the proposal outweighs the need to safeguard the nature conservation importance, that no alternative site that would result in less or no harm is available which will meet the need, and: i) Mitigation measures can be put in place to prevent damaging impacts; or ii) Appropriate compensation measures to offset the scale and kind of losses are provided</i>".</p> |
| <b>Priority Habitats</b> | Deciduous woodland                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Feature          |                     | Legislation/Policy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Traditional Orchard | These priority habitats are protected under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                  | Hedgerows           | Wokingham Borough Core Strategy Development Plan (2010) policy CP7 states <i>"Development which may harm habitats of principle importance in England for nature conservation, whether directly or indirectly... will only be permitted if it has been clearly demonstrated that the needs for the proposal outweighs the need to safeguard the nature conservation importance... and mitigation measures can be put in place to prevent damaging impacts; or appropriate compensation measure to offset the scale and kind of losses are provided"</i> . |
| Ancient Woodland |                     | Ancient Woodland are an irreplaceable component of biodiversity and an important habitat on the national scale which are covered under Section 41 of the NERC Act.                                                                                                                                                                                                                                                                                                                                                                                       |
| Species          | Bats                | All species of bat are fully protected under the Conservation of Habitats and Species Regulations 2017, (as amended) and partially protected under Schedule 5 of the Wildlife and Countryside Act 1981, (as amended). Some species of bat are also listed as priority species in England under the Natural Environment and Rural Communities (NERC) Act 2006.                                                                                                                                                                                            |
|                  | Badger              | Badgers are protected under The Protection of Badgers Act 1992.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                  | Reptiles            | Protected from killing and injury under Schedule 5 of the WCA 1981 (as amended). Priority species in England under the Natural Environment and Rural Communities (NERC) Act 2006.                                                                                                                                                                                                                                                                                                                                                                        |
|                  | Birds               | All birds, their eggs and nests are protected from damage and destruction under the Wildlife and Countryside Act 1981, (as amended). Some birds, including kingfisher, are listed on Schedule 1 of this act giving them protection from reckless or intentional disturbance whilst on or near an active nest.                                                                                                                                                                                                                                            |
|                  | Dormouse            | Fully protected under the Conservation of Habitats and Species Regulations 2017, (as amended) and partially protected under Schedule 5 of the Wildlife and Countryside                                                                                                                                                                                                                                                                                                                                                                                   |

| Feature               |                    | Legislation/Policy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       |                    | Act 1981, (as amended). Priority species under the NERC Act 2006.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                       | Great crested newt | Fully protected under the Conservation of Habitats and Species Regulations 2017, (as amended) and partially protected under Schedule 5 of the Wildlife and Countryside Act 1981, (as amended). Priority species under Section 41 of the NERC Act 2006.                                                                                                                                                                                                                                                                                                                                                                             |
|                       | Himalayan Balsam   | Listed under Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order 2019, which gives effect to EU regulations on the prevention and management of the spread of invasive alien species.<br><br>It is an offence to ' <i>plant or otherwise cause to grow in the wild</i> ' any plant species listed.                                                                                                                                                                                                                                                                                                         |
| All protected species |                    | Wokingham Borough Core Strategy Development Plan (2010) - Policy CP3: <i>Planning permission will be granted for developments that... have no detrimental impact upon important ecological features; maintain or enhance the ability of the site to support fauna or flora including protected species.</i>                                                                                                                                                                                                                                                                                                                        |
| All priority species  |                    | Wokingham Borough Core Strategy Development Plan (2010) - Policy CP7: <i>Development which may harm species of principle importance in England for nature conservation, whether directly or indirectly... will only be permitted if it has been clearly demonstrated that the needs for the proposal outweighs the need to safeguard the nature conservation importance... and mitigation measures can be put in place to prevent damaging impacts; or appropriate compensation measure to offset the scale and kind of losses are provided</i>                                                                                    |
| Biodiversity Net Gain |                    | The <b>Environment Act 2021</b> provides a framework to improve and protect the natural environment and is overseen by the Office for Environmental Protection. One of the provisions of the Act is the mandatory requirement for most new developments to provide a 10% net gain in biodiversity. Both onsite and offsite enhancements will need to be maintained for a period of at least 30 years following completion of a development.<br><br>Policy CP3 of the Wokingham Borough Core Strategy Development Plan (2010) states: " <i>Planning permission will be granted for developments that:...maintain or enhance the</i> |

---

| Feature | Legislation/Policy                                                                 |
|---------|------------------------------------------------------------------------------------|
|         | <i>ability of the site to support fauna or flora including protected species".</i> |

## 4. Methods

### 2024 Surveys

#### 4.1 Desk Study

4.1.1 An updated desk study was completed, the survey area was defined to cover the site and all land within a 5 km buffer area. Records for Special Areas of Conservation (SACs), SPAs and Ramsar sites were sought for a 5 km study area, with all other designated sites, ancient woodland and priority habitats sought for a 2 km study area. Records for protected species, species of conservation concern and invasive non-native species were sought for a 1 km buffer area. The site location and study areas are shown on Figure 1.

4.1.2 Sources of information were as follows:

- The Multi-Agency Geographical Information for the Countryside (MAGIC)
- Thames Valley Ecological Records Centre

4.1.3 Requests for information were to the Biological Record Centre sent on 11<sup>th</sup> September 2024 and were received on the same day.

#### 4.2 UKHab Survey

4.2.1 A survey area was defined as an area that encompassed the red line boundary. The survey area is shown on Figure 2.

4.2.2 A survey using the UK Habitat Classification system (UKHab) (UKHab Ltd, 2023) was conducted throughout the survey area. This is a nationally recognised habitat classification system that is compatible with the Defra statutory metric for calculating biodiversity net gain values (Defra, 2023a).

4.2.3 The UKHab has five hierarchical levels and includes the identification of priority habitats and Annex I habitats as listed under the European Habitats Directive. The five levels are:

- Level 1 - Biomes/major ecosystems (terrestrial, freshwater and coastal);
- Level 2 - Ecosystem types (i.e. woodland, grassland, heathland and scrub);
- Level 3 - Broad Habitats, based on those of the UK Biodiversity Action Plan (UKBAP);
- Level 4 - Habitats, including priority habitats; and
- Level 5 - Habitats, including Annex I habitats.

4.2.4 In addition, non-hierarchical secondary codes were used to provide supplementary information.

4.2.5 During the field survey, the habitats in the survey area were mapped to the highest level possible

4.2.6 Table 2 below shows the meta-data used for this survey.

**Table 2: Habitat survey meta-data**

|                                                                 |                                                                                                                  |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Scope and purpose of the survey</b>                          | Preliminary Ecological Appraisal (PEA)                                                                           |
| <b>Area surveyed</b>                                            | See Figure 2                                                                                                     |
| <b>Edition of UKHab used</b>                                    | UKHab-Professional (V2)                                                                                          |
| <b>Minimum Mapping Unit (MMU)</b>                               | 25m <sup>2</sup> for areas, 5m for linear features                                                               |
| <b>Level of UKHab Primary Hierarchy used</b>                    | Level 5, where possible                                                                                          |
| <b>List of Secondary Code groups recorded</b>                   | All secondary codes                                                                                              |
| <b>Additional attributes recorded</b>                           | Habitat condition assessment                                                                                     |
| <b>Map projection and units</b>                                 | See Figure 2                                                                                                     |
| <b>Date of survey</b>                                           | 11 <sup>th</sup> September 2024                                                                                  |
| <b>Organisation and individual undertaking the survey</b>       | Jessica Green, Ecological Consultant<br>Thomson Environmental Consultants                                        |
| <b>References for any existing datasets that have been used</b> | The Multi-Agency Geographical Information for the Countryside (MAGIC)<br>Thames Valley Ecological Records Centre |

**4.2.7** The dominant and readily identified species of higher plant species from each habitat type within the survey area were recorded and their abundance was assessed on the DAFOR scale:

- D Dominant;
- A Abundant;
- F Frequent;
- O Occasional; and
- R Rare.

**4.2.8** These scores represent the abundance within the defined area only and do not reflect national or regional abundances. Plant species nomenclature follows Stace (2019).

**4.2.9** Target notes were made for any features which were too small to map but were of particular ecological interest.

**4.2.10** Any significant changes in habitat were noted, to inform the decision as to the validity of the survey data already available for this site.



and further from the base (as required). Results were recorded using a GPS enabled mobile mapper, with photographs taken to support results.

**4.4.2** The survey searched for and recorded any PRFs which could be viewed from the ground. Those which were apparently pointing upwards were included in the assessment, as were seasonally wet features because these factors do not necessarily preclude use without further investigation. Where higher level areas of the tree were viewable from the ground, a high-powered torch was used to search for PRFs.

**4.4.3** Features searched for included those in Table 3 defined according to Bat Roosts in Trees, (BTHK, 2018).

**Table 3 PRF types that can be exploited by bats and how they form (adapted from Bat Roosts in Trees (BTHK, 2018))**

| Disease/Decay Formed PRFs | Damaged formed PRFs  | Association formed PRFs |
|---------------------------|----------------------|-------------------------|
| woodpecker holes          | lightning strikes    | Fluting                 |
| squirrel holes            | hazard beams         | ivy                     |
| knot holes                | subsidence cracks    |                         |
| pruning cuts              | shearing cracks      |                         |
| tear outs                 | transverse snaps     |                         |
| wounds                    | welds                |                         |
| cankers                   | lifting bark         |                         |
| compression forks         | desiccation fissures |                         |
| butt rots                 | frost cracks         |                         |

**4.4.4** All trees with identified PRFs and requiring further assessment were photographed, tagged, numbered and the following information recorded:

- GPS coordinates;
- UK Habitat Classification (if not recorded previously at the site)
- species, height, condition (alive, dead etc)
- approximate diameter at breast height

**4.4.5** Where PRFs were identified, they were recorded including PRF type, location on tree (stem or limb), height above ground and compass direction on the tree. Any evidence confirming or indicating use of a PRF was also recorded, including:

- GPS coordinates;
- Bat droppings, feeding remains and corpses (with notes made on quantity, freshness and type);
- Dark staining below an access point that may be caused by bat faeces or urine;
- Staining around a hole that may be caused by the natural oils in bat fur; and

- Noises made by bats.

4.4.6 The suitability of potential tree roosting habitat was classified according to the broad categories in Table 4, based on the presence or absence of potential roosting features (PRF).

**Table 4 Guidelines for assessing the suitability of trees on proposed development sites for bats, to be applied using professional judgement (adapted from Collins ed. 2023)**

| Suitability | Description                                                              |
|-------------|--------------------------------------------------------------------------|
| None        | Either no PRFs in the tree or highly unlikely to be any                  |
| FAR         | Further Assessment Required to establish if PRFs are present in the tree |
| PRF         | A tree with at least one PRF present                                     |

4.4.7 For each structure and tree with a PRF, contextual information was also recorded to aid the assessment. This was distance to hedge, distance to woodland, distance to water, potential commuting corridors, potential foraging corridors, setting, surrounding area habitat quality and the level of disturbance.

## 4.5 Great Crested Newt Methodology

### *Initial Search*

4.5.1 An initial search area was established which encompassed the land within the application site boundary and a 500 m additional buffer.

4.5.2 Ordnance survey maps and aerial photographs were used to identify any potential waterbodies, good quality great crested newt terrestrial habitats and major barriers to dispersal for great crested newts

### *Screening Stage I - Isolation*

4.5.3 All potential waterbodies within the search area which were separated from the application site by a major dispersal barrier were screened out from further assessment and the reason recorded.

### *Screening Stage II - Suitability*

4.5.4 The remaining potential waterbodies were then examined further to determine if they could comprise suitable breeding habitat for great crested newts.

4.5.5 A waterbody was screened out if it was obviously:

- Filled in or dry for at least most of the year;
- A slurry pond;
- A chlorinated swimming pool;
- A fishing lake or pond which is stocked with fish;

- Running water (streams and rivers);
- A lake greater than 2ha in size; or
- Saline.

4.5.6 Subject to permission to access from the landowner, the remaining waterbodies were then subject to an assessment in the field by a suitably qualified ecologist.

4.5.7 The Survey Area was defined as all the waterbodies subject to assessment to assessment in the field following Screening Stage II.

#### *Screening Stage III - Field Assessment*

4.5.8 On arrival at each waterbody, it was assessed again to see if it corresponded to any of the waterbody types listed in Screening Stage II. If so, it was screened out of further assessment and the reason was recorded.

#### *Habitat Suitability Assessment*

4.5.9 Where access was possible, waterbodies were subject to a Habitat Suitability Index (HSI) survey (Oldham et al 2000), in 2024.

4.5.10 The surveyor recorded suitability indices (SI) for ten habitat parameters. The SI results enable an HSI score to be calculated. This score gives a quantitative assessment of each waterbody for its suitability to support great crested newts. The indices used are set out below:

- Location (in Britain) - this accommodates the large scale habitat features which affect great crested newts;
  - Water body Area (m<sup>2</sup>) - great crested newts tend not to occur in small water bodies or large water bodies and more typically occur in fair-sized water bodies, usually greater than 100m<sup>2</sup>, less than 300 m<sup>2</sup> and over 0.5m deep;
  - Desiccation Rate - (years out of ten that water body dries) great crested newts have to spend a large proportion of the year in water and therefore tend to occur in water bodies that are permanent and present all year round (although occasional drying may be of benefit as it kills fish populations);
  - Water Quality - (subjective assessment) great crested newts tend to occur in nutrient rich waters and the larvae need well aerated water with a number of invertebrates;
  - % Shade - great crested newts tend to occur in largely un-shaded water bodies;
  - Number of waterfowl - large numbers of waterfowl can damage the habitat and cause excessive nutrient enrichment;
  - Fish Population - (subjective assessment) great crested newts are vulnerable to fish predation and therefore they tend to avoid water bodies that contain fish;
  - Number of water bodies within 1km - great crested newt population persistence depends in part upon the distance separating breeding sites;
  - Terrestrial Habitat Quality - great crested newts require more than 0.5ha of suitable and accessible terrestrial habitat for a viable population. The primary requirements for great

crested newt terrestrial habitats are: refuge habitat for shelter and over-wintering; foraging opportunities; and connectivity to aid dispersal; and

- % Macrophyte Cover - great crested newts require aquatic vegetation for egg-laying and tend to occur in water bodies with a fair amount of aquatic vegetation.

**4.5.11** In addition to the HSI data collected, each water body was photographed and a brief description was made of the pond and its surroundings.

**4.5.12** The SI scores (expressed as values between 0 and 1) are used to calculate the HSI of each water body and are determined as a geometric mean using the following equation:  $HSI = (SI1 * SI2 * SI3 * SI4 * SI5 * SI6 * SI7 * SI8 * SI9 * SI10)^{1/10}$  The result of this calculation is a single number between 0 and 1. A score of 0 represents a water body considered to be unsuitable for great crested newts, a score of 1 would represent ideal habitat for great crested newts.

**4.5.13** A suitability category was assigned to each standing water body based on the HSI score as shown in Table 5.

**Table 5: Habitat Suitability Index Categories**

| HSI Score   | Suitability Category |
|-------------|----------------------|
| > 0.80      | Excellent            |
| 0.70 - 0.79 | Good                 |
| 0.60 - 0.69 | Average              |
| 0.50 - 0.59 | Below Average        |
| < 0.50      | Poor                 |

**4.5.14** HSI scores are required to enable completion of a Natural England Licence Mitigation Method Statement should great crested newts be found to be present on a site and mitigation is required. However, the HSI score is not a reliable indicator of great crested newt presence or absence (Sellar, 2010). Therefore, waterbodies were not screened out of further survey based on HSI score alone.

## 2022 Surveys

### **4.6 Aerial Roost Inspection Methodology**

**4.6.1** Trees which had previously been identified with the potential to support roosting bats were climbed with the aid of a ladder or ropes. All accessible Preliminary Roost Features (PRF) were inspected by an appropriately licensed and trained ecologist using a torch and endoscope.

**4.6.2** The search for bats and evidence of bats focused on the areas around and within PRFs, such as:

- Natural crevices and holes;
- Woodpecker and rot holes;
- Loose bark, splits and cracks;
- Bird and bat boxes; and

- Dense ivy or dense epicormic growth.

- 4.6.3 Any inaccessible or partially accessible cavities that could not be thoroughly inspected were noted.
- 4.6.4 The information recorded for each PRF included a description of the feature, its location including aspect and height above ground level, dimensions, protection from the elements and search for evidence of roosting bats.
- 4.6.5 The location of each tree with a PRF was recorded on a map of the site and photographed.
- 4.6.6 Following the inspection a level of potential was assigned to each tree.

#### *Categorisation of Results*

- 4.6.7 In accordance with the guidelines at the time (Collins ed, 2016), each tree was assigned a level of potential to support a bat roost. To ensure that the results presented here are in line with current guidelines (Collins ed, 2023), the confirmed PRFs have been re-classified according to the following categories in Table 6.

**Table 6 Guidelines for assessing the suitability of tree PRFs on proposed development sites for bats, to be applied using professional judgement (adapted from Collins ed 2023)**

| Suitability | Description                                                                                                                         |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------|
| None        | No potential space to support roosting bats.                                                                                        |
| PRF-I       | PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats. |
| PRF-M       | PRF is suitable for multiple bats and may therefore be used for a maternity colony.                                                 |

## 4.7 Bat Habitat Assessment

- 4.7.1 A walkover survey was undertaken during which all potential bat roosting, foraging and commuting habitat was identified and evaluated. Examples of potential bat habitat are provided in Table 7.

**Table 7 Bat habitat types**

| Habitat Type     | Examples of habitat                                                                                                                                                                |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Roosting habitat | Buildings and other built structures, such as old walls;<br>Bridges and culverts;<br>Caves, mines and other underground cavities; and<br>Trees with cavities, cracks and fissures. |

| Habitat Type      | Examples of habitat                                                                                                                                                                                                                                            |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Commuting habitat | All hedgerows;<br>Tree lines;<br>Walls; and<br>Water courses, including ditches.                                                                                                                                                                               |
| Foraging habitat  | All wetland habitats;<br>Woodland;<br>Scrub;<br>Hedgerows and tree lines;<br>Heathland;<br>Species-rich semi- or unimproved pasture or hay meadow;<br>Coarse (unmanaged) grassland; and<br>Other areas of habitat likely to support a rich invertebrate fauna. |

**4.7.2** The suitability of potential commuting habitat and potential foraging habitat was classified in accordance with Table 8, and then an overall assessment of the site was made in accordance with Table 9.

**Table 8 Commuting and Foraging Habitat Suitability (adapted from Collins ed 2023)**

| Suitability for Significant Habitat | Examples for Commuting Habitat                                                                                                                                                                | Examples for Foraging Habitat                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible                          | No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour | Highly modified habitats including arable, improved grassland, walls, hard-standing and buildings, small (<1ha) conifer plantations, exposed upland habitats (open moorland and mountains) and exposed coastal habitats (beaches and cliff tops).                                                                                                                                                    |
| Low                                 | Linear feature connected to only low-suitability potential foraging habitat and greater than 1km from potential roosting habitat.                                                             | Modified habitats or small, isolated areas of semi-natural habitat such as small gardens, isolated broadleaved trees, semi-improved grassland and isolated patches of scrub, broadleaved woodland, etc of less than 0.1ha, or up to 1ha if very isolated. Conifer plantations.<br><br>Modified or narrow linear features such as hedgerows comprised of non-native species, gappy or heavily managed |

| Suitability for Significant Habitat | Examples for Commuting Habitat                                                                                                   | Examples for Foraging Habitat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |                                                                                                                                  | farmland hedgerows in large field systems, small watercourses or ditches with few trees and shrubs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Moderate                            | Linear feature connected to moderate or high -suitability foraging habitat and greater than 1km from potential roosting habitat. | <p>Medium-sized patches of semi-natural habitats (&gt;0.1ha to 1ha), including wetland, broadleaved woodland, scrub, heathland, species-rich semi- or unimproved pasture or hay meadow, coarse (unmanaged) grassland; and other areas of habitat likely to support a rich invertebrate fauna, and connectivity to other areas of moderate and high suitability foraging habitat, commuting corridors and roosting habitat. Several large gardens.</p> <p>Medium-width, continuous linear features with shrubs and trees including hedgerows with good connectivity to other areas of moderate and high quality foraging habitat, commuting corridors and roosting habitat.</p>                     |
| High                                | Linear feature connected to moderate or high -suitability foraging habitat and less than 1km from potential roosting habitat.    | <p>Sheltered and extensive (&gt;1ha individually or including connected high suitability habitat parcels) semi-natural habitats including wetland, broadleaved woodland, scrub, heathland, species-rich semi- or unimproved pasture or hay meadow, coarse (unmanaged) grassland; and other areas of habitat likely to support a rich invertebrate fauna. Small field systems (field size &lt;1ha) of semi- or unimproved and associated hedgerow network.</p> <p>Robust linear features including wide hedgerows and tree lines, woodland shelter belts, well-wooded railways and lanes and large watercourses and hedgerows which form part of a dense hedgerow network (field size &lt;1ha).</p> |

Table 9: Overall Site Suitability

| Suitability to support significant bat populations | Qualitative Examples                                                                                                                 | Quantitative                                                                                                                                                                                                                                   |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible                                         | The site is intensively farmed arable, highly urban or open moorland with very little habitat of more than low suitability for bats. | >80% negligible suitability foraging habitats                                                                                                                                                                                                  |
| Low                                                | The site is large fields of grazed, improved grassland with well-managed hedgerows and occasional small woodlands.                   | <80% negligible suitability foraging habitats; AND<br><40% high suitability foraging habitats; AND<br>Amount of low suitability > moderate + high suitability.<br>OR lacking connectivity to moderate or high roosting and foraging habitat    |
| Moderate                                           | The site is mostly medium-sized fields of arable and improved pasture but with some large unmanaged hedgerows and small woodlands.   | <80% negligible suitability foraging habitats; AND<br><40% high suitability foraging habitats; AND<br>Amount of moderate + high suitability > or = low suitability; AND<br>With connectivity to moderate or high roosting and foraging habitat |
| High                                               | The site includes large areas of woodlands interspersed with small fields of semi-improved grassland and marshy grassland.           | >40% high suitability foraging habitats; AND<br>With connectivity to moderate or high roosting and foraging habitat                                                                                                                            |

## 4.8 Bat Activity Transects Methodology

**4.8.1** The survey extent was defined as the site boundary, plus land in the surrounding area that is within David Wilson Homes control. During the Preliminary Ecological Appraisal, in 2022, an assessment was made of roosting, commuting, foraging and habitat suitability on the development site. The habitat suitability had not changed in 2024, and as such, the 2022 data was still considered valid. This information and the proposed development layout was used to inform the number and location of transects for the bat activity survey. The location of transects was selected to cover as much of the site as possible and focus on areas that could be used by bats for foraging and commuting.

**4.8.2** The overall habitat was assessed as being of moderate suitability. Survey effort for the activity surveys was determined in accordance with good practice guidelines (Collins ed, 2016). This

best practice guidance has now been superseded (Collins ed, 2023), but the survey data is still considered valid as the sufficient survey effort was conducted at the site to understand how bats were using the site and the surrounding area. In accordance with these guidelines, one dusk or dawn survey per month was undertaken, with one dusk and pre-dawn survey undertaken within a 24-hour period. The transects were supplemented by spot counts where the ecologists remained stationary for 5 minutes at pre-determined locations along the route that represented the habitats recorded within the survey area.

- 4.8.3** Dusk surveys began at sunset and ended approximately two to three hours after sunset. Dawn surveys began approximately two hours before sunrise and ended at sunrise. Weather conditions including cloud cover, wind, precipitation, the air temperature at 1m were recorded by the lead surveyor at the start and end of the survey. Table 10 was used to determine whether the conditions were suitable for the activity survey. Any other limitations that could affect bat behaviour were recorded (such as night lighting and excessive high frequency noise).

**Table 10: Guidance on weather conditions for bat surveys (based on Slack and Tinsley, 2015)**

| Conditions | Temperature at dusk or dawn (°C) | Wind Speed (Beaufort windforce scale)  | Precipitation                      |
|------------|----------------------------------|----------------------------------------|------------------------------------|
| Optimal    | >14                              | 0 to 3 (calm to slight wind)           | Dry                                |
| Acceptable | 10-14                            | 4 to 6.5 (moderate to strong breeze)   | Light showers to moderate rainfall |
| Unsuitable | <10                              | 6.5 and above (high wind and stronger) | Heavy rainfall                     |

- 4.8.4** The overall suitability of the conditions is determined by the least suitable of the three parameters.
- 4.8.5** Each transect was walked at a steady pace by a pair of ecologists equipped with an Elekon Bat Logger M and the internal recording function on the Bat Logger was used to record all bat passes.
- 4.8.6** Weather conditions recorded during the survey visits are shown in Table 11 below.

**Table 11: Survey weather conditions and timings**

| Visit | Survey date          | Start time | Finish time | Conditions | Temperature (°C) |     | Precipitation | Beaufort wind force scale |
|-------|----------------------|------------|-------------|------------|------------------|-----|---------------|---------------------------|
|       |                      |            |             |            | Max              | Min |               |                           |
| 1     | 27/04/2022<br>- Dusk | 08:24      | 09:55       | Optimal    | 12               | 11  | Dry           | 1                         |
| 2     | 18/05/2022<br>- Dusk | 08:54      | 11:04       | Acceptable | 17               | 15  | Showers       | 1                         |
| 3     | 13/06/2022<br>- Dusk | 09:13      | 11:21       | Optimal    | 17               | 14  | Dry           | 0                         |
| 4     | 18/07/2022<br>- Dusk | 21:09      | 10:58       | Optimal    | 27               | 23  | Dry           | 0                         |

| Visit | Survey date          | Start time | Finish time | Conditions | Temperature (°C) |     | Precipitation | Beaufort wind force scale |
|-------|----------------------|------------|-------------|------------|------------------|-----|---------------|---------------------------|
|       |                      |            |             |            | Max              | Min |               |                           |
| 5     | 19/07/2022<br>- Dawn | 03:03      | 04:53       | Optimal    | 23               | 21  | Dry           | 1                         |
| 6     | 15/08/2022<br>-Dusk  | 20:25      | 21:55       | Optimal    | 23               | 22  | Dry           | 1                         |
| 7     | 12/09/2022<br>-Dusk  | 19:25      | 21:25       | Optimal    | 20               | 16  | Dry           | 1                         |
| 8     | 04/10/2022<br>-Dusk  | 18:58      | 20:19       | Optimal    | 17               | 13  | Dry           | 1                         |

#### 4.9 Static monitoring

**4.9.1** In addition to the transect surveys, SM Mini bat detectors were deployed as static monitoring devices. The location of static monitoring devices is presented in Figure 6.

**4.9.2** For each transect, two static monitoring locations were selected to sample representative habitat along each transect. At each location, a static monitoring device was deployed seven occasions during the survey season, once per month. On each occasion, the static monitoring device was deployed for a minimum of five consecutive nights, until five nights recording in suitable weather conditions was achieved. The devices were set to commence recording 30 minutes before sunset and ended 30 minutes after sunrise.

**4.9.3** The same model of static monitoring device was used across the site with identical settings and yearly calibration taking place to ensure accurate results. The device's microphone was positioned to maximise the amount of bat activity recorded - in particular omnidirectional microphones were used, at heights between 2 to 4m. This was positioned to avoid background ambient noise, electrical interference and solid objects/scrub for instance blocking sound waves and therefore the detection of ultrasonic bat calls.

#### 4.10 Definition of a bat pass

**4.10.1** A pass is defined as an unbroken stream of echolocation calls up to five seconds long, heard as a series of 'clicks, slaps, ticks or warbles' on a bat detector as the bat passes in and out of the detector's range (Barataud, 2002; Barataud & Giosa, 2012, 2014). Where more than one bat was observed, up to a maximum of five bats, the number of bat passes is calculated as below:

$$\text{Bat Pass} = \left( \frac{\text{Bat call sequence}}{5} \right) * \text{Number of each bat species}$$

#### 4.11 Data analysis

**4.11.1** All bat calls were recorded, and these were analysed using Bat Explorer and Kaleidoscope. Quality assurance was undertaken on 10% of the bat call sound and noise files, and any rare or notable species.

- 4.11.2 The number of passes per species, during the activity transects and at the SM devices was then analysed, and conclusions drawn on the conservation status and impacts on bats using the site.

#### 4.12 Reptile Habitat Assessment

- 4.12.1 Habitat requirements differ for each native species of reptile in the British Isles. Habitat suitability was considered for each of the reptile species that has a native range concurrent with the site location. Suitable habitat was identified and classified as poor, good or exceptional based on the following habitat characteristics, with the classification options for each shown in brackets:

- Habitat type (using UK habitat classification survey methods);
- Vegetation structure (simple, moderate, complex);
- Likely age of the habitat (less than 2 years, greater than 2 years);
- Insolation (sun exposure) (low, medium, high);
- Aspect (North, South, East and West);
- Topography (flat, shallow slope, steep slope, varied);
- Surface geology (sand/gravel, clay, chalk, other);
- Connectivity to nearby suitable habitats (low, medium, high);
- Potential prey abundance (low, medium, high);
- Refuge opportunities (low, medium, high);
- Hibernation site availability (low, medium, high);
- Egg laying site availability (grass snake and sand lizard) (low, medium, high); and
- Disturbance (low, medium, high).

#### 4.13 Reptile Presence/Absence Surveys

- 4.13.1 The survey extent was defined as the site boundary, plus land in the surrounding area that is within David Wilson Homes control, with survey effort concentrated in areas of suitable habitat.
- 4.13.2 In areas of suitable habitat, two survey methods were then used to determine the presence or likely absence of reptiles. These were (i) a visual search for basking reptiles and (ii) the checking of artificial refugia deployed specifically to attract reptiles.
- 4.13.3 Survey visits were undertaken during the active season for reptiles (April, May and June) when weather conditions were most suitable for reptile surveys. This excludes periods of heavy rain, strong wind and temperatures below 9°C and above 20°C (Gent & Gibson, 2003).

##### *Visual Search*

- 4.13.4 On eight occasions the survey area was walked around slowly looking for basking reptiles. Any reptiles seen were approached cautiously so as not to disturb them and to allow species identification. Where necessary, binoculars were used to aide identification. The number,

species, life stage and location of any reptiles seen were recorded on a map of the survey area using a mobile mapper. Any evidence of reptiles such as sloughed skins was also recorded.

#### *Refugia Search*

- 4.13.5** On 27<sup>th</sup> April 2022, artificial refugia were placed in suitable locations throughout the survey area.
- 4.13.6** The artificial refugia were comprised of 0.5m x 0.5m cuts of roofing felt. The refugia were positioned so that they were in contact with the ground, in areas of suitable habitat and exposed to sunlight. To prevent interference in the survey, the refugia were not placed in areas where there was a high level of public activity. The location of artificial refugia was mapped using mobile mappers.
- 4.13.7** The artificial refugia were then left in place for two weeks before the survey commenced. Subsequently, on seven occasions, a minimum of one week apart, all of the refugia were cautiously checked for reptiles, both on top and underneath. If any reptiles were found, the refuge location, species, life stage and numbers of reptiles were recorded. Any evidence of reptiles such as sloughed skins was also recorded.
- 4.13.8** On days forecast to be hot and sunny, the survey was conducted during the morning or late afternoon, when the temperature beneath the refugia was not too high. On days forecast to be cooler or cloudy, the survey was conducted in mid- to late morning or early to mid- afternoon. The air temperature in the shade was recorded on each survey visit.
- 4.13.9** The artificial refugia were collected up and removed from the site after the end of the final survey.
- 4.13.10** The peak observation for each species (i.e. the highest number recorded on any one survey visit) were then used, as an indication of the population size class; classified as small, medium or large as per
- 4.13.11** Table 12.

**Table 12: Population Size Estimate**

| Species       | Population Size Class (Density) |        |       |
|---------------|---------------------------------|--------|-------|
|               | Small                           | Medium | Large |
| Slow worm     | <10                             | 10-40  | >40   |
| Common Lizard | <5                              | 5-20   | >20   |
| Grass Snake   | <5                              | 5-10   | >10   |
| Adder         | <5                              | 5-10   | >10   |

#### **4.14 Breeding Birds**

- 4.14.1** The survey extent was defined as the site boundary, plus land in the surrounding area that is within David Wilson Homes control. The habitat suitability of the site had not changed significantly between 2022 and 2024, and as such, the data collected in 2022 was considered to still be valid.
- 4.14.2** For territorial and semi-colonial species, the method used in this survey was based on the registration mapping technique, similar to that used in the British Trust for Ornithology's

Common Bird Census (Marchant, 1983; Bibby et al, 2000). The registration mapping technique allows the distribution of bird territories across the survey extent to be determined and, subsequently, a count of the number breeding pairs for each species in the survey extent as a whole can be derived. An advantage of this technique is that it allows the relative importance of different parts of the survey extent to be evaluated.

- 4.14.3 For non-territorial species, the territory mapping technique is not appropriate. Instead, peak counts were derived from the survey.
- 4.14.4 The survey area was visited on five occasions in the period 27<sup>th</sup> April 2022 to 14<sup>th</sup> June 2022, with at least one week between each visit.
- 4.14.5 On each occasion, the survey extent was walked over following a route that allowed the surveyor to pass within at least 50m of each point. During each walkover, the location and species of all birds encountered (including both those seen and those heard) were recorded on a map using standard British Trust for Ornithology (BTO) species codes. The birds recorded included those observed up to 50m outside the Survey Area. Information was also recorded on bird activity, such as singing or calling (Marchant, 1983).
- 4.14.6 During the survey, notes were also made on the habitat features of particular significance for breeding birds, such as unmanaged hedgerows.

#### 4.15 Dormouse Habitat Assessment

- 4.15.1 The survey extent was defined as the site boundary, plus land in the surrounding area that is within David Wilson Homes control.
- 4.15.2 An assessment of habitat suitability for dormice was made of all potential dormouse habitats in the survey extent. This included all areas of woodland, scrub and hedgerows.
- 4.15.3 Within each area of potentially suitable habitat (or habitat parcel), the following features were recorded:
  - Type of habitat (including age of woodland if applicable) and size in hectares;
  - Tree, shrub and climbing species and their abundance on the DAFOR scale;
  - Density of the canopy layer expressed as an average percent cover;
  - Degree of continuity in the shrub layer expressed as an average percent cover;
  - Degree of connectivity with other areas of potential habitat expressed as high, medium or low;
  - Availability of food sources;
  - Presence of potential summer and winter nest sites, such as tree holes, deep litter layers, wood piles and tangled woody vegetation;
  - Evidence and stocking density, where known, of grazing animals, including deer and livestock;
  - Evidence of likely presence of competitors and predators, such as squirrel and cats, respectively; and
  - Evidence of woodland management techniques e.g. coppicing.

4.15.4 For each hedgerow, additional habitat information was recorded, including:

- Hedgerow structure (leggy, dense, with trees, without trees, layered);
- Average height and width;
- Type of hedgerow management (flailed, traditional or none); and
- Number of gaps and length of gap as a percentage of the total length of the field boundary.

4.15.5 Each area of potentially suitable habitat was then assessed and assigned a category of negligible, low, medium or high suitability, using the criteria in Table 13 below:

**Table 13: Assessment of Habitat Suitability for Dormouse**

| Category   | Examples                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible | Annually cut hedgerows in arable landscapes.<br><br>Small (<5ha) area of woodland which is isolated from others by 500m or more and lacks two or more key features.<br><br>Woodland or scrub which floods throughout in winter.                                                                                                                                                                                                        |
| Low        | Annually cut hedgerows in wooded landscapes.<br><br>Small (<5ha) area of woodland which is isolated and lacks up to one of the key features*.<br><br>Moderate (5 - 20ha) or large areas (>20ha) of woodland or scrub which lack two or more of the key features.                                                                                                                                                                       |
| Good       | Moderate areas of woodland or scrub (5 - 20ha) with all the key features but which are isolated from other areas of high suitability woodland.<br><br>Large areas of woodland (>20ha) which lack one of the key features.<br><br>Infrequently cut hedgerows that are relatively isolated but have some connectivity to other areas of suitable dormouse habitat.                                                                       |
| Excellent  | Small and moderate areas of woodland with all the key features and well connected to other areas of suitable dormouse habitat.<br><br>Large areas (>20ha) of woodland or scrub with all the key features.<br><br>Infrequently cut hedgerows either in dense networks or linking areas of high suitability woodland.<br><br>Large areas (>20ha) of young plantation with good connectivity to other areas of suitable dormouse habitat. |

\*Key Features for dormouse: (i) mixed vegetation comprising a high proportion of at least three of these species: hazel (*Corylus avellana*), oak (*Quercus* spp.), honeysuckle (*Lonicera periclymenum*) and bramble (*Rubus fruticosus*); (ii) a dense shrub layer; (iii) no or relatively open tree canopy (above the shrub layer); (iv) scattered old trees with hollows, dense tangled vegetation, nest boxes or other suitable nest sites, such as dense leaf litter; and (v) tree stumps with cavities at around ground level or other suitable hibernation sites.

#### 4.16 Dormouse Presence/Absence Surveys

- 4.16.1 In the areas of suitable habitat, a dormouse survey was undertaken to determine the presence or likely absence of dormouse.

##### *Visual Search*

- 4.16.2 A visual and hand search for any natural dormouse nests were made within areas of suitable habitat for dormice on the site. Dormouse summer and breeding nests can be distinguished from other animal nests by a number of key characteristics. They are often about the size of a grapefruit, incorporate strips of honeysuckle bark, shredded bark and green leaves and are spherical and lack an obvious entrance hole. The search was conducted from ground level only and investigated possible features in which they could be made such as tangled vegetation and old birds' nests.

##### *Nest Tube Survey*

- 4.16.3 Nest tubes placed in appropriate places in suitable habitat that may be used by dormice to nest in. Dormouse summer and breeding nests within nest tubes can often be distinguished from other animal nests by a number of key characteristics: (i) they often incorporate strips of honeysuckle bark, or other shredded bark and green leaves and (ii) lack an obvious entrance hole.
- 4.16.4 Nest tubes constructed from folded corrugated plastic sheeting (approximately 60mmx60mm wide and 250mm long) were used. Each nest tube has a sliding plywood base which also forms the end of the tube and provides a platform extending approximately 50mm from the front of the tube.
- 4.16.5 The nest tubes were installed on 26<sup>th</sup> April 2022, one a month before the first survey visit, in order to allow dormice time to find and nest in the tubes before the first survey visit. 70 tubes were installed within the site.
- 4.16.6 Dormouse nest tubes were fastened to scrub or beneath a horizontal tree branch of sufficient thickness at a height of approximately 1.5m using cable ties. Tubes were positioned with the entrance of the tube orientated towards the centre of the shrub and angled slightly downwards to prevent water collecting within the tube. Each nest tube was given a number and its location recorded on ArcGIS Fieldmaps.
- 4.16.7 The nest tubes were left in situ for the duration of the survey and subsequently removed on completion of the survey, excluding any nest tubes which contained dormice or dormouse nests during the survey as these might still be in use by dormice.
- 4.16.8 All tubes were checked for the presence of dormice or their nests a total of five times between May and September (August and September survey still to be completed).
- 4.16.9 The number of tubes and the timing of the survey met the requirements for a thorough survey (Bright *et al*, 2006). This is defined as a survey in which the combined probability scores from Table 14 below exceed 20 and the survey is conducted over a minimum period of five months.

**Table 14: Dormouse detection probability scores (examples).**

| Month     | Score with 50 tubes | Score with 100 tubes | Score with 150 tubes |
|-----------|---------------------|----------------------|----------------------|
| April     | 1                   | 2                    | 3                    |
| May       | 4                   | 8                    | 12                   |
| June      | 2                   | 4                    | 6                    |
| July      | 2                   | 4                    | 6                    |
| August    | 5                   | 10                   | 15                   |
| September | 7                   | 14                   | 21                   |
| October   | 2                   | 4                    | 6                    |
| November  | 2                   | 4                    | 6                    |

#### 4.17 Great Crested Newt Methodology

##### *Environmental DNA*

- 4.17.1** All standing waterbodies not screened out in earlier assessments, and to which access was permitted, were subject to a presence/ absence survey using the Environmental DNA (eDNA) technique.
- 4.17.2** Environmental DNA is DNA that is collected from the environment in which an organism lives. In aquatic environments, animals shed cellular material into the water via their saliva, urine, faeces and skin cells. This material contains DNA which may persist for several weeks and can be collected through a water sample. The sample can then be analysed to determine the presence or absence of certain species, such as great crested newts, in the water body. It is a more effective technique for detecting the presence of great crested newts than conventional techniques, however, it cannot yet be used to estimate population size.
- 4.17.3** An eDNA sampling kit was used to collect water from the waterbody at the same time as the Habitat Suitability Assessment (HSI) was undertaken.
- 4.17.4** Before collecting samples, the surveyor identified twenty eDNA sample collection points. These were spread out as evenly as possible around the edge of the waterbody without giving cause for the surveyor to enter the water. Samples were then taken from the water in strict accordance with the published technical advice note (Defra Science and Research Project WC1067) and by suitably trained and experienced licensed great crested newt surveyors.
- 4.17.5** Samples were then sent to a suitably equipped laboratory for analysis to determine if GCN eDNA was present.

#### 4.18 Evaluation of Ecological Features and Impact Assessment

- 4.18.1** The methodology for assessing the impact on the ecological features identified during the surveys is set out in Appendix 2.

## 5. Baseline Ecological Conditions

### 5.1 Ecological Desk Study

**5.1.1** Responses were received from Thames Valley Ecological Record Centre (TVERC), and remained consistent with the results of 2022.

**5.1.2** The site is 3km away from the Thames Basin Heaths SPA, and 1.6km from Longmoor Bog SSSI and LNR. The development falls within the impact risk zone for recreational pressure for the Thames Basin Heath SPA. Fifteen LWSs occur within 2km of the site, the closest of which is 0.07km from the site. The results are summarised in Appendix 3, and the locations of statutory designated sites and priority habitats are shown on Figure 1.

#### *Ancient Woodland*

**5.1.3** There are 86 parcels of ancient woodland located within 2km of the site. The closest parcel is 72m west of the site. The locations of all parcels of ancient woodland can be found on Figure 1.

#### *Other Priority Habitats*

**5.1.4** Six types of priority habitat were identified within the study area. The habitats comprise deciduous woodland, traditional orchard, woodpasture and parkland, lowland heathland, coastal floodplain grazing marsh and lowland fens. The habitats are summarised in Table 15 and the locations are shown on Figure 1.

**Table 15** Priority habitats within the study area

| Priority Habitat Type            | Distance to Site of Nearest Parcel (km) | Number of parcels within 2km |
|----------------------------------|-----------------------------------------|------------------------------|
| Deciduous Woodland               | Adjacent to site                        | 86                           |
| Traditional Orchard              | 0.43                                    | 11                           |
| Woodpasture and Parkland         | 1.25                                    | 4                            |
| Lowland Heathland                | 1.71                                    | 3                            |
| Coastal Floodplain Grazing Marsh | 1.96                                    | 2                            |
| Lowland Fens                     | 1.98                                    | 1                            |

#### *Protected Species and species of conservation concern*

**5.1.5** Records of protected and priority species were returned in the desk study including ten species of bat and two species of non-flying mammals, one species of invertebrate, one vascular plant species, 44 species of bird including nine species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and two species of reptile. The full results are provided in Appendix 4.

## 5.2 2024 Habitat Survey

5.2.1 The following habitats and flora were identified during the UKHabitat Classification Survey:

- g3c Other neutral grassland;
- g4 Modified grassland;
- h2a Native hedgerow;
- h2a6 Other native hedgerow;
- h2b Non-native and ornamental hedgerow;
- h3h Mixed scrub; and
- w1f7 Lowland mixed deciduous woodland.

5.2.2 These habitats are described below and their distribution is given on Figure 3 with photographs of the site provided on Figure 4.

### *g3c-1 Other Neutral Grassland*

5.2.3 A small parcel of abandoned pasture (g3c-1 on Figure 3 and Photograph 1 on Figure 4), which is surrounded by g4-3 and g4-4. Within the parcel is a stand of Himalayan balsam (*Impatiens glandulifera*) (TN1 on Figure 3 and Photograph 2 on Figure 4), which is an invasive species. This habitat is within the residential site boundary.

5.2.4 This habitat is in Poor condition as it is not a good representation of its habitat type, the sward height is not varied, and there is more than 5% cover of species indicative of sub-optimal condition and physical damage within the parcel.

### *g3c-2 (16, 124, 128) Other Neutral Grassland, (Tall Forbs, Anthills, Tall or Tussocky Sward)*

5.2.5 This parcel is a road verge (g3c-2 on Figure 3 and Photograph 3 on Figure 4) planted with native tree species, but most of the planted trees have failed. This parcel is part of the BNG commitments of the Arborfield Cross Relief Road (planning application number: 172209). There are no woody species in tree growth form, all are small sampling shrubs comprising hazel and oak. Ground flora includes abundant thistle, and frequent ragwort (*Jacobaea vulgaris*). This habitat is within the SANG boundary.

5.2.6 This habitat is in Poor condition as it fails all criteria; it is not a good representation of its habitat type, the sward height is not varied, there is less than 1% bare ground coverage, there is more than 5% scrub and there is more than 5% cover of species indicative of sub-optimal condition and physical damage within the parcel.

### *g4-1 - Modified Grassland*

5.2.7 In the western-most parcel on site is a large pasture of modified grassland (g4-1 on Figure 3 and Photograph 4 on Figure 4), which made up of abundant Yorkshire fog and frequent perennial rye grass and timothy (*Phleum pratense*) grass. White clover (*Trifolium repens*) is occasional. This parcel is within the SANG boundary.

- 5.2.8** This habitat is in Poor condition as it does not meet the species richness requirement for this habitat type.

*g4-2 (128, 204, 521) - Modified Grassland (Tall or Tussocky Sward, Veteran Tree, Unmanaged)*

- 5.2.9** In the northeast of the site, there is a parcel of modified grassland (g4-2 on Figure 3), which has not been cut since before this growing season, and therefore lacks a varied sward height. There is a veteran pedunculate oak (*Quercus robur*) tree (T1 on Figure 2) in the northern corner of the grassland parcel. Perennial rye grass was the dominant species in 2022, but in 2024 this is no longer the case. Instead, cock's foot and Yorkshire fog are abundant, and Timothy grass is frequent. Red and white clover are rare within the parcel. This habitat is within the SANG boundary.
- 5.2.10** The condition of the g4-2 grassland is in Poor condition as it does not meet the species richness requirement for this habitat type and it failed criteria relating to varied sward height and prevalence of bare ground.

*g4-3 Modified Grassland*

- 5.2.11** In the south of the site is another large parcel of pastoral modified grassland (g4-3 on Figure 3). Perennial rye grass is abundant and cock's foot is rare. Thistle sp. is frequent next to the hedgerow (h2a6-3 on Figure 3). This habitat is within the residential site boundary.
- 5.2.12** This habitat is in Poor condition as it does not meet the species richness requirement for this habitat type.

*g4-4 (128, 521) - Modified Grassland (Tall or Tussocky Sward, Unmanaged)*

- 5.2.13** In the south of the site, there is a parcel of modified grassland (g4-4 on Figure 3 and Photograph 5 on Figure 4), which is very similar in structure and composition as g4-2, except there is no veteran tree within the parcel.
- 5.2.14** The condition of the g4-4 grassland is Moderate, as it does not meet the species richness requirement for this habitat type and it failed criteria relating to varied sward height and prevalence of bare ground. This parcel lies partly within the SANG boundary and partly within the residential boundary.

*g4-5 (108, 516, 801) - Modified Grassland (Frequently Mown, Active Management, Road Verge or Island)*

- 5.2.15** In the southeast of the site, there is a grass verge that runs adjacent to the road (g4-5 on Figure 3). The grassland is shortly mown, and is dominated by perennial rye grass and meadow grass (*Poa* sp). This parcel lies within the residential site boundary.
- 5.2.16** This habitat is in Poor condition as it does not meet the species richness requirement for this habitat type.

*h2a-1 Native Hedgerow*

- 5.2.17** In the east of the site is a thick hedge, with lots of woody species and few substantial gaps (h2a-1 on Figure 3). The hedgerow degrades slightly heading north as the canopy lifts away from the ground and there are two holes punched through for gates. Woody species are made up of hawthorn (*Crataegus monogyna*), rose species, blackthorn (*Prunus spinosa*) and bramble. This hedgerow is within the SANG boundary.
- 5.2.18** This hedgerow was assessed as Good condition due to the size and shape of the hedge allowing for a good species richness, connectivity and its infrequent management.

#### *h2a-2 - Native Hedgerow*

- 5.2.19** Running east to west, this hedgerow separates g4-3 and g4-4 from g4-2 (h2a-2 on Figure 3). The hedgerow is derelict with mature trees. This hedge is made up of hawthorn and bramble scrub with some gaps and one mature oak tree. This hedgerow lies partly within the SANG boundary and partly within the residential boundary.
- 5.2.20** This parcel is in Poor condition, due to the amount of gaps, physical damage and species suggesting nutrient enrichment.

#### *h2a-3 (116) Native Hedgerow (Flailed Hedgerow)*

- 5.2.21** In the southeast of the site is a native hedgerow (h2a-3 on Figure 3), which shows signs of management through flailing. The hedgerow is 2.5 m high and has a species composition of abundant hawthorn and blackthorn, frequent bramble, and occasional hazel. This parcel lies within the residential site boundary.
- 5.2.22** The condition of h2a-3 is Good, as it only fails one criterion, which is C1, as there is disturbed ground at the base of the hedgerow.

#### *h2a6-1 (50) Other Native Hedgerow (Ditch)*

- 5.2.23** Along the northern boundary of the grassland parcel g4-1, is a hedgerow which is growing over a dry ditch (h2a6-1 on Figure 3 and Photograph 6 on Figure 4). Oak, elm sp (*Ulmus* sp) and hawthorn are occasional throughout the hedge, with field maple (*Acer campestre*) and elder (*Sambucus nigra*) rare. This hedgerow is within the SANG boundary.
- 5.2.24** The condition of h2a6-1 is Good, as it only fails one criterion, which is C1, as there is disturbed ground at the base of the hedgerow.

#### *h2a6-2 (11, 116) Other Native Hedgerow (Hedgerow with Trees, Flailed Hedgerow)*

- 5.2.25** A roadside hedge (h2a6-2 on Figure 3) separating g4-1 in the east with the B3030, with mature trees backed by single wire fence on field side and flailed on the roadside of the hedge. This species composition is made up of hawthorn, hazel (*Corylus avellana*), elder, oak, ash and blackthorn. This hedgerow is within the SANG boundary.
- 5.2.26** The hedgerow is in Moderate condition, as it fails criteria C1 and C2, as disturbed ground is present over more than 10% of the hedgerow length and nutrient rich perennial vegetation is

present over more than 20% of the hedgerow, criterion D2 as there is sign of damage caused by felling, and criterion E2, as the trees present in the hedgerow are not in good health.

#### *h2a6-3 (11) Other Native Hedgerow (Hedgerow with Trees)*

- 5.2.27** A derelict hedge (h2a6-3 on Figure 3 and Photograph 7 on Figure 4) that contains native broadleaves species such as hawthorn, blackthorn, oak which are all occasional throughout the hedge. The parcel is located between g4-3 and g4-4, which falls within the residential site boundary.
- 5.2.28** The condition of h2a6-3 is Good, as it only fails one criterion, which is C2, as nettle coverage is over the 20% threshold.

#### *h2a6-4 Other Native Hedgerow*

- 5.2.29** A newly planted hedgerow (h2a6-4 on Figure 4) is present along the western boundary of the site. This hedgerow is part of the BNG commitments of the Arborfield Cross Relief Road. There is abundant hawthorn, frequent black thorn and rose sp (*Rosa* sp), and dogwood (*Cornus sanguinea*) and hazel are occasional. This hedgerow lies partly within the SANG boundary and partly within the residential boundary.
- 5.2.30** The hedgerow is in Moderate condition, as it fails criterion A2 as the hedge is less than 1.5 wide along its length, and criteria B1 and B2, as there are undesirable gaps between the ground and the base of the canopy, and there is a horizontal 'gappiness' to the hedge.

#### *h2b-1 Non-Native and Ornamental Hedgerow*

- 5.2.31** This parcel is present in the south of g4-1, separating the site from a small industrial style unit and comprises a line of cypress trees (*Cupressus* sp) (h2b-1 on Figure 3). This connects to the priority hedgerow h2a-1 on site. This hedgerow is within the SANG boundary.
- 5.2.32** Under the Statutory Biodiversity Metric, condition assessments are not required for this habitat type.

#### *w1f7-1 (33) Other Lowland Mixed Deciduous Woodland (Line of Trees)*

- 5.2.33** There is a line of trees (w1f7-1 on Figure 3) in the northwestern corner of g4-1, which transitions into h2a6-1, Species comprise abundant goat willow (*Salix caprea*), occasional oak, and rare hazel and field maple. This hedgerow is within the SANG boundary.
- 5.2.34** This line of trees is in Moderate condition as it fails criterion D, as there is not an undisturbed strip of natural vegetation at least 6m either side of the hedgerow.

#### *w1f7-2 (521) Other Lowland Mixed Deciduous Woodland (Unmanaged)*

- 5.2.35** At the south of the site is a parcel of woodland (w1f7-2 on Figure 3), where dense, mature scrub has recently succeeded to woodland. As over 25% of the parcel has trees over 5m emerging from the scrub, this parcel has been classified as woodland. Bramble and pedunculate oak are

both abundant, with ash (*Fraxinus excelsior*) and hawthorn rare. This parcel of woodland is within the residential site boundary.

- 5.2.36 The woodland is in Moderate condition, with a criteria score of 27. It scored down due to reasons such as the lack of deadwood and veteran trees.

#### *Fauna*

- 5.2.37 The following incidental species or their field signs were recorded during the initial site visit in 2022, and/or the updated walkover in 2024:

- Red Kite (*Milvus milvus*) 2022 and 2024;
- Starling (*Sturnus vulgaris*) 2022;
- Woodpigeon (*Columba palumbus*) 2024;
- Fieldfare (*Turdus pilaris*) 2022;
- Roe deer (*Capreolus capreolus*) 2024;
- Fallow deer (*Dama dama*) 2022; and
- [REDACTED]

### 5.3 Preliminary Roost Assessment of Trees and Aerial Assessment

- 5.3.1 During the Ground Level Tree Assessment (GLTA), four trees were identified with potential to support roosting bats and three trees were identified as needing further assessment. Summary of the results are provided in

**5.3.2** Table 16 below and are shown on Figure 5 and Photographs 8 and 9 on Figure 4, with full results provided in Appendix 5.

**5.3.3** The results of the aerial roost inspections carried out in 2022 are also shown in

**5.3.4** Table 16; with only T1 and T3 aerially inspected.

**Table 16: Summary of Tree Roost Assessment Results**

| Tree No. | Tree Description                                                                                                                                  | GLTA Potential | Tree Climbed in 2022                                              | Overall Potential in 2024 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------|---------------------------|
| T1       | Veteran pedunculate oak with a potentially hollow trunk.                                                                                          | PRF            | Yes - PRFs were present that could support multiple bats          | PRF-M                     |
| T2       | Mature ash covered in dense ivy. The tree is showing signs of ash dieback so there is potential for cracks and wounds to be hidden under the ivy. | FAR            | No                                                                | FAR                       |
| T3       | Mature ash covered in dense ivy. There is evidence of minor ash die back                                                                          | FAR            | Yes - tree assigned negligible potential after aerial inspection. | FAR                       |
| T4       | Veteran pedunculate oak with potentially some hollowing to the trunk as water seams are visible, running out of a split in the trunk.             | FAR            | No                                                                | FAR                       |
| T5       | Veteran pedunculate oak with some dead, snapped off branches. Dense foliage is potentially covering other suitable roosting features              | PRF            | No                                                                | PRF                       |
| T6       | Veteran pedunculate oak with some dead, snapped off branches. Dense foliage is potentially covering other suitable roosting features              | PRF            | No                                                                | PRF                       |
| T7       | Mature ash with multiple stems. Dense ivy covers the tree, and there is evidence of minor ash dieback.                                            | FAR            | No                                                                | PRF                       |

## 5.4 Bat Activity Transect and Static Monitoring Results

**5.4.1** During the activity transect surveys, the following seven species were recorded within the survey extent, with their distribution shown on Figure 6.

- Barbastelle (*Barbastella barbastellus*);
- Leisler's bat (*Nyctalus leisleri*);
- Myotis Sp. (*Myotis Sp.*);
- Common Noctule (*Nyctalus noctula*);
- Pipistrelle species (*Pipistrelle sp.*);
- Common pipistrelle (*Pipistrellus pipistrellus*); and
- Soprano pipistrelle (*Pipistrellus pygmaeus*).

**5.4.2** During the static monitoring surveys, eight species of bat were recorded. In addition to those stated in Paragraph 5.4.1, the following bat species were recorded:

- Serotine bat (*Eptesicus serotinus*);
- Brown long-eared (*Plecotus auratus*); and

- Nathusius' pipistrelle (*Pipistrellus nathusii*).

5.4.3 A full analysis of the bat transect and static monitoring results can be found in Appendix 6.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

## 5.6 Reptile Habitat Assessment

5.6.1 Areas surrounding g4-1, with basking and foraging opportunities. In addition to this g3c-2 running along a line of trees provides good microclimates and varied structure that suits reptiles. The central areas of the grassland fields on site only offer limited suitability for reptiles due to the lack of variety in vegetation structure which therefore offers little shelter or basking opportunities.

## 5.7 Reptile Results

5.7.1 A low population of grass snake and slow worm was recorded during the reptile surveys. The location of the artificial refugia and survey results are shown on Figure 8.

**Table 18: Reptile Survey Results**

| Date       | Visit Number       | Reptiles Present                 | Location                                                                                                                              |
|------------|--------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 27/04/2022 | Refugia deployment | No                               | N/A                                                                                                                                   |
| 16/05/2022 | 1                  | No                               | N/A                                                                                                                                   |
| 25/05/2022 | 2                  | No                               | N/A                                                                                                                                   |
| 30/05/2022 | 3                  | 2 x grass snake<br>1 x slow worm | One grass snake recorded within SANG boundary<br><br>One slow worm and one grass snake within survey extent but outside site boundary |
| 06/06/2022 | 4                  | No                               | N/A                                                                                                                                   |
| 13/06/2022 | 5                  | 1 x grass snake                  | One grass snake recorded within SANG boundary                                                                                         |
| 21/06/2022 | 6                  | No                               | N/A                                                                                                                                   |
| 27/06/2022 | 7                  | No                               | N/A                                                                                                                                   |

## 5.8 Breeding Bird Results

**5.8.1** The results of the breeding bird survey can be found on Figure 9. Forty-one species of bird were recorded within the survey extent during the surveys including one species (red kite) listed on Schedule 1 of the Wildlife and Countryside Act, 1981 ((as amended)), six species of principle importance as listed on Section 41 of the NERC Act, 2006, seven species on the Birds of Conservation Concern 5 (BoCC 5) red list and eight species on the BoCC5 amber list.

**5.8.2** All the species recorded are common/widespread across the country.

## 5.9 Dormouse Habitat Assessment

**5.9.1** Within the survey extent, three areas were assessed as being suitable for dormice, these are the small area of woodland, north of the site boundary, and on-site, the priority hedgerow h2a-1, other native hedgerow h2a6-1 and h2a6-2, and non-priority hedgerow h2b-1. Following the updated site walkover in 2024, it was confirmed that there had been no changes in habitat suitability for dormouse, and therefore the survey data from 2022 is considered valid.

## 5.10 Dormouse Results

- 5.10.1** No dormice or evidence of dormice was recorded during the surveys, dormouse are therefore considered likely absent from the site. The locations of the dormouse tubes can be found on Figure 10.

## 5.11 Great Crested Newt Results

- 5.11.1** Access was only possible to three waterbodies, albeit limited, within 500m of the site (P1, P2 and P3 on Figure 11). Waterbodies P1 - P3 were subject to updated HSI surveys in 2024 with eDNA surveys carried out at P1 and P3 in 2022. No eDNA survey was undertaken at P2, in 2022, as the water level was too low. From the vantage point possible, and as the ponds were already considered to be excellent in 2022, the habitat suitability assessment has remained the same in 2022. The results of the HSI and eDNA survey are shown in Table 19. All three waterbodies were assessed to have excellent suitability for GCN. The eDNA survey returned a negative result for GCN from P1 and P3. It was therefore assumed GCN are also likely absent from P2 in 2022. No eDNA update was conducted in 2024.

**Table 19: HSI and eDNA Results**

| Waterbody            | P1              | P2              | P3              |
|----------------------|-----------------|-----------------|-----------------|
| Location             | Zone A          | Zone A          | Zone A          |
| Pond Area            | 238             | 423             | 872             |
| Pond Drying          | Sometimes Dries | Sometimes Dries | Sometimes Dries |
| Water Quality        | Good            | Good            | Good            |
| Shade                | 0%              | 0%              | 0%              |
| Water Fowl           | Absent          | Absent          | Absent          |
| Fish                 | Absent          | Absent          | Absent          |
| Pond Density         | 11              | 11              | 11              |
| Terrestrial Habitat  | Good            | Good            | Good            |
| Macrophytes          | 100%            | 100%            | 90%             |
| HSI Score            | 0.849           | 0.89            | 0.92            |
| Suitability Category | Excellent       | Excellent       | Excellent       |
| eDNA Result          | Negative        | N/A             | Negative        |

- 5.11.2** Access to two of the waterbodies identified for survey in Stage II was possible (these waterbodies are shown in grey on Figure 11). All waterbodies identified are to the west of the site, and the ponds are separated from site by the A327 which will limit GCN dispersal from these ponds.

## 6. Assessment of Effects and Mitigation Measures

### 6.1 Designated Sites

#### *Potential Impacts*

- 6.1.1 The Thames Basin Heaths SPA is located 3.0 km south from site. Due to the distance from site there is unlikely to be any impacts on the SPA during the construction phase of the development. There is potential for the completed development once operational to cause increased levels of recreational pressure, from both dog walkers and non-dog walkers, on the habitats and species that the Thames Basin Heath SPA is designated for.
- 6.1.2 In addition to recreational pressure, the completed development could impact the Thames Basin Heath SPA, through changes in air quality caused by commuting residents along the A327, which runs south to immediately adjacent to the Thames Basin Heath SPA.
- 6.1.3 A full assessment on the impacts of the development on the SPA and relevant mitigation measures, is discussed in the Habitats Regulation Assessment (SLR Consulting, 2024).
- 6.1.4 Longmoor Bog SSSI is located 1.6km from the site, and although there are unlikely to be any impacts on the SSSI during the construction phase of the development, there is potential for the completed development, once operational, to cause increased recreational pressure on the site.
- 6.1.5 The closest LWS (Long Copse (North) and Spring Copse) is 72 m from site and is separated from site by the A327. However, given the proximity to site, the development could have a negative impact on the LWS through construction pollution and recreational pressure following the completion of the development. There are 14 additional LWSs located within 2 km of the site. Due to the distance from site, it is considered unlikely that the development will have an impact on the additional LWSs.

#### *Mitigation and Compensation Measures*

- 6.1.6 An area of SANG will be incorporated into the development proposals in order to mitigate any potential impact on the Thames Basin Heaths SPA and Longmoor Bog SSSI from increased recreational pressure resulting from the development. In addition, a Strategic Access Management and Monitoring (SAMM) tariff will be made, which will be paid per dwelling, for the Thames Basin Heath SPA.
- 6.1.7 The creation of additional accessible natural greenspace provided by the SANG will reduce recreational pressure on existing LWSs in the local area, and therefore, the development is considered unlikely to impact on Long Copse (North) and Spring Copse LWS.
- 6.1.8 Best practice pollution measures, such as Heras fencing with dust sheeting, should be implemented to prevent any contamination of soil or air. This includes prevention of emissions of sediment, dust and chemicals. Further details around these measures will be detailed in a Construction Environmental Management Plan (CEMP).

#### *Significance of Residual Effects*

- 6.1.9 The proposed SANG complies with the Natural England SANG guidance and the conclusion of Habitat Regulations Assessment (SLR Consulting, 2024) considered that the incorporation of the SANG within the development will be sufficient to mitigate negative impacts to The Thames Basin Heaths SPA and result in no significant negative residual effects on the SPA.

## 6.2 Ancient Woodland

- 6.2.1 A number of parcels of ancient woodland were recorded in the desk study, the closest of which is 72 m west of the site, which is the Long Copse (North) and Spring Copse LWS. The potential impacts, mitigation measures and significance of residual effect for ancient woodland are considered to be the same as already concluded for Long Copse (North) and Spring Copse LWS.

## 6.3 Priority Habitats

### *Potential Impacts*

- 6.3.1 The species-rich hedgerow (h2a-1), located in the east of the site, is a habitat of principal importance for the conservation of biodiversity. The majority of this hedgerow will be retained although there may be some losses in order to create/widen access points. During the construction phase of the development there may be impacts from pollution and ground compaction in the vicinity of the hedgerow.
- 6.3.2 There are 86 parcels of deciduous woodland within 2 km of the site, the closest of which is directly adjacent to the site. The parcels of deciduous woodland adjacent to site will be separated from construction activities by areas proposed to be SANG or other areas of open space as such it is not anticipated that these areas will be impacted by the development.
- 6.3.3 All other parcels of priority habitat (traditional orchard, lowland heathland, coastal floodplain grazing marsh and lowland fens) are over 400 m from site. Due to the distance to the site, it is considered that the traditional orchard parcels will not be impacted from the development.

### *Mitigation Measures and Compensation*

- 6.3.4 The development landscaping proposals include the retention of the majority of hedgerows on site with some areas enhanced and the planting of approximately 1 km of additional native hedgerow on site. This results in an overall biodiversity net gain for hedgerows on site (Thomson 2024). Retained hedgerows will be managed and protected during construction including root protection area fencing.
- 6.3.5 Pollution control measures including dust suppression and control of groundwater and surface run-off should be implemented during construction.

### *Significance of Residual Effects*

- 6.3.6 Any residual pollution following the control measure is likely to be temporary at a local level and is unlikely to significantly affect the priority habitat hedgerows onsite and deciduous woodlands adjacent to the site.

## 6.4 Bats

### *Potential Impacts*

- 6.4.1** The site provides trees with roosting potential, as well as commuting and foraging habitat for bats. The trees with roost potential will be retained as part of the development but there is potential for disturbance, from construction activities and lighting post development, particularly to T5, T6 and T7 which are in the south of the area proposed for residential development,
- 6.4.2** A range of bat species have been recorded using the site for foraging and commuting particularly the mature hedgerows within and surrounding the site where the highest level of bat activity was recorded. There is potential impacts from disturbance from construction activities and lighting post development.

### *Mitigation Measures and Compensation*

- 6.4.3** All trees with bat potential are proposed to be retained in the development. If construction works are to be undertaken at night, site lighting should be planned to avoid any light spill towards retained trees with bat potential (in particular), and the hedgerows and lines of trees withing and along the perimeter of the site. Works should also be avoided at the times when bats will be leaving and returning to their roost locations from May-August inclusive (sunset - 2hrs after sunset and the 2hrs up to sunrise), in the key dark zones shown on Figure 12.
- 6.4.4** A sympathetic lighting regime should be incorporated into the design of exterior lighting for new homes and any required street lighting. Key dark zones to be maintained are shown on Figure 12. Once lighting plans become available, a bat lighting strategy will be submitted to Wokingham Borough Council.
- 6.4.5** As the majority of the foraging or commuting habitat is being retained or improved there will be no major impacts on how the site is used by bats.

### *Significance of Residual Effects*

- 6.4.6** Following the implementation of the mitigation measures described above, there could remain a small temporary negative effect caused by disturbance of bats as a result of construction activities. However, this impact will be temporary and is unlikely to be significant due to the retention and improvement of commuting and foraging habitats.
- 6.4.7** The change in use of the site could cause ongoing disturbance to commuting and foraging bats from increased lighting and use of the site. However, following mitigation measures and implementing a sympathetic lighting plan, this impact is unlikely to be significant. In addition, the proposed landscaping will result in enhanced foraging opportunities on site for bats.

[REDACTED]

[REDACTED]

#### *Mitigation Measures and Compensation*

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

#### *Significance of Residual Effects*

[REDACTED]

## 6.6 Invasive Species

### *Potential Impacts*

- 6.6.1 One stand of Himalayan balsam was recorded on site, within the grassland parcel g3c-1. In the absence of mitigation, this invasive species could spread to other areas of the site, and into the local area, where it may dominate important habitats.

### *Mitigation Measures*

- 6.6.2** A walkover survey of the site boundary will be carried out a minimum of one month prior to the works to identify any new evidence of invasive species on the site.
- 6.6.3** The already identified Himalayan balsam will be removed from site by a specialist contractor at an appropriate time of year, before it starts to seed (seeds from mid-July onwards).

#### *Significance of Residual Effects*

- 6.6.4** Following mitigation measures, it is unlikely that invasive species would have any significant residual effects on the site and on the local area.

### **6.7 Reptiles**

#### *Potential Impacts*

- 6.7.1** Throughout the site hedgerows and edge habitats provide suitable habitats for reptiles. A single slow worm and three grass snakes were recorded in May and June 2022 during reptile surveys. The development proposals include the retention and enhancement of the majority of suitable reptile habitat either within the SANG or proposed landscaping, with the areas affected by the residential development unsuitable for reptiles.
- 6.7.2** The habitat on site hasn't changed significantly between 2022 and 2024, and therefore the impacts remain the same for reptiles, as previously identified.
- 6.7.3** There is a risk during construction of reptiles entering the construction area and being killed or injured. The potential impact on reptiles is therefore assessed to be low at a local level.

#### *Mitigation Measures and Compensation*

- 6.7.4** Reptile mitigation/reasonable avoidance measures can be included in a CEMP or separate Reptile Mitigation Method Statement, which will detail how reptiles will be protected during the development. Where suitable habitat for reptiles will be impacted, then reptiles will be trapped and translocated or displaced into suitable receptor habitat.
- 6.7.5** The SANG will have designated footpaths, which will result in areas being undisturbed for wildlife, creating suitable habitat for reptiles to reside.

#### *Significance of Residual Effects*

- 6.7.6** Following the implementation of mitigation, it is unlikely that the project would have any significant residual effects on reptiles. Mitigation will be designed to prevent harm to reptiles and minimise the risk of an offence under the legislation protecting reptiles.

### **6.8 Breeding Birds**

#### *Potential Impacts*

- 6.8.1** The vegetation present on site and within the surrounding habitat supports a range common nesting birds. The majority of suitable nesting habitat, comprising hedgerows and scrub within the site and running along the site boundary, will not require removal meaning any impacts on nesting birds will be temporary at a local level.

*Mitigation Measures and Compensation*

- 6.8.2** If vegetation clearance is required to facilitate the works, this should be carried out outside of the nesting bird season (March-September). If this is not possible, vegetation clearance must be undertaken following a check for nesting birds by an Ecological Clerk of Works (ECoW), if a birds nest is discovered it must be protected by a suitable buffer until the chicks have fledged or the nest is otherwise no longer active.
- 6.8.3** The landscaping of the SANG will continue to provide suitable nesting and foraging habitat for the red and amber listed species, recorded as using the site, including the linnet which is less commonly recorded in the Wokingham Borough. Landscaping will include woodland edge planting and scrub.
- 6.8.4** The SANG will have designated footpaths, which will result in areas being undisturbed for wildlife, creating suitable habitat for birds to breed and forage.

*Significance of Residual Effects*

- 6.8.5** Following mitigation implementation, significant residual effects or offenses under legislation protecting nesting birds are unlikely. The proposed landscaping includes additional lengths of hedgerow, tree and scrub planting which will result in an increase in nesting opportunities on site. The range of habitats proposed will also mean that there will be a range of food sources available to birds through-out the year.

**6.9 Dormouse**

- 6.9.1** Several areas of habitats and hedgerows were considered suitable for dormouse. However, no dormice or evidence of dormice was recorded during the 2022 surveys, and the habitat had not significantly changed in 2024, and therefore they are considered likely absent and the development will not have an impact on dormice.

**6.10 Great Crested Newts**

*Potential Impacts*

- 6.10.1** The accessible waterbodies within the survey area tested negative for GCN eDNA, indicating a likely absence of GCN from the site in 2022. The habitat on site, nor the suitability of the ponds, has changed significantly, and there were no records for GCN within the desk study, and therefore it is still considered unlikely that the development will have impacts on GCN.
- 6.10.2** However, it is noted that the site intersects both the red and amber risk zones for great crested newt according to the district licence risk map.

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*Mitigation Measures and Compensation*

- 6.10.3** An enquiry should be sent to NatureSpace, about registering the site under a District Level Licence.
- 6.10.4** Landscaping for the SANG and residential development will include hedgerows, Sustainable Urban Drainage System, ponds, tree planting and scrub, all of which will enhance the site for great crested newt.
- 6.10.5** The SANG will have designated footpaths, and a fenced off wildlife pond, which will result in areas being undisturbed for wildlife, creating suitable habitat for great crested newts to reside.

*Significance of Residual Effects*

- 6.10.6** Following mitigation implementation, significant residual effects or offenses under legislation protecting great crested newt are unlikely. Development proposals are likely to increase suitable habitat for great crested newt.

**6.11 Hedgehog**

*Potential Impacts*

- 6.11.1** The vegetation present on site and within the surrounding habitat has potential to support hedgehog. The majority of suitable habitat, comprising hedgerows running along the site boundary, will not require removal meaning any impacts on hedgehog will be temporary at a local level.

*Mitigation Measures and Compensation*

- 6.11.2** If vegetation clearance of scrub or hedgerows or dismantling of log/brush piles is required to facilitate the works, this should be undertaken following a check by an Ecological Clerk of Works (ECoW) to identify the presence of hedgehog.
- 6.11.3** Development design should consider the incorporation of a hedgehog highway through residential gardens to maintain connectivity across the site for commuting and foraging hedgehog.
- 6.11.4** The SANG will have designated footpaths, which will result in areas being undisturbed for wildlife, creating suitable habitat for hedgehogs within the SANG.

*Significance of Residual Effects*

- 6.11.5** Following mitigation implementation, significant residual effects or offenses under legislation protecting hedgehog is unlikely. Development proposals in relation to the SANG are likely to increase suitable habitat foraging and commuting habitat for hedgehog.

## 7. Enhancement

### 7.1 Management and Enhancement Plans

**7.1.1** A Biodiversity Enhancement Plan will be submitted to Wokingham Borough Council prior to construction, and biodiversity enhancements shall be provided at a rate of at least one feature per dwelling. Types of feature, appropriate to benefit different species groups, are indicated below and further details will be provided in the biodiversity enhancement plan.

**7.1.2** A Landscape and Environmental Management Plan will be produced, and submitted to Wokingham Borough Council prior to construction commencing, which will outline how the biodiversity net gain habitat objectives and how the habitats will be maintained to achieve these.

### 7.2 Biodiversity Net Gain

**7.2.1** Assessment of the current development proposals indicate that the development will result in a biodiversity net gain for both habitats and hedgerows (Thomson Environmental Consultants, 2024) and will therefore be compliant with the requirements of policy and legislation relating to biodiversity net gain.

### 7.3 Bats

**7.3.1** To enhance the site for roosting bats, bat bricks and/or boxes should be incorporated into the development proposals on buildings and retained trees. Examples of these could include:

- For crevice dwelling bats, Beaumaris Woodstone Bat Box, or similar, positioned externally above 3m from the ground on south or east facing walls on new buildings.
- For larger bats, 2FN Schwegler or similar, positioned on a similar aspect as described above.

**7.3.2** Where planting is proposed, a range of native species with different flowering periods should be considered to promote insect (bats primary food source) diversity on site.

### 7.4 Reptiles

**7.4.1** Additional reptile enhancements such as hibernacula and egg laying heaps for grass snake can be included in the detailed landscaping plans at the detailed design/reserved matters application and within the Biodiversity Enhancement Plan.

### 7.5 Birds

**7.5.1** Areas of habitat created as part of the development should be designed to offer nesting opportunities for birds, especially song thrush, this can be achieved through the provision of bird boxes and/or the creation and retention of areas of dense woody vegetation comprising native scrub, woodland and fruiting trees.

**7.5.2** As an example, Schwegler 16 Swift Box or Schwegler 16S Swift Box (with Starling Barrier) or similar could be incorporated into some of the new builds above 5m from the ground without obstruction.

## **7.6 Hedgehog**

**7.6.1** Log and brash piles should be created using removed vegetation for hedgehog with routes established throughout the site to promote connectivity.

## 8. Monitoring

### *Suitable Alternative Natural Greenspace (SANG)*

- 8.1.1 Monitoring of the implementation and delivery of the SANG should be undertaken, to ensure that the SANG is functioning as proposed in the Habitats Regulation Assessment (SLR Consulting, 2024).

### *Bat Activity Surveys*

- 8.1.2 Activity transects should be undertaken to establish how bats are using the site post development, and to ensure that the key dark zones are being implemented. Surveys should be carried out between May and October in accordance with good practice guidelines (Collins ed, 2023).

### *Reptile Surveys*

- 8.1.3 Although not the primary goal of the SANG, it will have a role to play in adding biodiversity value to the area, if managed accordingly.
- 8.1.4 Reptile surveys should be repeated post development on the SANG. Surveys would consist of placement of artificial refugia, checked on seven occasions between mid-March to early October. Surveys should be undertaken in suitable weather conditions, excluding periods of heavy rain, strong wind and temperatures below 9°C and above 20°C (Gent & Gibson, 2003). with June, July and October being suboptimal months dependant on weather.

## 9. Ecological Constraints and Opportunities Plan

Table 20: Ecological Constraints and Opportunities Plan

| Feature                 | Description/<br>name of<br>feature | Construction<br>or Operational<br>Phase | Potential Ecological<br>Impact                                                               | Mitigation (e.g., avoidance,<br>enhancement)                                                                                                                  | Additional surveys,<br>licences, consents,<br>ecological supervision<br>or reporting required | Timing Constraints                                                                  |
|-------------------------|------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Designated Sites</b> | Thames Basin Heath SPA             | Operational                             | Recreational pressure                                                                        | An area of suitable alternative natural greenspace (SANG) will be incorporated into the development proposals, and SAMM payments to be made.                  | The proposal needs to be approved by Natural England.                                         | The SANG needs to be operational before the development becomes operational.        |
| <b>Ancient Woodland</b> | Ancient Woodland                   | Construction                            | Pollution                                                                                    | Pollution prevention guidelines will be followed which may include Heras fencing with dust sheeting.                                                          | N/A                                                                                           | N/A                                                                                 |
| <b>Priority Habitat</b> | Deciduous Woodland and Hedgerows   | Construction                            | Pollution                                                                                    | Pollution prevention guidelines will be followed which may include Heras fencing with dust sheeting around the root protection areas of retained hedgerows.   | N/A                                                                                           | N/A                                                                                 |
| <b>Species</b>          | Bats                               | Construction                            | Disturbance.<br><br>Works have potential to disturb foraging and commuting bats in the area. | Lighting should be directional and away from any hedgerows and trees retained on site.<br><br>Trees with roosting potential should be protected and retained. | N/A                                                                                           | Works should not be undertaken in the peak times for bat emergence/return to roost. |

| Feature | Description/<br>name of<br>feature | Construction<br>or Operational<br>Phase | Potential Ecological<br>Impact | Mitigation (e.g., avoidance,<br>enhancement)                                                                     | Additional surveys,<br>licences, consents,<br>ecological supervision<br>or reporting required | Timing Constraints |
|---------|------------------------------------|-----------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------|
|         |                                    |                                         |                                | Retention of commuting and foraging habitat for bats.<br><br>Incorporation of bat boxes into development design. |                                                                                               |                    |
|         |                                    | Operation                               | Disturbance by lighting.       | Key dark zones enforced across the site                                                                          | N/A                                                                                           | N/A                |
|         |                                    |                                         |                                |                                                                                                                  |                                                                                               |                    |

| Feature | Description/<br>name of<br>feature | Construction<br>or Operational<br>Phase | Potential Ecological<br>Impact                                                                                                                      | Mitigation (e.g., avoidance,<br>enhancement)                                                                                                                                                           | Additional surveys,<br>licences, consents,<br>ecological supervision<br>or reporting required                                                            | Timing Constraints                                                                                                              |
|---------|------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|         |                                    |                                         |                                                                                                                                                     |                                                                                                                                                                                                        |                                                                                                                                                          |                                                                                                                                 |
|         | Reptiles                           | Construction                            | Species injuries and mortalities. Potential for reptiles within the works area. Vegetation clearance have the potential to kill or injure reptiles. | A detailed mitigation method statement, informed by further surveys closer to the construction date (if necessary) should be produced detailing how reptiles will be protected during the development. | Ecological Clerk of Works to conduct a pre works check for reptiles.                                                                                     | Vegetation clearance of habitat suitable for reptiles should be completed inside the active season for reptiles. March-October. |
|         | Breeding Birds                     | Construction                            | Disturbance, species mortalities and injury. Vegetation clearance could impact nesting birds.                                                       | Vegetation clearance should be undertaken outside of the breeding bird season (March - September) or as a last resort following a check for nesting birds at least 24 hours prior to clearance.        | ECOW to check for nesting birds, any active nests to remain in situ with a suitable buffer until the nest is no longer active or the young have fledged. | Nesting bird season - March - September.                                                                                        |
|         | Great Crested Newt                 | Construction                            | Disturbance, species mortalities and injury. Loss of suitable terrestrial habitat.                                                                  | Enquiry sent to NatureSpace about District Level Licence                                                                                                                                               | Enquiry sent to NatureSpace about District Level Licence                                                                                                 | Any mitigation required by NatureSpace Mitigation Guidelines, will need to be                                                   |

| Feature | Description/<br>name of<br>feature | Construction<br>or Operational<br>Phase | Potential Ecological<br>Impact                                                                                              | Mitigation (e.g., avoidance,<br>enhancement)                                                                                                                                                                                                                                                                  | Additional surveys,<br>licences, consents,<br>ecological supervision<br>or reporting required | Timing Constraints                                              |
|---------|------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
|         |                                    |                                         |                                                                                                                             |                                                                                                                                                                                                                                                                                                               |                                                                                               | conducted during<br>the GCN active<br>season March-<br>October. |
|         | Hedgehog                           | Construction                            | Disturbance,<br>species mortalities<br>and injury.<br><br>Vegetation<br>clearance could<br>impact hibernating<br>hedgehogs. | Excavations should be covered at<br>night, or provide an escape ramp to<br>allow trapped hedgehogs to leave of<br>their own accord.<br><br>Hibernacula and refugia should be<br>dismantled by hand by and ECoW to<br>allow hedgehogs to leave of their<br>own accord.                                         | Ecological Clerk of Works<br>to conduct a pre works<br>check for hedgehogs.                   | Hedgehog<br>hibernation<br>season: October -<br>April.          |
|         |                                    | Operation                               | Loss of ecological<br>permeability in<br>residential area                                                                   | Design should consider connectivity<br>of habitats. Hedgehog highways<br>linking residential gardens could be<br>implemented into design.<br><br>Log and brash piles should be<br>created using removed vegetation<br>for hedgehog with routes<br>established throughout the site to<br>promote connectivity. | N/A                                                                                           | N/A                                                             |
|         | Invasive<br>Species                | Construction                            | Spread of invasive<br>species on site,<br>and into local area                                                               | Removal of Himalayan balsam from<br>site, by a specialist contractor.                                                                                                                                                                                                                                         | Pre-construction check<br>prior to works<br>commencing to ascertain                           | Before main<br>seeding season                                   |

| Feature | Description/<br>name of<br>feature | Construction<br>or Operational<br>Phase | Potential Ecological<br>Impact | Mitigation (e.g., avoidance,<br>enhancement) | Additional surveys,<br>licences, consents,<br>ecological supervision<br>or reporting required | Timing Constraints            |
|---------|------------------------------------|-----------------------------------------|--------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------|
|         |                                    |                                         |                                |                                              | the location of any new<br>invasive species on site                                           | (seeding starts<br>mid-July). |

## 10. Conclusions

- 10.1.1** Following a baseline ecological assessment of the site, ecological features have been identified that could be adversely impacted by the proposed development in the absence of mitigation.
- 10.1.2** In the absence of mitigation there is a likely significant affect on internationally important designated sites for nature conservation. This has been assessed in detail within the HRA and can be adequately mitigated by the creation of SANG and payment of a SAMM tariff.
- 10.1.3** Adverse impacts on non-statutory designated sites, ancient woodland and important habitats outside of the site boundary will be avoided by the implementation of pollution control measures that will be detailed in a CEMP.
- 10.1.4** Important habitats for nature conservation within the site boundary will be retained where possible and habitat creation within the SANG will enable the proposal to generate a biodiversity net gain.
- 10.1.5** Following the implementation of avoidance and mitigation measures the development will not result in a significant negative impact on protected species or species of conservation concern.
- 10.1.6** A Construction Environmental Management Plan, a Landscape Environmental Management Plan and a Biodiversity Enhancement Plan will be submitted to Wokingham Borough Council, prior to commencement of development.

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Wokingham Borough Council Adopted Core Strategy Development Plan Document (2010)

## Appendix 1: Surveyors

### 2024 Surveys

The updated PEA, GLTA, HSI assessments [REDACTED] was carried out on 11<sup>th</sup> September 2024, during suitable weather by Ecological Consultant Jessica Green BSc (Hons) who holds a Natural England GCN licence (2021-51495-CLS-CLS) and Natural England Level 1 bat licence (2022-10684-CL17-BAT) and Assistant Ecologist Paul Schofield who also holds a Natural England GCN licence (2024-12193-CL08-GCN).

### 2022 Surveys

The PEA, bat roost inspection [REDACTED] were carried out on 11<sup>th</sup> April 2022 by Ecological Consultant Gary Price ACIEEM, who holds a Natural England level 1 bat licence (licence number: 2021-51197-CLS-CLS), a level 1 great crested newt licence (licence number 2019-40922-CLS-CLS), and a level 1 dormouse licence (licence number 2019-42623-CLS-CLS) and Ecological Consultant Hannah Frame BSc (Hons) ACIEEM who holds a level 1 great crested licence (Licence number: 2020-46398-CLS-CLS).

The aerial roost inspections of trees were carried out on 26<sup>th</sup> May 2022 by Ecological Consultants Gary Price ACIEEM and Hannah Frame BSc (Hons) ACIEEM. Gary holds a Natural England level 1 Class bat licence and was accredited by Senior Ecological Consultant Joseph Salkeld, who holds a Natural England level 2 bat licence (2019-43538-CLS-CLS), to use an endoscope.

Bat transect surveys and static monitoring were carried out between 27<sup>th</sup> April 2022 and 10<sup>th</sup> October 2022. A full list of surveyors and dates can be found in Table 21.

**Table 21: Bat Activity Transects Dates and Surveyors**

| Bat Activity Transects |               |                     |
|------------------------|---------------|---------------------|
| Date                   | Surveyor      | Role                |
| 28/04/22               | Dan Riva      | Assistant Ecologist |
|                        | Katie Ewers   | Assistant Ecologist |
| 19/05/22               | Oliver Smith  | Assistant Ecologist |
|                        | Abi Perry     | Assistant Ecologist |
| 14/06/22               | Joshua Hecken | Assistant Ecologist |
|                        | Katie Ewers   | Assistant Ecologist |
| 18/07/22 & 19/07/22    | Alex Walker   | Assistant Ecologist |
|                        | Clare Spooner | Assistant Ecologist |

| Bat Activity Transects |               |                     |
|------------------------|---------------|---------------------|
| Date                   | Surveyor      | Role                |
| 15/08/22               | Beth Lewis    | Assistant Ecologist |
|                        | Jess Sweeney  | Assistant Ecologist |
| 12/09/22               | William Hirst | Assistant Ecologist |
|                        | David Mahers  | Assistant Ecologist |
| 04/10/22               | Jake Purchase | Assistant Ecologist |
|                        | Josh Hecken   | Assistant Ecologist |

Reptile surveys were undertaken on seven occasions throughout May and June 2022. A list of surveyors and survey dates can be found in Table 22.

**Table 22: Reptile Survey Dates and Surveyors**

| Reptile Surveys |                    |                              |
|-----------------|--------------------|------------------------------|
| Date            | Visit Number       | Surveyor                     |
| 27/04/2022      | Refugia deployment | Gary Price and Abigail Perry |
| 16/05/2022      | 1                  | Frances Bennett              |
| 25/05/2022      | 2                  | Alex Walker                  |
| 30/05/2022      | 3                  | Katherine Ewers              |
| 06/06/2022      | 4                  | Katherine Ewers              |
| 13/06/2022      | 5                  | Frances Bennett              |
| 21/06/2022      | 6                  | Alex Walker                  |
| 27/06/2022      | 7                  | Frances Bennett              |

Breeding bird surveys were undertaken on five occasions between April and June 2022. A full list of dates and surveyors can be found in Table 23.

**Table 23: Breeding Bird Survey Dates and Surveyors**

| Date       | Surveyor                        |
|------------|---------------------------------|
| 27/04/2022 | Jonathan Scragg                 |
| 10/05/2022 | Warren Packer                   |
| 25/05/2022 | Warren Packer                   |
| 07/06/2022 | Alice Samuel & Oliver Smith     |
| 14/06/2022 | Jonathan Scragg & Abigail Perry |

Dormouse surveys were undertaken on five occasions between April and September 2022. A full list of dates and surveyors and their licence number can be found in Table 24.

**Table 24: Dormouse Survey Dates and Surveyors**

| Date                                 | Surveyor                        | Licence Number                                    |
|--------------------------------------|---------------------------------|---------------------------------------------------|
| 26/04/2022 (Tube Deployment)         | Gary Price & Abigail Perry      | 2019-42623-CLS-CLS                                |
| 24/05/2022                           | Gary Price                      | 2019-42623-CLS-CLS                                |
| 20/06/2022                           | Alex Walker                     | Accredited by Kate Taylor -<br>2016-21211-CLS-CLS |
| 25/07/2022                           | Gary Price                      | 2019-42623-CLS-CLS                                |
| 22/08/2022                           | Gary Price & Charlotte Epps     | 2019-42623-CLS-CLS                                |
| 26/09/2022 including tube collection | Gary Price & Felicity Andruszko | 2019-42623-CLS-CLS                                |

Great crested newt (GCN) environmental DNA (eDNA) surveys to identify presence/likely absence were undertaken on 24<sup>th</sup> June 2022 by Ecological Consultant Jessica Green BSc (Hons) who holds a Natural England GCN licence (2021-51495-CLS-CLS), MSc and Assistant Ecologist Joshua Hecken BSc who also Natural England GCN licence (2022-10707-CL08-GCN).

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## Appendix 2: Assessment Methodology

### Legal and Planning Policy Context

The relevant legal and policy context is identified as follows:

#### Features

##### *Designated Sites*

The location of the site is compared to the distribution of sites with a statutory or non-statutory nature conservation designation using information derived from the desk study. Consideration is given to designated sites that could be affected directly or indirectly by the proposed development.

##### *Habitats outside Designated Sites*

The habitats known to occur on the site are compared to those which receive some protection, in law or policy, outside of designated sites. These include hedgerows, uncultivated land and seminatural areas; national priority habitats and local priority habitats listed as requiring action in Local Biodiversity Action Plans.

##### *Ancient Woodland*

The ancient woodland inventory is checked to determine whether any known ancient woodland occurs either on the site or nearby.

##### *Protected Species*

The species known to occur on the site as a result of the desk study and UK Habitat Classification survey are compared to those listed in nature conservation legislation i.e. the WCA 1981, ((as amended)) and the Conservation of Habitats and Species Regulations 2017 (as amended).

In addition, the species known to occur on the site as a result of the desk study and Phase 1 habitat survey are compared to those listed in animal welfare legislation, i.e. the Badgers Act 1992 and the Wild Mammals (Protection) Act 1996.

##### *Priority Species*

The species known to occur on the site are compared to those listed as priority species in the relevant country or those requiring action in Local Biodiversity Action Plans.

##### *Other Species of Conservation Concern*

The species known to occur on the site are compared with other nature conservation listings, such as red data books.

##### *Invasive Plant Species*

The species of plant present on the site are compared to those listed in the WCA 1981, ((as amended)).

### *Relevant Legislation and Policy*

If any of the above are found to occur on or near the site and are likely to be affected by the development in any way, the relevant legislation and planning policy (including national, regional, county and borough policies) is listed and summarised in the table.

### **Nature Conservation Value**

#### *CIEEM Geographic Scale*

The value of the designated sites, habitats and species populations present on the site are then determined on a geographic scale (based on CIEEM, 2018). The scale is as follows:

- International and European
- National
- Regional
- Metropolitan, County, vice-county or other local authority-wide area
- Local

In arriving at a level of value for an ecological receptor, the criteria set out below are used.

#### *Designated Sites*

The highest level of site designated on the basis that an assessment of intrinsic nature conservation has already been carried out using the same or similar criteria as that given below for habitats and species.

#### *Habitats*

The table below sets out the criteria used for evaluating habitats. The criteria are based on Ratcliffe (1977), Annex III of the Habitats Directive and a review of criteria used for the designation of Local sites, many of which are reiterated in CIEEM (2016).

Each habitat identified during the survey is evaluated against these criteria. Reference is made to published lists of habitats of conservation concern to help establish the degree to which a habitat is rare or threatened, however, presence on such a list is not a criteria used in the evaluation.

| Level   | Criteria            | Explanation                                                                                                                                                                                                                                                                               |
|---------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Primary | Size                | Semi-natural habitats tend to be highly fragmented and the value of the habitat usually increases with its size, because large areas of a habitat will generally support more species and, being more resilient to external influences, is more likely to retain its value in the future. |
|         | Proportion of total | Areas of a habitat that represents a large proportion of the total with a given geographic area are generally of higher nature conservation value than areas of a habitat that are a small proportion of the total for a given geographic area.                                           |
|         | Diversity           | The diversity of species in a habitat is mainly influenced by habitat type, size, structure, age and management. The diversity of species supported by a given habitat strongly influences its value with habitats showing high species                                                   |

| Level            | Criteria                        | Explanation                                                                                                                                                                                                                                                                                                                                               |
|------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                 | diversity generally being of higher value than a habitat of the same type with low species diversity. However, it is recognised that some habitats naturally have low species diversity.                                                                                                                                                                  |
|                  | <b>Naturalness/<br/>Quality</b> | Truly natural habitats, unmodified by man, are rare in Britain, and nature conservation deals largely with semi-natural habitats. Those semi-natural habitats that exhibit a level of quality marked by a lack of features which indicate gross or recent human modification are generally more highly valued than highly and recently modified habitats. |
|                  | <b>Rarity</b>                   | Rare semi-natural habitats are of higher value for their own sake and because they are likely to support rare and uncommon species. The general principle is that the rarer the habitat, the greater the value for nature conservation. Rarity is related to the frequency of occurrence at all geographic levels on the IEEM scale.                      |
|                  | <b>Fragility</b>                | Fragility reflects the degree of sensitivity of habitats, communities and species to environmental change. Because of their vulnerability, fragile habitats are generally of higher nature conservation value than those that are more resilient to change.                                                                                               |
|                  | <b>Level of threat</b>          | A habitat which is undergoing a rapid decline in either extent or quality is assigned a higher value than a habitat which is more stable.                                                                                                                                                                                                                 |
| <b>Secondary</b> | <b>Recorded History</b>         | The extent to which a site has been used for scientific study and research is a factor of some importance, with those sites having a long recorded history being of more value than others.                                                                                                                                                               |
|                  | <b>Position</b>                 | Habitats that have an ecological link with adjacent areas of important semi-natural habitat may have more value than is apparent when considering the habitat in isolation.                                                                                                                                                                               |
|                  | <b>Potential</b>                | Certain sites could, through appropriate management or natural change, develop a greater nature conservation interest. Potential value is assessed separately from current value.                                                                                                                                                                         |
|                  | <b>Intrinsic Appeal</b>         | Some habitats are of greater appeal than others, which can be taken into account when arriving at a level of value.                                                                                                                                                                                                                                       |
|                  | <b>Re-creatability</b>          | Some habitats can be readily re-created, such as ponds, while others, such as ancient woodland can not. The degree to which a habitat can be re-created can influence its value, with those more readily re-created being of lower value than those that are hard or impossible to re-create.                                                             |

| Level | Criteria       | Explanation                                                                                                                                                                                                                                                                          |
|-------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <b>Amenity</b> | Some areas of habitat are more important to local people than others. This may be a function of accessibility in rural areas or scarcity in urban areas, but habitats used and valued by local people may have more value than is apparent when considering more biological factors. |

### Species

The table below sets out the criteria used for evaluating the populations of species present on the site. The criteria are again based on Ratcliffe (1977) and Annex III of the Habitats Directive and also the IUCN criteria categories and criteria.

Populations of a species recorded during the survey are assessed against the following criteria. Where further investigation is required to establish population size, an estimate is made based on the likely maximum that the habitat can support, to provide a preliminary indication of nature conservation value. As with habitats, reference is made to published lists of species of conservation concern to help establish the degree to which a species is rare or threatened, however, presence on such a list is not a criteria used in the evaluation.

| Level          | Criteria                   | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Primary</b> | <b>Rarity</b>              | A population of a species that is rare in a given area is important because the loss of, or damage to, the population may threaten the survival of the species in that area. This criterion may be extended to include distinct races of a species, as well as the species itself. Endemic and near endemic species have a special status as, by definition, they are globally rare even though they may be relatively common where they occur. |
|                | <b>Proportion of total</b> | A population of a species that represents a significant proportion of the total population in a given area could be more important than smaller populations because the loss of a large population is particularly likely to threaten the survival of the species in that area. Large populations also tend to be more robust and may provide a source for the colonisation of other sites.                                                     |
|                | <b>Level of threat</b>     | A population of a species which is undergoing a rapid decline is assigned a higher value than a population of a species which is more stable. In determining the level of threat, reference is made to the criteria published by the IUCN.                                                                                                                                                                                                      |
|                | <b>Native Status</b>       | Non-native species, especially recent introductions, are generally regarded as having low or negligible nature conservation value, even if they are rare or threatened in the UK. The presence of some non-native species may even detract from the conservation status of the site. However, certain ancient                                                                                                                                   |

| Level            | Criteria                                                   | Explanation                                                                                                                                                                                                                                                                                                                                      |
|------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                                            | introductions are given higher status, particularly rare arable weeds, than other introduced plant species.                                                                                                                                                                                                                                      |
| <b>Secondary</b> | <b>History of Presence</b>                                 | Long-established populations of species which depend on long periods of traditional management, require long established habitats or are otherwise known to have been present at a particular site for many years may be assigned higher values than newly established populations or populations of species which readily colonise new sites.   |
|                  | <b>Importance for fauna</b>                                | Some species of plants provide an important resource for fauna, either in terms of the general diversity of species or numbers of individuals supported, or in providing a particular resource to a specialist, dependent species of fauna. Such plants may be assigned higher value than others even if they are just as common and widespread. |
|                  | <b>Links to other populations/ degree of fragmentation</b> | Small populations of a species may be of more importance because than is apparent from the population size because they form a link or potential link to other populations of the same species, and reduce the negative effects of isolation.                                                                                                    |
|                  | <b>Cultural interest/aesthetic appeal</b>                  | Some species of plant could be important to local people either because there is a cultural connection e.g. wild daffodil in Wales or because they have aesthetic appeal e.g. bee orchid. Populations of such species may be more highly valued than others that are similarly abundant.                                                         |
|                  | <b>Economic</b>                                            | Some species of plant could be important to local people because they provide an economic benefit e.g. by encouraging tourism or use as a commercial crop.                                                                                                                                                                                       |

### *Use of Primary and Secondary Criteria*

The primary criteria are considered at each geographic scale so that, for example, a small population of a native species that is rare in the county but relatively common in the region and stable could be considered important at the county level. Once a rough level of value is derived from the primary criteria, the secondary criteria are considered and may lead to a slight increase or decrease in the level of value assigned to a given population.

### **Preliminary Impact Assessment**

Consideration is given to whether and how the development could affect each of the features identified during the desk study and Phase 1 survey. The assessment is very much a preliminary exercise, designed to inform early stages in the development process, for example, site selection, development design, master planning and avoidance, mitigation and compensation measures that may be required. Re-appraisal of the impacts will be required if there are design changes and when further information is obtained in later stages of the assessment process.

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### Identification of Potential Further Ecological Issues

Further ecological issues are those which cannot be resolved during preliminary ecological appraisal for any reason, including the following:

- The development is near a designated site and consultation with the relevant regulator is required in order to determine whether further assessment is required;
- Suitable habitat is present on or near the site for a protected species/species of conservation concern and specialist survey techniques are required for their detection;
- Suitable habitat is present on or near the site for a protected species/species of conservation concern and the extended Phase 1 habitat survey was not undertaken at a suitable time of year for their detection;
- A protected species/species of conservation concern was found on or near the site but further information on population size or distribution is required in order to resolve any legal and planning policy issues (such as obtaining licences) or make a reliable assessment of nature conservation value; and
- Discussion of issues raised by 3<sup>rd</sup> parties, e.g. reports of protected species from the site by local people, may also be discussed under this heading.

The desk study is used as a guide to the protected species/species of conservation in the local area, however, the list is not taken to be exhaustive and it is borne in mind that some species may longer occur in the locality.

No attempt is made to evaluate the importance of the site for species not yet confirmed to be on or near the site, nor to discuss the implications for the development if the species were to be found on the site.

### References

CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

Ratcliffe (1977) A Nature Conservation Review, Cambridge University Press.

## Appendix 3: Desk Study - Designated Sites

| Site Designation                                | Grid Reference | Area (ha) | Distance to site (km) | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------|----------------|-----------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>National Sites (SPA, SSSI)</b>               |                |           |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Longmoor Bog SSSI and LNR                       | SU781653       | 14.0      | 1.60                  | Area of wet woodland and heath and is part of the California Country Park. Designated for valley mire, wet woodland and wet heathland habitats that support notable bird and invertebrate assemblages. Bird species include woodcock ( <i>Scolopax rusticola</i> ), great spotted woodpecker ( <i>Dendrocopos major</i> ), green woodpecker ( <i>Picus viridis</i> ), treecreeper ( <i>Certhia familiaris</i> ), tree pipit ( <i>Anthus trivialis</i> ). Invertebrates associated with wet habitats include bog bush cricket ( <i>Metrioptera brachyptera</i> ) silver-studded blue butterfly ( <i>Plebejus argus</i> ) and an assemblage of dragonflies. |
| Thames Basin Heaths SPA                         | SU909556       | 8400.0    | 2.99                  | Thames Basin Heath Special Protection Area (SPA) one of the most important natural areas in the southeast, as such additional protection is given to it. The site supports important breeding populations of nightjar ( <i>Caprimulgus europaeus</i> ), woodlark ( <i>Lullula arborea</i> ) and Dartford warbler ( <i>Sylvia undata</i> ).                                                                                                                                                                                                                                                                                                                |
| <b>County and Local Sites (SINCs, LWS, etc)</b> |                |           |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Long Copse (North) and Spring Copse LWS         | SU756660       | 4.5       | 0.07                  | This Local Wildlife Site supports two habitats of principal importance; lowland mixed deciduous woodland and wet woodland. Long Copse (North) consists of two almost continuous areas of semi-natural ancient woodland, with Spring Copse lying                                                                                                                                                                                                                                                                                                                                                                                                           |

| Site Designation                               | Grid Reference | Area (ha) | Distance to site (km) | Description                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------|----------------|-----------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                |           |                       | to the north of the woodland areas.                                                                                                                                                                                                                                                                                                           |
| Long Copse (South) & Robin Hood Copse LWS      | SU760655       | 5.6       | 0.35                  | A parcel of woodland that has a canopy dominated by ash ( <i>Fraxinus excelsior</i> ), alder ( <i>Alnus glutinosa</i> ) and birch ( <i>Betula pendula</i> ), with a hazel ( <i>Corylus avellana</i> ) coppice present in Robin Hood Copse.                                                                                                    |
| Hazeltons Copse LWS                            | SU765674       | 2.6       | 0.79                  | Hazelton Copse, located towards the north-east of Arborfield Copse, is a Lowland Mixed Deciduous Woodland (Section 41 Habitat of principal importance), which is marked on the ancient woodland inventory as ancient semi-natural woodland.                                                                                                   |
| Farley Hill Woods, Great Copse, New Plantation | SU746558       | 34.5      | 0.90                  | This site is largely ancient woodland with extensive semi-natural areas and some parts replanted with conifers. There are also areas of more recent woodland and mixed plantation. Great Copse has gullies and pools with wet alder dominated woodland. The semi-natural stands are dominated by ash, oak ( <i>Quercus robur</i> ) and birch. |
| Pound Copse LWS                                | SU751972       | 1.1       | 1.03                  | This site is a small area of ancient woodland which is owned by the parish council. The site has been classified as National Vegetation Classification types W8 ash-fled maple-dog's mercury woodland and W10 oak-bracken- bramble woodland.                                                                                                  |
| The Coombes LWS                                | SU775676       | 33.4      | 1.23                  | The Coombes consists of an area of Lowland Mixed Deciduous Woodland that varies in its structure and species throughout. The canopy is predominately oak and silver birch with an                                                                                                                                                             |

| Site Designation                                       | Grid Reference | Area (ha) | Distance to site (km) | Description                                                                                                                                                                                                                                |
|--------------------------------------------------------|----------------|-----------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                        |                |           |                       | understorey of rowan ( <i>Sorbus aucuparia</i> ), hawthorn ( <i>Crataegua monogyna</i> ), hazel ( <i>Corylus avellana</i> ), holly ( <i>Ilex aquifolium</i> ) and in areas, dense rhododendron sp. ( <i>rhododendron sp.</i> )             |
| Hogwood Shaw LWS                                       | SU770648       | 1.3       | 1.31                  | This site is a small area of woodland with a small pond. The north-eastern section is dominated by oak. The south-western section is largely hazel coppice and there is a small area of Norway spruce ( <i>Picea abies</i> ) in the south. |
| Bearwood Estate                                        | SU776686       | 135.7     | 1.52                  | An extensive area of established broadleaved woodland with a large lake. The lake and woods attract a good variety of birds.                                                                                                               |
| Longmoor Woodland and Bog, California Country Park LWS | SU779652       | 12.3      | 1.59                  | This is the part of California Country Park that lies outside the Longmoor Bog SSSI.                                                                                                                                                       |
| Moor Copse LWS                                         | SU740666       | 12.8      | 1.60                  | This site is ancient woodland. The site has been modified by the planting of sweet chestnut throughout the much of the site. Otherwise the canopy is dominated by oak and ash with frequent hazel coppice in the understorey.              |
| Rounds Copse LWS                                       | SU742715       | 2.4       | 1.72                  | This site is a small area of ancient woodland. The north east of the wood has hazel coppice with hawthorn but no standard trees                                                                                                            |
| Westwood Copse LWS                                     | SU760641       | 3.7       | 1.73                  | This ancient woodland is an area of neglected coppice woodland that is quite open in the south east corner. There are two small ponds near the western side and also a flush area.                                                         |

| Site Designation             | Grid Reference | Area (ha) | Distance to site (km) | Description                                                                                                                                                                                                                                                   |
|------------------------------|----------------|-----------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wyvol's Copse<br>LWS         | SU752639       | 14.6      | 1.78                  | Ancient woodland that has been converted to conifer plantation but large areas are now being restored to broad-leaved woodland. The field layer of the woodland includes records for 30 ancient woodland indicator plants.                                    |
| Claypits Copse<br>LWS        | SU764640       | 1.6       | 1.90                  | This site is a small area of oak dominated woodland. There are a number of old yew ( <i>Taxus baccata</i> ) trees and one old crab apple ( <i>Malus sylvestris</i> ) in the site.                                                                             |
| Arborfield Bridge<br>Meadows | SU746680       | 4.5       | 1.93                  | This is an eyot within the River Lodden, with a few man-made channels and is predominantly an area of wet woodland with widespread mature hybrid crack-willow, dense common sallow and some mature weeping willow. Riparian margins contain some fen species. |

## Appendix 4: Desk Study - Protected Species and Species of Conservation Concern

| Common name       | Scientific Name                   | Habitat <sup>1</sup> Regulations | WCA <sup>2</sup> | SPI <sup>3</sup> | BOCC <sup>4</sup> | Protecti on of Badgers Act 1992 | England Red List Status <sup>5</sup> | No. of records | Distanc e from site (km) | Source |
|-------------------|-----------------------------------|----------------------------------|------------------|------------------|-------------------|---------------------------------|--------------------------------------|----------------|--------------------------|--------|
| <b>Birds</b>      |                                   |                                  |                  |                  |                   |                                 |                                      |                |                          |        |
| Barn owl          | <i>Tyto alba</i>                  |                                  | Schedule 1       |                  |                   |                                 |                                      | 1              | < 1 km                   | TVERC  |
| Black-headed gull | <i>Chroicocephalus ridibundus</i> |                                  |                  |                  | Amber             |                                 |                                      | 5              | < 1 km                   | TVERC  |
| Black redstart    | <i>Phoenicurus ochruros</i>       |                                  | Schedule 1       |                  | Red               |                                 |                                      | 7              | < 1 km                   | TVERC  |
| Brambling         | <i>Fringilla montifringilla</i>   |                                  | Schedule 1       |                  |                   |                                 |                                      | 13             | < 1 km                   | TVERC  |
| Bullfinch         | <i>Pyrrhula pyrrhula</i>          |                                  |                  | ✓                | Amber             |                                 |                                      | 6              | < 1 km                   | TVERC  |
| Cuckoo            | <i>Cuculus canorus</i>            |                                  |                  | ✓                | Red               |                                 |                                      | 2              | < 1 km                   | TVERC  |
| Dunnock           | <i>Prunella modularis</i>         |                                  |                  | ✓                | Amber             |                                 |                                      | 10             | < 1 km                   | TVERC  |
| Fieldfare         | <i>Turdus pilaris</i>             |                                  | Schedule 1       |                  | Red               |                                 |                                      | 3              | < 1 km                   | TVERC  |
| Gadwall           | <i>Mareca strepera</i>            |                                  |                  |                  | Amber             |                                 |                                      | 3              | < 1 km                   | TVERC  |
| Green sandpiper   | <i>Tringa ochropus</i>            |                                  | Schedule 1       |                  | Amber             |                                 |                                      | 3              | < 1 km                   | TVERC  |
| Grey partridge    | <i>Perdix perdix</i>              |                                  |                  | ✓                | Red               |                                 |                                      | 3              | < 1 km                   | TVERC  |
| Grey wagtail      | <i>Motacilla cinerea</i>          |                                  |                  |                  | Amber             |                                 |                                      | 1              | < 1 km                   | TVERC  |
| Greylag goose     | <i>Anser anser</i>                |                                  | Schedule 1       |                  | Amber             |                                 |                                      | 1              | < 1 km                   | TVERC  |

<sup>1</sup> Conservation of Habitats and Species Regulations 2017, as amended

<sup>2</sup> Wildlife and Countryside Act 1981, as amended

<sup>3</sup> Species of Principal Importance within the relevant country of the United Kingdom

<sup>4</sup> Birds of Conservation Concern 5: the status of all regularly occurring birds in the United Kingdom, Channel Islands and the Isle of Man (Stanbury *et al.*, 2021)

<sup>5</sup> Near Threatened (NT), Vulnerable (VU), Endangered (EN) or Critically Endangered (CE) in England

| Common name          | Scientific Name                   | Habitat <sup>1</sup><br>Regulations | WCA <sup>2</sup> | SPI <sup>3</sup> | BOCC <sup>4</sup> | Protecti<br>on of<br>Badgers<br>Act<br>1992 | England<br>Red List<br>Status <sup>5</sup> | No. of<br>records | Distanc<br>e from<br>site (km) | Source |
|----------------------|-----------------------------------|-------------------------------------|------------------|------------------|-------------------|---------------------------------------------|--------------------------------------------|-------------------|--------------------------------|--------|
| House martin         | <i>Delichon urbicum</i>           |                                     |                  |                  | Red               |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Kestrel              | <i>Falco tinnunculus</i>          |                                     |                  |                  | Amber             |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Lapwing              | <i>Vanellus vanellus</i>          |                                     |                  | ✓                | Red               |                                             |                                            | 8                 | < 1 km                         | TVERC  |
| Linnet               | <i>Linaria cannabina</i>          |                                     |                  | ✓                | Red               |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Little ringed plover | <i>Charadrius dubius</i>          |                                     | Schedule 1       |                  |                   |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Mallard              | <i>Anas platyrhynchos</i>         |                                     |                  |                  | Amber             |                                             |                                            | 9                 | < 1 km                         | TVERC  |
| Meadow pipit         | <i>Anthus pratensis</i>           |                                     |                  |                  | Amber             |                                             |                                            | 5                 | < 1 km                         | TVERC  |
| Mistle thrush        | <i>Turdus viscivorus</i>          |                                     |                  |                  | Red               |                                             |                                            | 5                 | < 1 km                         | TVERC  |
| Moorhen              | <i>Gallinula chloropus</i>        |                                     |                  |                  | Amber             |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Nightingale          | <i>Luscinia megarhynchos</i>      |                                     |                  |                  | Red               |                                             |                                            | 2                 | < 1 km                         | TVERC  |
| Red kite             | <i>Milvus milvus</i>              |                                     | Schedule 1       |                  |                   |                                             |                                            | 10                | < 1 km                         | TVERC  |
| Redwing              | <i>Turdus iliacus</i>             |                                     | Schedule 1       |                  | Amber             |                                             |                                            | 4                 | < 1 km                         | TVERC  |
| Reed bunting         | <i>Emberiza schoeniclus</i>       |                                     |                  | ✓                | Amber             |                                             |                                            | 3                 | < 1 km                         | TVERC  |
| Rook                 | <i>Corvus frugilegus</i>          |                                     |                  |                  | Amber             |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Sedge warbler        | <i>Acrocephalus schoenobaenus</i> |                                     |                  |                  | Amber             |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Shelduck             | <i>Tadorna tadorna</i>            |                                     |                  |                  | Amber             |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Shoveler             | <i>Spatula clypeata</i>           |                                     |                  |                  | Amber             |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Skylark              | <i>Alauda arvensis</i>            |                                     |                  | ✓                | Red               |                                             |                                            | 6                 | < 1 km                         | TVERC  |
| Song thrush          | <i>Turdus philomelos</i>          |                                     |                  | ✓                | Amber             |                                             |                                            | 15                | < 1 km                         | TVERC  |
| Sparrowhawk          | <i>Accipiter nisus</i>            |                                     |                  |                  | Amber             |                                             |                                            | 4                 | < 1 km                         | TVERC  |
| Spotted flycatcher   | <i>Muscicapa striata</i>          |                                     |                  | ✓                | Red               |                                             |                                            | 5                 | < 1 km                         | TVERC  |

| Common name                     | Scientific Name                  | Habitat <sup>1</sup><br>Regulations | WCA <sup>2</sup>          | SPI <sup>3</sup> | BOCC <sup>4</sup> | Protecti<br>on of<br>Badgers<br>Act<br>1992 | England<br>Red List<br>Status <sup>5</sup> | No. of<br>records | Distanc<br>e from<br>site (km) | Source |
|---------------------------------|----------------------------------|-------------------------------------|---------------------------|------------------|-------------------|---------------------------------------------|--------------------------------------------|-------------------|--------------------------------|--------|
| Starling                        | <i>Sturnus vulgaris</i>          |                                     |                           | ✓                | Red               |                                             |                                            | 5                 | < 1 km                         | TVERC  |
| Stock dove                      | <i>Columba oenas</i>             |                                     |                           |                  | Amber             |                                             |                                            | 2                 | < 1 km                         | TVERC  |
| Tawny owl                       | <i>Strix aluco</i>               |                                     |                           |                  | Amber             |                                             |                                            | 6                 | < 1 km                         | TVERC  |
| Teal                            | <i>Anas crecca</i>               |                                     |                           |                  | Amber             |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Whitethroat                     | <i>Curruca communis</i>          |                                     |                           |                  | Amber             |                                             |                                            | 5                 | < 1 km                         | TVERC  |
| Wigeon                          | <i>Mareca penelope</i>           |                                     |                           |                  | Amber             |                                             |                                            | 2                 | < 1 km                         | TVERC  |
| Woodpigeon                      | <i>Columba palumbus</i>          |                                     |                           |                  | Amber             |                                             |                                            | 14                | < 1 km                         | TVERC  |
| Wren                            | <i>Troglodytes troglodytes</i>   |                                     |                           |                  | Amber             |                                             |                                            | 13                | < 1 km                         | TVERC  |
| Yellow wagtail                  | <i>Motacilla flava</i>           |                                     |                           | ✓                | Red               |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Yellowhammer                    | <i>Emberiza citrinella</i>       |                                     |                           | ✓                | Red               |                                             |                                            | 10                | < 1 km                         | TVERC  |
| <b>Vascular Plant</b>           |                                  |                                     |                           |                  |                   |                                             |                                            |                   |                                |        |
| Common wood sorrel              | <i>Oxalis acetosella</i>         |                                     |                           |                  |                   |                                             | NT                                         | 1                 | < 1 km                         | TVERC  |
| <b>Terrestrial Invertebrate</b> |                                  |                                     |                           |                  |                   |                                             |                                            |                   |                                |        |
| Stag beetle                     | <i>Lucanus cervus</i>            |                                     | Schedule 5<br>(sale only) | ✓                |                   |                                             |                                            | 31                | < 1 km                         | TVERC  |
| <b>Mammals</b>                  |                                  |                                     |                           |                  |                   |                                             |                                            |                   |                                |        |
| Brown long-eared                | <i>Plecotus auritus</i>          | Schedule 2                          | Schedule 5                | ✓                |                   |                                             |                                            | 48                | < 1 km                         | TVERC  |
| Common pipistrelle              | <i>Pipistrellus pipistrellus</i> | Schedule 2                          | Schedule 5                |                  |                   |                                             |                                            | 137               | < 1 km                         | TVERC  |
| Daubenton's                     | <i>Myotis daubentonii</i>        | Schedule 2                          | Schedule 5                |                  |                   |                                             |                                            | 1                 | < 1 km                         | TVERC  |
| Leisler's                       | <i>Nyctalus leisleri</i>         | Schedule 2                          | Schedule 5                |                  |                   |                                             |                                            | 6                 | < 1 km                         | TVERC  |
| Myotis sp                       | <i>Myotis</i>                    | Schedule 2                          | Schedule 5                |                  |                   |                                             |                                            | 31                | < 1 km                         | TVERC  |
| Nathusius's pipistrelle         | <i>Pipistrellus nathusii</i>     | Schedule 2                          | Schedule 5                |                  |                   |                                             |                                            | 7                 | < 1 km                         | TVERC  |

| Common name                  | Scientific Name                 | Habitat <sup>1</sup><br>Regulations | WCA <sup>2</sup> | SPI <sup>3</sup> | BOCC <sup>4</sup> | Protecti<br>on of<br>Badgers<br>Act<br>1992 | England<br>Red List<br>Status <sup>5</sup> | No. of<br>records | Distanc<br>e from<br>site (km) | Source     |
|------------------------------|---------------------------------|-------------------------------------|------------------|------------------|-------------------|---------------------------------------------|--------------------------------------------|-------------------|--------------------------------|------------|
| Natterer's                   | <i>Myotis nattereri</i>         | Schedule 2                          | Schedule 5       |                  |                   |                                             |                                            | 6                 | < 1 km                         | TVERC      |
| Noctule                      | <i>Nyctalus noctula</i>         | Schedule 2                          | Schedule 5       | ✓                |                   |                                             |                                            | 49                | < 1 km                         | TVERC      |
| Serotine                     | <i>Eptesicus serotinus</i>      | Schedule 2                          | Schedule 5       |                  |                   |                                             |                                            | 27                | < 1 km                         | TVERC      |
| Soprano pipistrelle          | <i>Pipistrellus pygmaeus</i>    | Schedule 2                          | Schedule 5       | ✓                |                   |                                             |                                            | 75                | < 1 km                         | TVERC      |
| Barbastelle                  | <i>Barbastella barbastellus</i> | Schedule 2                          | Schedule 5       | ✓                |                   |                                             |                                            | 1                 | < 1 km                         | TVERC      |
| ██████                       | ██████████                      |                                     |                  |                  |                   | ■                                           |                                            |                   | ██████████                     | ██████████ |
| Western European<br>hedgehog | <i>Erinaceus europaeus</i>      |                                     |                  | ✓                |                   |                                             |                                            | 13                | < 1 km                         | TVERC      |
| <b>Reptiles</b>              |                                 |                                     |                  |                  |                   |                                             |                                            |                   |                                |            |
| Barred grass snake           | <i>Natrix helvetica</i>         |                                     | Schedule 5*      | ✓                |                   |                                             |                                            | 6                 | < 1 km                         | TVERC      |
| Slow-worm                    | <i>Anguis fragilis</i>          |                                     | Schedule 5*      | ✓                |                   |                                             |                                            | 5                 | < 1 km                         | TVERC      |

\* Protected from intentional killing, injuring and selling only

## Appendix 5: Ground Level Tree Assessment and Aerial Inspection Results

| Tree | Species                                  | Height (m) | DBH (m) | Age class           | Condition   | Distance to hedgerow (m) | Distance to woodland (m) | Distance to water (m) | Potential commuting corridors? | Potential foraging corridors | Setting | Habitat quality of surrounding area | Level of baseline disturbance | Tree Climbed in 2022                                             | Overall potential (of tree) |
|------|------------------------------------------|------------|---------|---------------------|-------------|--------------------------|--------------------------|-----------------------|--------------------------------|------------------------------|---------|-------------------------------------|-------------------------------|------------------------------------------------------------------|-----------------------------|
| T1   | Pedunculate oak;<br><i>Quercus robur</i> | 18         | 1.8     | Veteran / Senescing | Good Health | <200m                    | >400m                    | >400m                 | Yes                            | Yes                          | Rural   | High                                | Negligible                    | Yes - PRFs were present that could support multiple bats         | PRF-M                       |
| T2   | Ash;<br><i>Fraxinus excelsior</i>        | 14         | 0.6     | Mature              | Poor Health | In Hedgerow              | >400m                    | >400m                 | Yes                            | Yes                          | Rural   | High                                | High                          | No                                                               | FAR                         |
| T3   | Ash                                      | 16         | 0.8     | Mature              | Poor Health | In Hedgerow              | >400m                    | >400m                 | Yes                            | Yes                          | Rural   | High                                | Low                           | Yes - tree assigned negligible potential after aerial inspection | FAR                         |

| Tree | Species         | Height (m) | DBH (m) | Age class           | Condition   | Distance to hedgerow (m) | Distance to woodland (m) | Distance to water (m) | Potential commuting corridors? | Potential foraging corridors | Setting | Habitat quality of surrounding area | Level of baseline disturbance | Tree Climbed in 2022 | Overall potential (of tree) |
|------|-----------------|------------|---------|---------------------|-------------|--------------------------|--------------------------|-----------------------|--------------------------------|------------------------------|---------|-------------------------------------|-------------------------------|----------------------|-----------------------------|
| T4   | Pedunculate oak | 16         | 1.2     | Veteran / Senescing | Good Health | In Hedgerow              | >400m                    | >400m                 | Yes                            | Yes                          | Rural   | High                                | Negligible                    | No                   | FAR                         |
| T5   | Pedunculate oak | 22         | 1.3     | Veteran / Senescing | Good Health | In Hedgerow              | >400m                    | >400m                 | Yes                            | Yes                          | Rural   | High                                | Low                           | No                   | PRF                         |
| T6   | Pedunculate oak | 20         | 1.4     | Veteran / Senescing | Good Health | In Hedgerow              | >400m                    | >400m                 | Yes                            | Yes                          | Rural   | High                                | Low                           | No                   | PRF                         |
| T7   | Ash             | 12         | 0.4     | Mature              | Good Health | In Hedgerow              | >400m                    | >400m                 | Yes                            | Yes                          | Rural   | High                                | Low                           | No                   | PRF                         |

## Appendix 6: Static Monitoring Bat Survey Data

### Transects

Survey effort for the activity surveys was determined in accordance with good practice guidelines (Collins ed, 2016). This best practice guidance has now been superseded (Collins ed, 2023), but the survey data is still considered valid as the sufficient survey effort was conducted at the site to understand how bats were using the site and the surrounding area.

Table 25 shows the breakdown of the number of passes of each species recorded during the bat activity transects undertaken during 2022. Table 26 shows the total number of passes per species and per visit.

Peak levels of bat activity was recorded during visit 2 with a total of 62 passes of these 69% (43) were passes by common pipistrelle. Overall across all the transect visits passes by pipistrelle bats accounted for nearly 87% of all passes recorded (common pipistrelle - 159 (69.7%), soprano pipistrelle - 34 (14.9%), pipistrelle sp. - 5 (2.2%)). Common and soprano pipistrelles were recorded on every visit. Common pipistrelle was the most frequently recorded bat on all visits apart from visit 1 and visit 8. On visit 2 the soprano pipistrelle was most frequently recorded and visit 8 2 passes of each of common pipistrelle and soprano pipistrelle were recorded. Noctule bats were third most frequently recorded species with 23 passes recorded (10.1%) with 18 of these passes being recorded on visit 2. Noctule bats were also recorded on visits 3 and 7. A total of four passes from the species group myotis sp. were recorded across visits 1 and 3, one pass from Leisler's bat was recorded on visit 7 and two passes from barbastelle were recorded on visit 7.

Transect leg 3 was the leg where across all eight survey visits the most bat activity was recorded (95 passes (41.6%)). Three species and two species groups were recorded on this leg (common pipistrelle, soprano pipistrelle, noctule, pipistrelle sp. and myotis sp.). On five of the eight visits the highest level of activity was recorded on transect leg 2 (visit 1 - 7 passes, visit 3 - 29 passes, visit 4 - 12 passes, visit 5 - 7 passes, visit 8 - 2 passes) during visit 2 and 6 the highest level of activity was recorded on transect leg 2 (22 and 3 passes) and on visit 7 the highest level of activity was recorded on transect leg 1 ( 30 passes).

**Table 25: Number of passes per species recorded during the bat activity transects**

| Transect Results | Species   | Visit 1<br>27/04/<br>2022 | Visit 2<br>18/05/<br>2022 | Visit 3<br>13/06/<br>2022 | Visit 4<br>18/07/<br>2022 | Visit 5<br>19/07/<br>2022 | Visit 6<br>15/08/<br>2022 | Visit 7<br>12/09/<br>2022 | Visit 8<br>03/10/<br>2022 |
|------------------|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Stopping point 1 | P pip     |                           |                           | 2                         |                           | 1                         |                           |                           |                           |
|                  | Myotis sp |                           |                           |                           |                           | 1                         |                           |                           |                           |
|                  | N noc     |                           |                           | 2                         |                           |                           |                           |                           |                           |
| Leg 1            | P pip     |                           | 2                         | 5                         |                           |                           |                           | 16                        |                           |
|                  | Myotis sp |                           |                           |                           |                           |                           |                           | 1                         |                           |
|                  | N noc     |                           | 4                         |                           |                           |                           |                           | 3                         |                           |
|                  | Pip sp    |                           |                           |                           |                           |                           |                           | 1                         |                           |

| Transect Results | Species   | Visit 1<br>27/04/<br>2022 | Visit 2<br>18/05/<br>2022 | Visit 3<br>13/06/<br>2022 | Visit 4<br>18/07/<br>2022 | Visit 5<br>19/07/<br>2022 | Visit 6<br>15/08/<br>2022 | Visit 7<br>12/09/<br>2022 | Visit 8<br>03/10/<br>2022 |
|------------------|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                  | P pyg     |                           |                           | 1                         |                           | 1                         |                           | 9                         |                           |
| Stopping point 2 | P pip     |                           | 6                         |                           | 1                         |                           | 1                         |                           |                           |
|                  | Nnoc      |                           | 6                         |                           |                           |                           |                           |                           |                           |
|                  | P pyg     | 2                         |                           |                           |                           |                           |                           |                           |                           |
| Leg 2            | P pip     |                           | 19                        |                           |                           | 4                         | 2                         | 4                         |                           |
|                  | N noc     |                           | 2                         |                           |                           |                           |                           |                           |                           |
|                  | P pyg     |                           | 1                         |                           |                           | 1                         | 1                         |                           | 1                         |
| Stopping point 3 | P pip     |                           | 1                         | 11                        |                           | 1                         |                           |                           |                           |
|                  | Pip sp    |                           |                           |                           | 1                         |                           |                           |                           |                           |
|                  | P pyg     |                           |                           |                           |                           | 5                         |                           |                           |                           |
| Leg 3            | P pip     | 1                         | 15                        | 27                        | 10                        | 6                         | 1                         | 14                        | 2                         |
|                  | Myotis sp |                           |                           |                           |                           |                           |                           | 1                         |                           |
|                  | N noc     |                           | 6                         |                           |                           |                           |                           |                           |                           |
|                  | Pip sp    |                           |                           |                           | 1                         |                           |                           |                           |                           |
|                  | P pyg     | 6                         |                           | 2                         | 1                         | 1                         | 1                         |                           |                           |
| Stopping point 4 | P pip     |                           |                           | 5                         |                           | 1                         |                           |                           |                           |
|                  | P pyg     |                           |                           |                           |                           |                           |                           |                           | 1                         |
| Leg 4            | B bar     |                           |                           |                           |                           |                           |                           | 2                         |                           |
|                  | P pip     |                           |                           |                           |                           |                           |                           | 1                         |                           |
|                  | N lei     |                           |                           |                           |                           |                           |                           | 1                         |                           |
|                  | Myotis sp |                           |                           |                           |                           |                           |                           | 1                         |                           |
|                  | Pip sp    |                           |                           |                           | 1                         |                           |                           | 1                         |                           |

Table 26: Total passes by species and visit

| Species   | Visit 1 | Visit 2 | Visit 3 | Visit 4 | Visit 5 | Visit 6 | Visit 7 | Visit 8 | Total |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| B bar     | 0       | 0       | 0       | 0       | 0       | 0       | 2       | 0       | 2     |
| P pip     | 1       | 43      | 50      | 11      | 13      | 4       | 35      | 2       | 159   |
| N lei     | 0       | 0       | 0       | 0       | 0       | 0       | 1       | 0       | 1     |
| Myotis sp | 0       | 0       | 0       | 0       | 1       | 0       | 3       | 0       | 4     |
| N noc     | 0       | 18      | 2       | 0       | 0       | 0       | 3       | 0       | 23    |
| Pip sp    | 0       | 0       | 0       | 3       | 0       | 0       | 2       | 0       | 5     |

|              |          |           |           |           |           |          |           |          |            |
|--------------|----------|-----------|-----------|-----------|-----------|----------|-----------|----------|------------|
| P pyg        | 8        | 1         | 3         | 1         | 8         | 2        | 9         | 2        | 34         |
| <b>Total</b> | <b>9</b> | <b>62</b> | <b>55</b> | <b>15</b> | <b>22</b> | <b>6</b> | <b>55</b> | <b>4</b> | <b>228</b> |

### Static Monitoring

Table 27 and Table 28 show the results of the static monitoring surveys with the data broken down by date. Table 29 shows the nightly weather conditions during the static monitoring surveys. The static monitoring device at SM1 failed to record during visit 1 (April) and only recorded on two nights during visit 2 (May). The data collected through the rest of the season and the second static monitoring device which did record, combined with the transect data still allows for an assessment of how bats use the site.

At both static monitoring locations common pipistrelle was the most frequently recorded species accounting for 69.21% (3438) of passes at SM1 and 90.69% (11223) of passes at SM2. The second most frequently recorded species at both locations was soprano pipistrelle (SM1 29.53%/1467 passes and SM2 7.57%/937 passes). Common pipistrelle was the most frequently recorded species at both locations on all visits except visit 4 at SM1 when soprano pipistrelle was the most frequently recorded species. Soprano pipistrelle, common pipistrelle were recorded on all visits at both locations. Noctule bats were recorded on all visits at both locations except visit 1 at SM2. Brown long-eared bats were recorded on all visits except visit 1 (SM malfunction) and 2 at SM1 and all but visit 4 at SM2. Serotine bats were recorded on visits 2, 3 and 4 at SM1 and visits 3, 4 and 5 at SM2; the species group Myotis sp. were recorded on visits 6 and 7 at SM1 and visits 3, 5, 6 and 7 at SM2; Leisler's bat were recorded on visits 3 and 4 at SM1 and visits 3 and 6 at SM2; Nathusius' pipistrelle was recorded on visit 4 at SM1 and visits 2 and 3 at SM2.

Overall higher levels of activity were higher at SM2 than SM1 (SM1 - 4967 passes, SM2 - 12375 passes). SM2 had higher levels of activity than SM1 on all visits except visit 4 and the highest level of activity was recorded on visit 2 (4067 passes). The highest level of activity at SM1 was recorded during visit 4 (2115 passes). The peak level of activity at SM1 was recorded on 14th September 2022 with a total of 849 passes (815 passes of common pipistrelle, 33 passes of soprano pipistrelle and 1 myotis sp. pass). The peak activity at SM2 was recorded on 21<sup>st</sup> May 2022 with 1386 passes (1356 common pipistrelle passes, 6 soprano pipistrelle passes, 6 nathusius pipistrelle passes, 3 brown long-eared bat passes and 15 noctule passes).

**Table 27: Number of passes per species at SM1**

|                             | Date       | Number Passes/Species |           |        |       |       |       |       |       | Total |
|-----------------------------|------------|-----------------------|-----------|--------|-------|-------|-------|-------|-------|-------|
|                             |            | E ser                 | Myotis sp | N leis | N noc | P aur | P nat | P pip | P pyg |       |
| Visit 1<br>(SM malfunction) | 27/04/2022 |                       |           |        |       |       |       |       |       | N/A   |
|                             | 28/04/2022 |                       |           |        |       |       |       |       |       | N/A   |
|                             | 29/04/2022 |                       |           |        |       |       |       |       |       | N/A   |
|                             | 30/04/2022 |                       |           |        |       |       |       |       |       | N/A   |
| Visit 2                     | 18/05/2022 | 2                     |           |        | 2     |       |       | 53    | 9     | 66    |
|                             | 19/05/2022 |                       |           |        |       |       |       | 80    | 4     | 84    |

|              | Date              | Number Passes/Species |               |          |           |           |          |             |             |             |
|--------------|-------------------|-----------------------|---------------|----------|-----------|-----------|----------|-------------|-------------|-------------|
|              |                   | E ser                 | Myoti<br>s sp | N leis   | N noc     | P aur     | P nat    | P pip       | P pyg       | Total       |
|              | SM<br>Malfunction |                       |               |          |           |           |          |             |             | N/A         |
|              | SM<br>Malfunction |                       |               |          |           |           |          |             |             | N/A         |
| Visit 3      | 13/06/2022        |                       |               |          |           |           |          | 93          | 7           | 100         |
|              | 14/06/2022        | 1                     |               |          |           | 1         |          | 274         | 9           | 285         |
|              | 15/06/2022        |                       |               | 1        |           | 3         |          | 85          | 6           | 95          |
|              | 16/06/2022        |                       |               |          | 1         |           |          | 201         | 15          | 217         |
| Visit 4      | 19/07/2023        |                       |               |          | 1         |           |          | 28          | 101         | 130         |
|              | 20/07/2023        | 1                     |               |          |           | 1         |          | 67          | 52          | 121         |
|              | 21/07/2023        |                       |               | 1        |           |           | 1        | 227         | 263         | 492         |
|              | 22/07/2023        |                       |               |          |           |           |          | 223         | 430         | 653         |
|              | 23/07/2023        |                       |               |          | 6         |           |          | 194         | 251         | 451         |
|              | 24/07/2023        |                       |               |          |           |           |          | 125         | 143         | 268         |
| Visit 5      | 16/08/2022        |                       |               |          |           |           |          | 9           | 6           | 15          |
|              | 17/08/2022        |                       |               |          | 1         |           |          | 96          | 9           | 106         |
|              | 18/08/2022        |                       |               |          | 2         | 1         |          | 52          | 7           | 62          |
|              | 19/08/2022        |                       |               |          | 1         |           |          | 28          | 10          | 39          |
|              | 20/08/2022        |                       |               |          |           |           |          | 11          | 9           | 20          |
|              | 21/08/2022        |                       |               |          |           |           |          | 6           | 2           | 8           |
| Visit 6      | 12/09/2022        |                       |               |          | 16        |           |          | 86          | 6           | 108         |
|              | 13/09/2022        |                       | 1             |          | 1         | 4         |          | 108         | 43          | 157         |
|              | 14/09/2022        |                       | 1             |          |           |           |          | 815         | 33          | 849         |
|              | 15/09/2022        |                       | 2             |          |           | 1         |          | 533         | 21          | 557         |
|              | 16/09/2022        |                       |               |          |           | 1         |          | 3           |             | 4           |
| Visit 7      | 04/10/2022        |                       |               |          | 1         |           |          | 4           | 7           | 12          |
|              | 05/10/2022        |                       |               | 1        |           | 3         |          | 27          | 11          | 42          |
|              | 06/10/2022        |                       |               |          | 1         |           |          | 2           | 3           | 6           |
|              | 07/10/2022        |                       | 1             | 1        |           |           |          | 5           | 10          | 17          |
|              | 08/10/2022        |                       |               |          |           |           |          | 3           |             | 3           |
| <b>Total</b> |                   | <b>4</b>              | <b>5</b>      | <b>4</b> | <b>33</b> | <b>15</b> | <b>1</b> | <b>3438</b> | <b>1467</b> | <b>4967</b> |

**Table 28: Number of passes per species at SM2**

|         | Date       | Number Passes/Species |           |        |       |       |       |       |       | Total |
|---------|------------|-----------------------|-----------|--------|-------|-------|-------|-------|-------|-------|
|         |            | E ser                 | Myotis sp | N leis | N noc | P aur | P nat | P pip | P pyg |       |
| Visit 1 | 27/04/2022 |                       |           |        |       |       |       | 40    | 3     | 43    |
|         | 28/04/2022 |                       |           |        |       |       |       | 217   | 11    | 228   |
|         | 29/04/2022 |                       |           |        |       |       |       | 103   | 4     | 107   |
|         | 30/04/2022 |                       |           |        |       |       |       | 317   | 32    | 349   |
| Visit 2 | 18/05/2022 |                       |           |        | 4     |       | 11    | 304   | 19    | 338   |
|         | 19/05/2022 |                       |           |        |       |       | 7     | 519   | 5     | 531   |
|         | 20/05/2022 |                       |           |        | 14    | 1     | 7     | 1337  | 8     | 1367  |
|         | 21/05/2022 |                       |           |        | 15    | 3     | 6     | 1356  | 6     | 1386  |
|         | 22/05/2022 |                       |           |        | 20    |       | 5     | 414   | 6     | 445   |
| Visit 3 | 13/06/2022 |                       |           |        |       |       | 7     | 224   | 4     | 235   |
|         | 14/06/2022 |                       |           |        | 1     | 1     | 9     | 361   | 19    | 391   |
|         | 15/06/2022 |                       |           | 1      | 1     |       | 2     | 475   | 6     | 485   |
|         | 16/06/2022 | 1                     | 1         |        |       |       |       | 289   | 12    | 303   |
|         | 17/06/2022 |                       |           | 2      | 2     | 1     | 4     | 310   | 6     | 325   |
| Visit 4 | 19/07/2022 | 1                     |           |        |       |       |       | 72    | 3     | 130   |
|         | 20/07/2022 |                       |           |        | 7     |       |       | 643   | 35    | 121   |
|         | 21/07/2022 |                       |           |        |       |       |       | 581   | 26    | 492   |
|         | 22/07/2022 |                       |           |        |       |       |       | 105   | 1     | 653   |
| Visit 5 | 15/08/2022 |                       |           |        |       |       |       | 12    |       | 12    |
|         | 16/08/2022 |                       |           |        | 4     |       |       | 246   | 15    | 265   |
|         | 17/08/2022 |                       | 1         |        |       |       |       | 422   | 17    | 440   |
|         | 18/08/2022 | 2                     | 2         |        | 8     | 1     |       | 560   | 35    | 608   |
|         | 19/08/2022 |                       |           |        |       |       |       | 15    | 9     | 24    |
| Visit 6 | 12/09/2022 |                       | 23        |        | 12    | 4     |       | 283   | 163   | 485   |
|         | 13/09/2022 |                       | 8         |        | 2     | 4     |       | 523   | 170   | 707   |
|         | 14/09/2022 |                       | 25        | 2      | 4     | 7     |       | 197   | 58    | 293   |
|         | 15/09/2022 |                       | 24        |        | 2     | 5     |       | 138   | 36    | 205   |
| Visit 7 | 03/10/2022 |                       | 1         |        |       | 1     |       | 67    | 23    | 92    |
|         | 04/10/2022 |                       |           |        | 5     | 1     |       | 523   | 67    | 596   |
|         | 05/10/2022 |                       |           |        | 5     |       |       | 173   | 59    | 237   |
|         | 06/10/2022 |                       | 1         |        | 3     | 1     |       | 251   | 49    | 305   |
|         | 07/10/2022 |                       |           |        |       | 1     |       | 146   | 30    | 177   |
| Total   |            | 4                     | 86        | 5      | 109   | 31    | 58    | 11223 | 937   | 12375 |

**Table 29: Weather conditions during the static monitoring**

|         | Date       | Sunset time | Sunrise time (following day) | Temp sunset (°C) | Min Temp (°C) | Rainfall (mm) | Wind   |
|---------|------------|-------------|------------------------------|------------------|---------------|---------------|--------|
| Visit 1 | 27/04/2022 | 20:19       | 05:41                        | 12               | 7             | 0             | <10mph |
|         | 28/04/2022 | 20:21       | 05:39                        | 10               | 2             | 0             | <10mph |
|         | 29/04/2022 | 20:23       | 05:37                        | 10               | -2            | 0             | <5mph  |
|         | 30/04/2022 | 20:24       | 05:35                        | 12               | 8             | 0             | <5mph  |
|         | 01/05/2022 | 20:26       | 05:33                        | 10               | 8             | 0             | <5mph  |
| Visit 2 | 18/05/2022 | 20:53       | 05:06                        | 17               | 13            | 0             | <10mph |
|         | 19/05/2022 | 20:54       | 05:04                        | 13               | 11            | 0             | <5mph  |
|         | 20/05/2022 | 20:56       | 05:03                        | 13               | 9             | 0             | <10mph |
|         | 21/05/2022 | 20:57       | 05:02                        | 12               | 7             | 0             | <5mph  |
|         | 22/05/2022 | 20:58       | 05:01                        | 13               | 9             | 0             | <5mph  |
| Visit 3 | 13/06/2022 | 21:20       | 04:46                        | 15               | 7             | 0             | <10mph |
|         | 14/06/2022 | 21:21       | 04:45                        | 16               | 6             | 0             | <5mph  |
|         | 15/06/2022 | 21:22       | 04:45                        | 18               | 11            | 0             | <5mph  |
|         | 16/06/2022 | 21:22       | 04:45                        | 19               | 14            | 0             | <5mph  |
|         | 17/06/2022 | 21:23       | 04:45                        | 21               | 15            | 0             | <5mph  |
| Visit 4 | 19/07/2022 | 21:09       | 05:10                        | 25               | 18            | 0             | <15mph |
|         | 20/07/2022 | 21:08       | 05:11                        | 20               | 13            | 0             | <10mph |
|         | 21/07/2022 | 21:07       | 05:12                        | 20               | 16            | 0             | <10mph |
|         | 22/07/2022 | 21:06       | 05:14                        | 19               | 14            | 0             | <5mph  |
|         | 23/07/2022 | 21:04       | 05:15                        | 19               | 17            | 0             | <10mph |
|         | 24/07/2022 | 21:03       | 05:17                        | 19               | 17            | 0             | <10mph |
| Visit 5 | 15/08/2022 | 20:25       | 05:50                        | 25               | 17            | 0             | <10mph |
|         | 16/08/2022 | 20:24       | 05:52                        | 21               | 13            | 0             | <5mph  |
|         | 17/08/2022 | 20:22       | 05:53                        | 18               | 17            | 0             | <5mph  |
|         | 18/08/2022 | 20:19       | 05:55                        | 21               | 18            | 0             | <10mph |
|         | 19/08/2022 | 20:17       | 05:56                        | 20               | 12            | 0             | <5mph  |
|         | 20/08/2022 | 20:15       | 05:58                        | 20               | 13            | 0             | <10mph |
|         | 21/08/2022 | 20:13       | 06:00                        | 20               | 11            | 0             | <10mph |
| Visit 6 | 12/09/2022 | 19:25       | 06:35                        | 22               | 15            | 0             | <5mph  |
|         | 13/09/2022 | 19:22       | 06:36                        | 16               | 15            | 6.1           | <10mph |
|         | 14/09/2022 | 19:20       | 06:38                        | 19               | 10            | 0             | <10mph |

|         | Date       | Sunset time | Sunrise time (following day) | Temp sunset (°C) | Min Temp (°C) | Rainfall (mm) | Wind   |
|---------|------------|-------------|------------------------------|------------------|---------------|---------------|--------|
|         | 15/09/2022 | 19:18       | 06:39                        | 15               | 7             | 0             | <10mph |
|         | 16/09/2022 | 19:15       | 06:41                        | 15               | 3             | 0             | <5mph  |
| Visit 7 | 03/10/2022 | 18:37       | 07:08                        | 15               | 12            | 0             | <5mph  |
|         | 04/10/2022 | 18:34       | 07:10                        | 16               | 16            | 0             | <20mph |
|         | 05/10/2022 | 18:32       | 07:12                        | 14               | 6             | 0             | <15mph |
|         | 06/10/2022 | 18:30       | 07:13                        | 16               | 12            | 0             | <15mph |
|         | 07/10/2022 | 18:27       | 07:15                        | 16               | 7             | 0             | <10mph |
|         | 08/10/2022 | 18:25       | 07:17                        | 15               | 2             | 0             | <5mph  |

### Conservation status and impacts on bats using the site

In both the transects and the static monitoring surveys common pipistrelle was the most frequently recorded bat 69.7% activity during the transects and 84.5% of activity during the static monitoring. Common pipistrelle is the second most common species of bat in Britain with an estimated population size of 3.04 million (Mathews *et al.*, 2018). They are widespread and known to breed across Berkshire (Andrews, 2021).

Soprano pipistrelle was the second most frequently recorded species during the transects and static monitoring (14.9% of activity on the transects and 13.9% of activity recorded during the static monitoring). Soprano pipistrelle is one of the most common species of bat in Britain with an estimated population size of 4.6 million (Mathews *et al.*, 2018) and are known to utilise a wide variety of habitats. They are widespread and known to breed across Berkshire occurring in all districts. Within the county they have been associated with habitats close to water (Andrews, 2021).

Nathusius' pipistrelle was not recorded during the transects but was recorded at both locations during the static monitoring (0.3% of total SM activity). Nationally there have been 2689 captures of Nathusius' pipistrelle. It is unknown if they breed in Berkshire but they are considered to be widespread across the county (Andrews, 2021).

In addition to the above 2.2% of activity recorded during the transect surveys was from Pipistrelle species that could not be identified to species level.

Noctule activity accounted for 10.1% of activity on the transect and 0.8% of activity during the static monitoring. There is an estimated population of 565,000 in Britain (Mathews *et al.*, 2018). They are known to breed in Berkshire and have a distribution heavily biased to the centre of the county around the area which includes Wokingham (Andrews, 2021).

Brown long-eared bat was not recorded during the transects but accounted for 0.3% of the SM activity. Brown long-eared bats have a wide distribution in Britain with a population estimated at 943,000 (Mathews *et al.*, 2018). They are known to breed in Berkshire and are widespread across the county (Andrews, 2021).

One pass of Leisler's bat was recorded during the transects 0.4% of activity and accounted for 0.05% of activity recorded during the static monitoring. Leisler's bat have a patchy distribution across southern England with a population estimated to be 24,000 - 40,000 (Mathews et al., 2018). There are no records of Leisler's bat breeding in Berkshire but there are acoustic records mostly from the centre of the county including Wokingham (Andrews, 2021).

Serotine bats were only recorded in the static monitoring and account for 0.04% of activity. Nationally serotine is restricted to southern England and parts of Wales with a population estimated at 136,000 (Mathews et al., 2018). Serotine is known to breed in Berkshire and is widespread across the county (Andrews, 2021).

The species group "Myotis sp." comprises six different resident Myotis species found in the UK. To reliably identify these to species level they need to be caught and identified in hand. Of the Myotis species five are known to be present in Berkshire (Natter's Bat, Daubenton's bat, Bechstein's bat, Whiskered bat, and Brandt's bat). Overall Myotis activity accounted for 1.8% of activity during the transects and 0.5% of activity during the static monitoring. Of the Myotis species present in Berkshire the most common are Natterer's bat and Daubenton's bat both of which are known to breed and are widespread across the county (Andrews, 2021) and have populations in Britain of >400,000 (Natterer's bat) and >1 million (Daubenton's bat) (Mathews et al., 2018). Whiskered bats are not known in the Wokingham (Andrews, 2021), Bechstein's bat have only been recorded at one site in Remenham in Berkshire (Andrews, 2021) and there are only three contemporary records of Brandt's bat in Berkshire none of which are from the Arborfield area (Andrews, 2021) it is therefore considered unlikely that these three species were recorded during the surveys.

The majority of habitat features (such as the mature scrub and hedgerows withing the site) that bats were recorded using during the surveys are proposed to be retained and suitable commuting and foraging habitat for bats is proposed in the form of tree, scrub, hedgerow and grassland creation within the landscaping plans. Key dark zones for bats are shown on Figure 12.

Across the site and survey area the majority of bat activity was recorded in the area which is proposed to become Suitable Alternative Natural Greenspace (SANG). Whilst the SANG will be used by residents of the new development and from the surrounding area for recreational purposes, including dog walking, the SANG will not contain street lighting and therefore will be unlikely to be used for recreation at night when bats are active and therefore bats will continue to use this area for commuting and foraging. Some habitat enhancement measures proposed both within the SANG and development area including areas of woodland, scrub, pond and grassland creation will enhance the foraging opportunities on the site. Within the development area the majority of commuting features such as hedgerows and lines of trees will be retained which will ensure the continuation of commuting pathways around the site.

Given the majority of bat species using the site are widespread within the UK and Berkshire the site is considered to have local importance to bats. The majority of habitats impacted by the development are of limited suitability for bats (modified grassland) and within the proposed landscaping areas will be enhanced. There is also opportunity within the detailed design of the housing areas to include measures to enhance the roosting habitat on site through the provision of bat bricks/boxes. It is therefore concluded that the development will have a neutral impact on bats using the site.

- Andrews, C. (2021). Review of the Status of Bats in Berkshire 2020. A report by CA Ecology on Behalf of Wokingham Borough Council.
- Mathews, F., Kubasiewicz, L. M., Gurnell, J., Harrower, C. A., Macdonald, R. A. & Shore, R.F. 2018. A Review of the Population and Conservation Status of British Mammals. A report by the

Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage, Peterborough, Natural England.