



# One Earth Solar Farm

**Volume 6.0 Environmental Statement [EN010159]**

**Volume 3: Technical Appendices Supporting ES Volume 2**

**Appendix 6.5: Breeding Bird Baseline**

**February 2025**

Document Reference: EN010159/APP/6.21

Revision 01

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009  
- Reg 5 (2) (a)

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## A.6 Appendix 6.5: Breeding Bird Baseline

### A.6.1 Introduction

#### Background

- A.6.1.1. This Appendix should be read in conjunction with Chapter 6 of the Environmental Statement (ES) which is provided in support of the delivery of an Environmental Impact Assessment (EIA) associated with the One Earth Solar Farm, hereafter referred to as the 'Proposed Development'.
- A.6.1.2. This Appendix describes the survey methodologies used and summarised the results of the breeding bird surveys undertaken in 2023 within the then proposed Order Limits; with emphasis on open farmland habitats including those containing complex ditch and hedgerow networks that have the potential to support important populations of breeding birds.

#### Purpose of this appendix

- A.6.1.3. The purpose of the Appendix is to present the results of the breeding bird survey which was undertaken to identify and assess the assemblage of breeding birds potentially impacted by the Proposed Development.
- A.6.1.4. Surveys were completed within the breeding period between May and July in 2023 (where breeding species are most likely to be encountered) following an adapted method based on the British Trust for Ornithology's (BTO's) Common Bird Census (CBC) methodology (Gilbert *et al.*, 1998).
- A.6.1.5. The breeding bird surveys were designed to identify the distribution, density and activities of breeding birds within an appropriate sampling area within the Order Limits. This sampling area targeted habitats representative of the Order limits that are likely to support breeding bird assemblages. Following the completion of the breeding bird surveys, evolution of the Proposed Development design has removed some of the sampled area from the Order Limits.

#### Structure of this appendix

- A.6.1.6. This appendix is structured as follows:
- > Section 2: Methods;
  - > Section 3: Results;
  - > Section 4: References;
  - > Annex A: Figures;
  - > Annex B: Species recorded during the breeding bird survey;

- > Annex C: Full survey details; and
- > Annex D: Territory mapping criteria.

## A.6.2 Methods

### Desk Study

- A.6.2.1. An environmental desk study was undertaken to identify statutory designated sites of international and national importance for ornithology within 10km of the proposed Order Limits, and non-statutory designated sites of ornithological importance within 2km of it. The search for statutory sites was carried out using the Multi-Agency Geographic Information for the Countryside (MAGIC) website (an internet-based Geographic Information Systems database provided by the Department for Environment, Foods and Rural Affairs (DEFRA) (Defra, 2024)) and for non-statutory sites through a data request to Greater Lincolnshire Nature Partnership (GLNP) and Nottinghamshire Biological and Geological Records Centre (NBGR). Information on statutory designated sites was gathered from the websites of Natural England (Natural England, 2024) and the Joint Nature Conservation Committee (JNCC) (JNCC, 2024).
- A.6.2.2. In addition to information on designated sites, species specific data was gathered from GLNP and NBGR within 2km of the proposed Order Limits.

### Breeding bird surveys

- A.6.2.3. Breeding bird surveys were undertaken between May and July 2023 inclusive. The purpose of the breeding bird survey was to collect data to confirm the typical distribution and assemblages of species present within the area surveyed (See **Section 3.1**).

### Data collection locations

- A.6.2.4. The survey adopted a sampling approach and focused on large areas of accessible land within which the breeding bird assemblage has the potential to be impacted by the proposed development. The survey area covered 633 hectares (ha) of the 1478 ha of land available at the time of survey. The survey area covered large areas of open farmland, ditch, and hedgerow complexes on both sides of the river Trent, woodland edge habitats (east of the river Trent) and linear features including the river Trent corridor and the embankment of the dismantled railway line that runs east-west through the Site serving as a functional Sustrans Route (647). The survey was undertaken based on the proposed Order Limits, plus a 50m buffer, where the survey areas directly overlapped Order Limits, information was gathered for birds outside of the Order Limits.
- A.6.2.5. For the purposes of the breeding bird survey, this area was divided into five survey areas. These survey areas received systematic coverage with surveys

undertaken by a single surveyor to avoid duplication of counting or overlap of adjacent area recordings (**Figures 2.1 to 2.1e, Annex A**). Data from all survey areas was combined for reporting purposes.

- A.6.2.6. Area 1: lies within the northwest of the Site boundary and includes areas of open farmland (with predominantly large rectangular fields), divided in places by narrow hedgerows and ditches. This area covers approximately 136 ha of land adjacent to the Sustrans route 647, northwest of the National Grid substation at High Marnham. The area is dominated by cereal crop production including wheat and oil seed rape.
- A.6.2.7. Area 2: abuts Area 1 to the southeast and continues south and eastwards from the hamlet of Ragnall toward Fledborough. This area covers approximately 168 ha and consists of a large expanse of agricultural crop fields including examples of the largest agricultural fields within the Order Limits. These large fields were predominantly used for wheat and oil seed rape production with boundary features of hedgerows and overgrown ditches also present. The area includes a agricultural land considered as coastal floodplain grassing marsh (on the priority habitat inventory) on the west of the river Trent. Three agricultural fields east of the river Trent are also within Area 2, these fields are set back from the Trent corridor to the north of a small off-site reservoir and west of the A1133 road. These fields are bordered by intact hedgerows and small treelines, which reach approximately 5 metres (m) high in places.
- A.6.2.8. Area 3: Consists of approximately 70 ha of agricultural fields directly east of the river Trent between the villages of South- and North Clifton. These large fields are bordered by linear features including hedgerows and ditches. To the immediate west of the Area is the river Trent, with Church Lane immediately east. These arable fields were cropping wheat, legumes and sports turf during the breeding bird survey period.
- A.6.2.9. Area 4: Includes two satellite parcels of agricultural land within the land east of the river Trent. The largest area, approximately 66 ha, lies immediately east of the river Trent on low-lying agricultural land used for crop production. This area includes fields north of Trent Lane between the river corridor escarpment to the east and the river to the west. This land was used for wheat production and also had a set-aside or sacrificial crop used for game cover. Along the eastern side of these fields there is a large pond and ditch network (the Sewer Dyke) which forms a transitional habitat from low-lying agricultural land into a scrub / wooded escarpment. The other parcel of land within Area 4 consists of 45 ha of agricultural cropland east of the A1133, located immediately north of the decommissioned railway (Sustrans Route 647).
- A.6.2.10. Area 5: Includes a large area of agricultural cropland in the northeast of the Site. The area covers approximately 148 ha. At the time of survey these field were cropping mixed cereals and root crops including wheat, oil seed rape, barley, potatoes, legumes, set-aside and sports turf. Well established hedgerows with trees form boundary features to major blocks of fields with

smaller defunct hedgerows and ditch systems also present on field edges. There were three small parcels of young plantation woodland within this area and three small stubble fields which had been ploughed through at the time of survey.

- A.6.2.11. Full survey details, including surveyor names, visit dates and times, and weather conditions are available in **Table C-1**, Annex C.

#### Data collection methods

- A.6.2.12. The surveys followed an adapted method based on the BTO's CBC methodology (Gilbert *et al.*, 1998), whereby the observer undertakes a census of all species present. The location of each bird detected (visually and / or aurally) was mapped using the standard two-character BTO codes, and bird activity was recorded using standard behaviour codes (Marchant, 1983).
- A.6.2.13. Survey visits were undertaken between May and July 2023, at broadly 10-day intervals from the previous visit.
- A.6.2.14. Six survey visits were undertaken during the 2023 breeding season: one in Mid-May, three in June (early, mid-month and late in the month) and two in July (Early and mid-month).
- A.6.2.15. All surveys were undertaken in favourable conditions, avoiding periods of heavy rain, or strong or cold winds, therefore minimising variation in bird activity levels due to weather conditions.
- A.6.2.16. Visits started at least half an hour after dawn and were completed no later than midday, with an exception during visit four (See Deviations, constraints, and limitations section (paragraphs 2.2.19 to 2.2.22)).
- A.6.2.17. A different route (start and end point) was used on each survey visit to ensure that certain parts of the survey area did not receive systematically better coverage due to a possible decline in song (or other breeding bird activity) output later in the morning.

#### Territory mapping

- A.6.2.18. On completion of the field survey, results were collated and analysed, and provided as maps of indicative territory centre-points, made across all visits within the survey period. Territory mapping analysis was based on criteria adapted from Amar *et al.* (2006) (See **Annex D**) and involved an experienced ornithologist looking for spatial groupings of song registrations.
- A.6.2.19. No temporal restrictions have been applied, such that any grouping within more than one visit represented, or consisting of at least one registration of song, has been assessed as a territory. These data have been used to determine the

number and distribution of species, and overall breeding assemblage within the survey area.

- A.6.2.20. As territory locations were derived from a combination of mapped visits (as per the CBC methodology (Gilbert *et al.*, 1998)); it should be noted that mapped territory locations represent indicative breeding territories and not specific nesting locations.

#### Deviations, constraints and limitations

- A.6.2.21. Surveys were conducted within a sampling area based on the potential for habitats within the Order Limits to provide breeding bird habitat. The sampling area focussed on areas with higher habitat diversity within the Order Limits to assess greater quality habitats for breeding birds and form a baseline (worst case scenario) that can be used to assess the potential impacts of the proposed development. In undertaking these surveys during the early stages of the Scheme, some areas subject to survey are no longer within the Order Limits. This represents a limitation and constraint to the overall breeding bird assessment of the scheme.
- A.6.2.22. During the field survey, there were deviations from the methodology during visits four, five and six within selected Areas; with surveys continuing beyond midday to ensure full survey coverage. During visit four in Area 5, surveys were completed by 12:45, with surveys in Area 2 completed by 14:45. During visit five in Areas 1 and 2 surveys were completed by 13:55, to avoid inclement and sub-optimal weather in the following days. During visit 6 in Area 2, surveys were completed by 13:30, 90 minutes after suggested timings. There were no deviations, constraints, or limitations within Areas 3 or 4.
- A.6.2.23. Surveys were conducted between May and July having commenced slightly later within the field season than would normally be considered appropriate (April – mid-June). However, given the habitats present within the Site and the continuation of surveys beyond mid-June to capture further breeding evidence and provide a robust evidence base for the breeding bird assemblage, it is not considered that this limitation has had a negative impact on the overall breeding bird assessment.
- A.6.2.24. Despite the deviation, constraints and limitations describe above, the dataset is considered to provide a robust approximation of the breeding bird assemblage within the survey area. This conclusion can be drawn as constraints and limitations faces within the breeding bird assessment were not extensive enough to negatively impact the territory mapping exercise undertaken following the completion of the surveys. Further the areas sampled as part of this assessment include the areas most likely to present increased species diversity and density therefore using these areas to extrapolate potential impacts on the overall breeding bird assemblage allows creation of a robust baseline. Expansive areas of open arable land which were not subject to breeding bird survey are considered to be of limited importance to breeding birds due to the



homogeneity of the habitats and lack of suitable nesting cover within woody vegetation.

### **A.6.3 Results**

#### **Statutory designated sites of ornithological importance**

- A.6.3.1. There are no nationally or internationally statutory designated sites of ornithological importance within 10km of the Order Limits.

#### **Non-statutory designated sites of ornithological importance**

- A.6.3.2. There are no non-statutory designated sites of ornithological importance within 2km of the Order Limits.

#### **Species records**

- A.6.3.3. As part of the environmental desk study, species data for birds likely to be breeding within, or in proximity to the Order Limits was gathered from GLNP and NBGR. Species data was screened to include all records within the breeding season (here considered to be 1<sup>st</sup> March – 31<sup>st</sup> August inclusive) from within the last ten years.
- A.6.3.4. The desk study returned 40 records of 19 species considered to be notable<sup>1</sup> during the breeding season, including:
- > Six Schedule 1 listed species – barn owl, corncrake, hobby, kingfisher, marsh harrier and red kite.
  - > 11 Species of Principal Importance (SPI) (Natural Environment and Rural Communities Act (NERC), 2006) – bullfinch, corncrake, cuckoo, house sparrow, lapwing, linnet, reed bunting, skylark, song thrush, yellowhammer, and yellow wagtail.

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<sup>1</sup> The desk study returned records of birds considered notable if listed as local priority species (Listed as UK Biodiversity Action Plan (UK BAP) species), protected by Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) or priority species listed on Birds of Conservation Concern 5 – Red List.



- > Nine birds of conservation concern<sup>2</sup> (BoCC) Red-listed species – corncrake, cuckoo, house sparrow, lapwing, linnet, skylark, swift, yellowhammer, and yellow wagtail.

A.6.3.5. Further details of the desk study records can be found within Appendix 6-2 (Document Reference: Ecology Desk Study).

### Breeding bird survey

A.6.3.6. A total of thirty-nine species were recorded breeding or holding territory during the breeding bird survey (See **Figures 3.1a to 3.1m, Annex A**), of which:

- > Three species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended): barn owl, hobby and quail.
- > Ten species listed as SPI: dunnock, grey partridge, house sparrow, linnet, reed bunting, skylark, song thrush, turtle dove, yellowhammer, and yellow wagtail.
- > Nine species recorded as BoCC red-listed species: greenfinch, grey partridge, house martin, house sparrow, linnet, skylark, turtle dove, yellowhammer, and yellow wagtail.

A.6.3.7. **Table 3.1**, below, presents the total number of territories for each species within the survey area, along with any legislative protection or conservation status.

*Table 3-1 – Territory assemblage recorded during breeding bird surveys*

BTO code	Species	Number of territories	Sch. 1 <sup>3</sup>	SPI <sup>4</sup>	BoCC <sup>2</sup>
BO	Barn owl	1	✓		Green
B.	Blackbird	28			Green

<sup>2</sup> BoCC Red list = The background to the establishment of a 'traffic light system' of conservation concern for UK birds is discussed in Gregory et al. (2002). The updated criteria and lists are detailed in Stanbury et al. (2021). Broadly, 'Red-listed' species include those that are globally threatened, have suffered a historical population decline in the UK (between 1800 and 1995) or which have experienced rapid declines in their UK breeding population or contractions in their UK range of more than 50% over the past twenty-five years. 'Amber-listed' species include any species on the European Red List (Critically Endangered, Endangered or Vulnerable), these are detailed in Stanbury et al. (2021).

<sup>3</sup> **Sch.1** = listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). These species are afforded additional levels of protection making it an offence to intentionally or recklessly disturb at, or near an 'active nest'. Schedule 1 protection extends to the nest, eggs, and dependent young of a Schedule 1 species.

<sup>4</sup> **SPI** = Species "of principal importance for the purpose of conserving biodiversity" covered under Section 41 (England) of the NERC Act (2006).

BTO code	Species	Number of territories	Sch. 1 <sup>3</sup>	SPI <sup>4</sup>	BoCC <sup>2</sup>
BC	Blackcap	10			Green
BT	Blue tit	2			Green
BZ	Buzzard	4			Green
C.	Carrion crow	2			Green
CH	Chaffinch	40			Green
CC	Chiffchaff	12			Green
CD	Collared dove	1			Green
D.	Dunnock	10		✓	Amber
GO	Goldfinch	5			Green
GT	Great tit	7			Green
GR	Greenfinch	5			Red
P.	Grey partridge	3		✓	Red
HY	Hobby	1	✓		Green
HM	House martin	3			Red
HS	House sparrow	12		✓	Red
K.	Kestrel	1			Amber
LW	Lesser whitethroat	1			Green
LI	Linnet	7		✓	Red
LO	Little owl	1			Green

BTO code	Species	Number of territories	Sch. 1 <sup>3</sup>	SPI <sup>4</sup>	BoCC <sup>2</sup>
MG	Magpie	1			Green
MA	Mallard	3			Amber
OC	Oystercatcher	3			Amber
PW	Pied wagtail	2			Green
Q.	Quail	2	✓		Amber
RB	Reed bunting	14		✓	Amber
R.	Robin	13			Green
SW	Sedge warbler	12			Green
S.	Skylark	98		✓	Red
ST	Song thrush	9		✓	Amber
SD	Stock dove	1			Amber
SL	Swallow	6			Green
TD	Turtle dove	1		✓	Red
WH	Whitethroat	39			Amber
WP	Woodpigeon	13			Amber
WR	Wren	55			Amber
Y.	Yellowhammer	29		✓	Red
YW	Yellow wagtail	7		✓	Red

- A.6.3.8. The breeding bird assemblage recorded within the survey area is typical of open farmland habitats with limited vegetative cover (aside from seasonal crop) to provide breeding cover. The species assemblage and overall abundance of breeding territories recorded is also typical of open farmland with a reduced species count and a low overall breeding density.
- A.6.3.9. There were noticeable increases in species diversity and abundance within well-established marginal features such as those found along the river Trent corridor, the escarpment along the east of the Trent and the woodland and scrub edges within the 50m buffer from the Order Limits. There were also notable increases in breeding bird activity around farmsteads and built infrastructure, with species including collared dove, house martin, house sparrow, little owl, pied wagtail, stock dove and swallow nesting within built up areas.
- A.6.3.10. Barn owl nested off-site within the outbuildings surrounding South Clifton.
- A.6.3.11. A full list of species observed during the breeding bird surveys is available in **Annex B.**

## A.6.4 References

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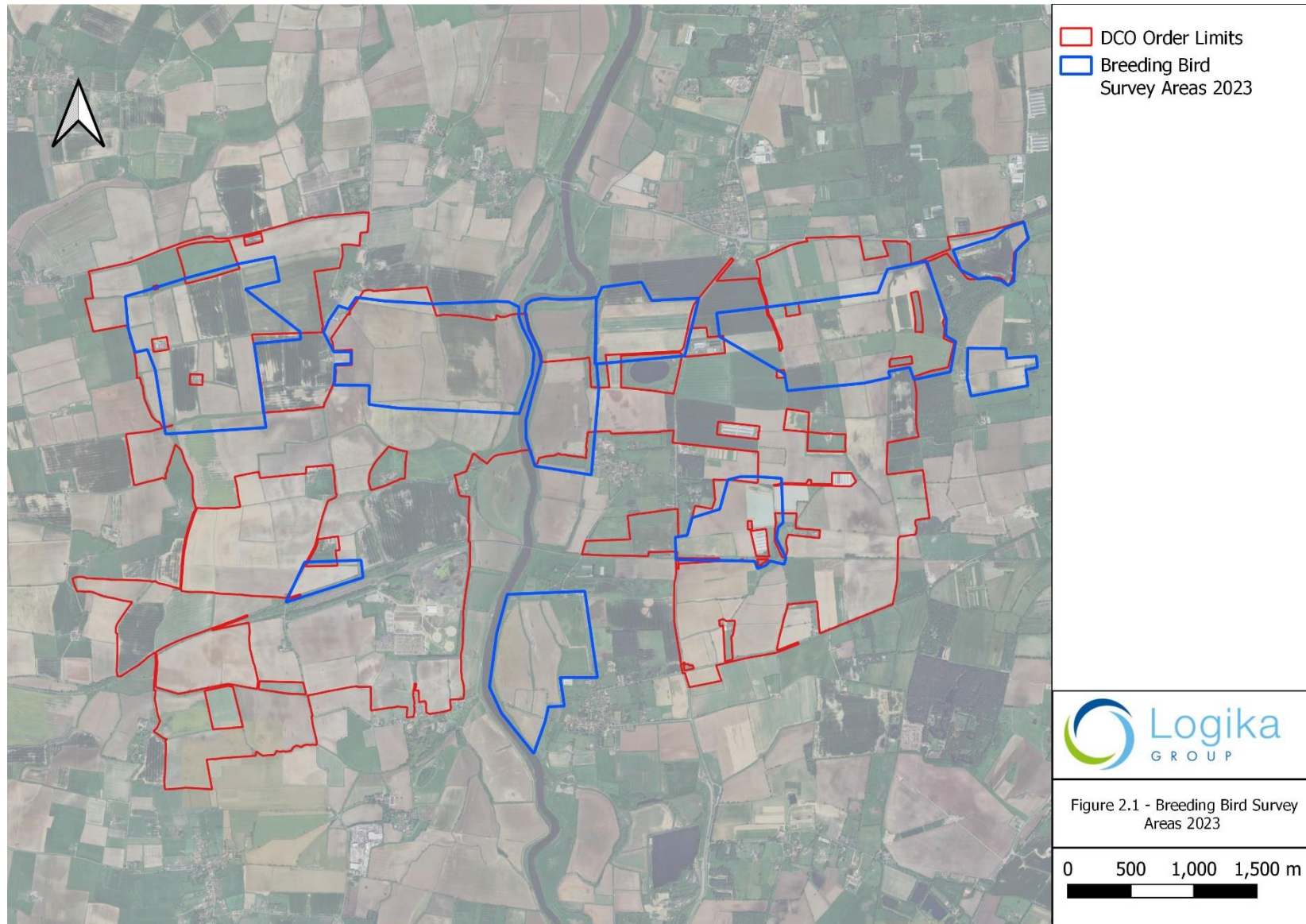
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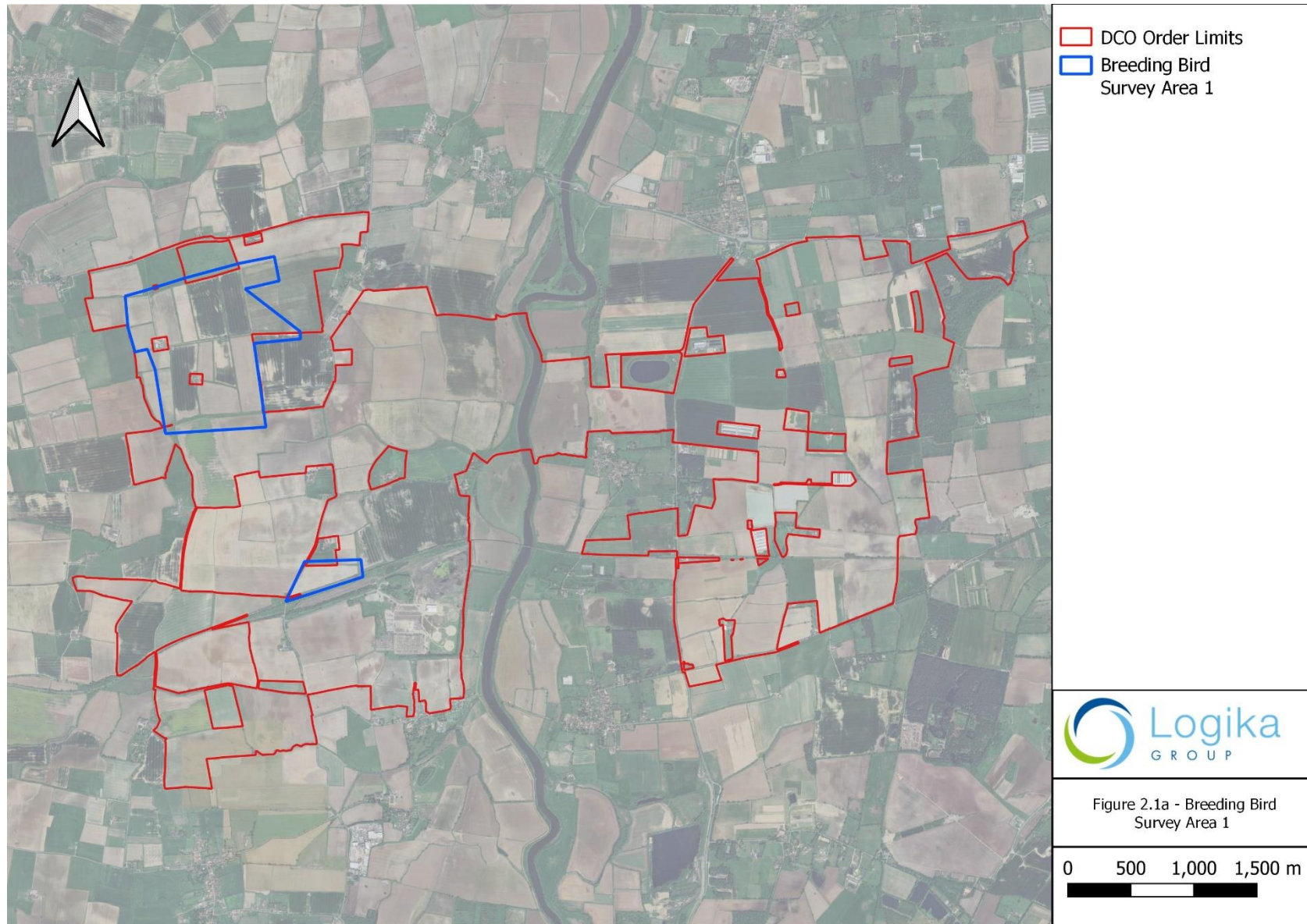
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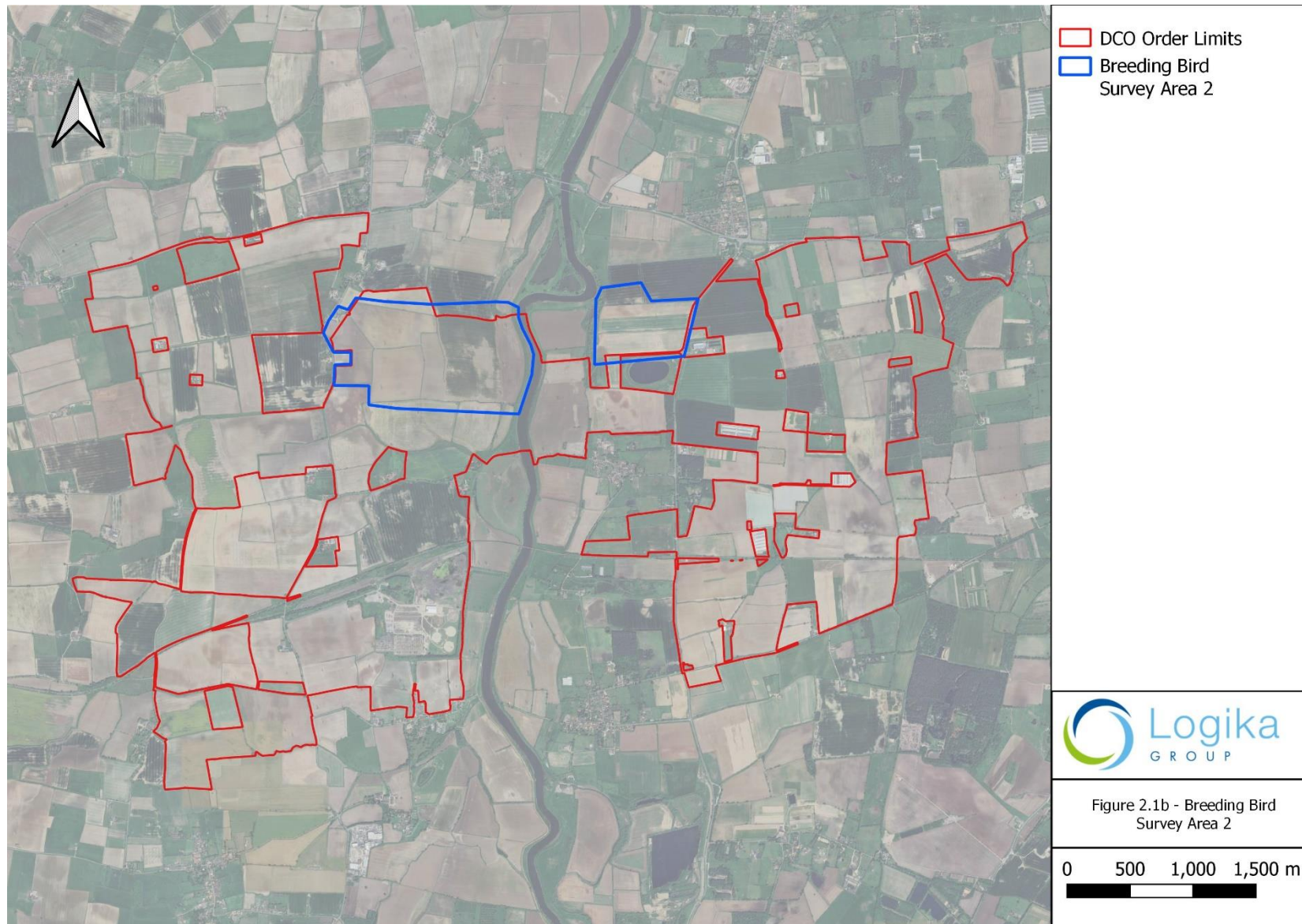
## A.6.5 Figures



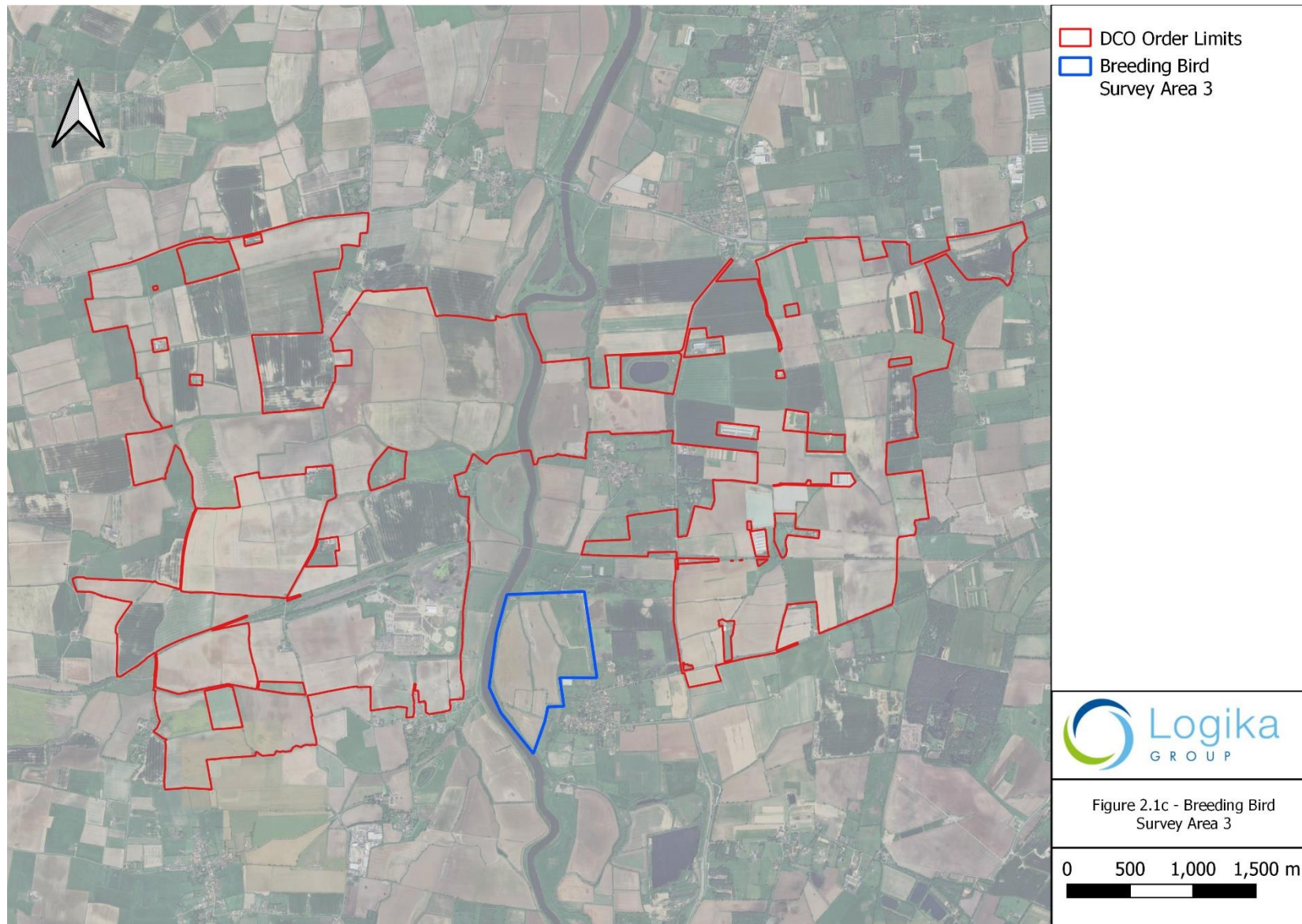


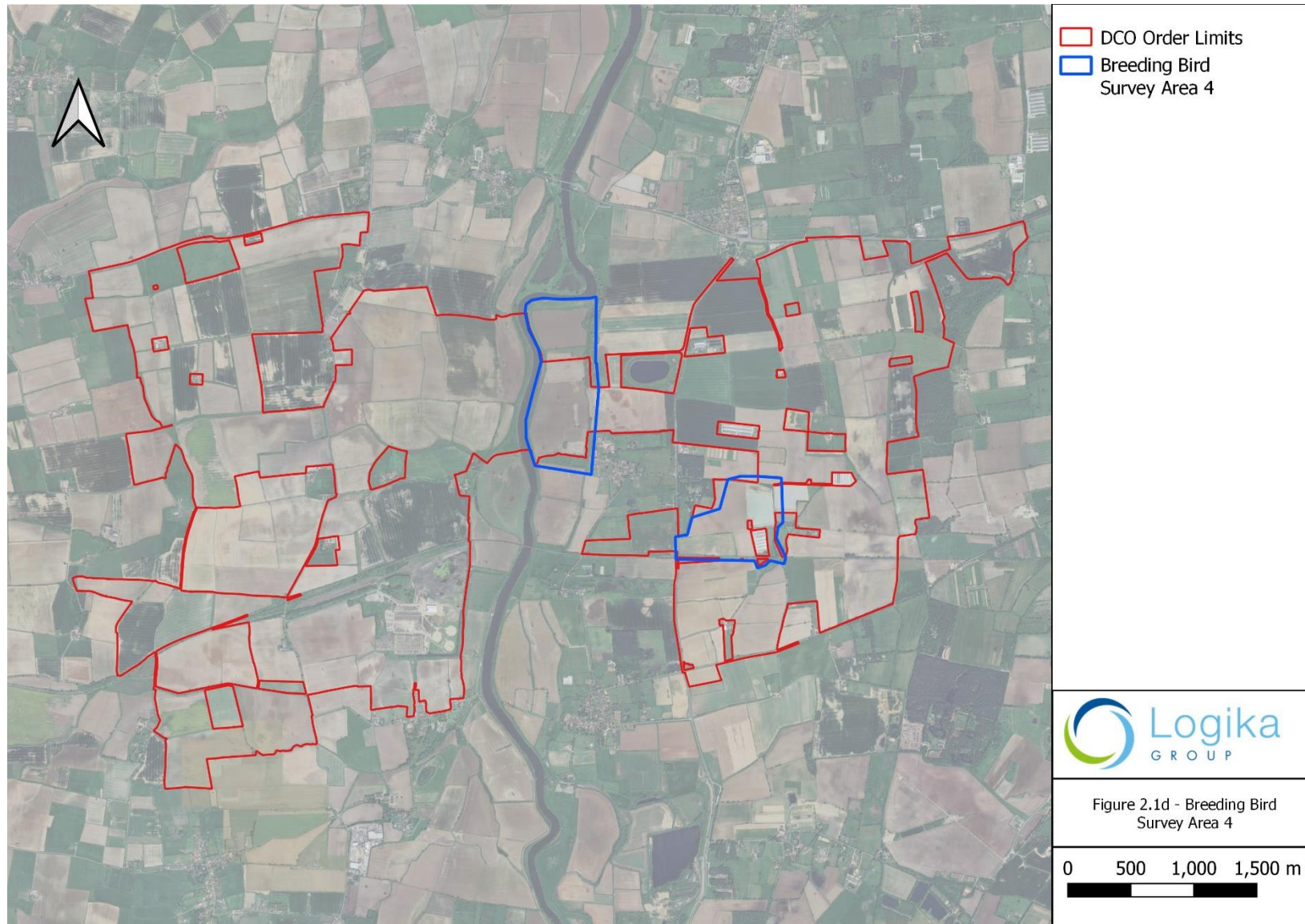




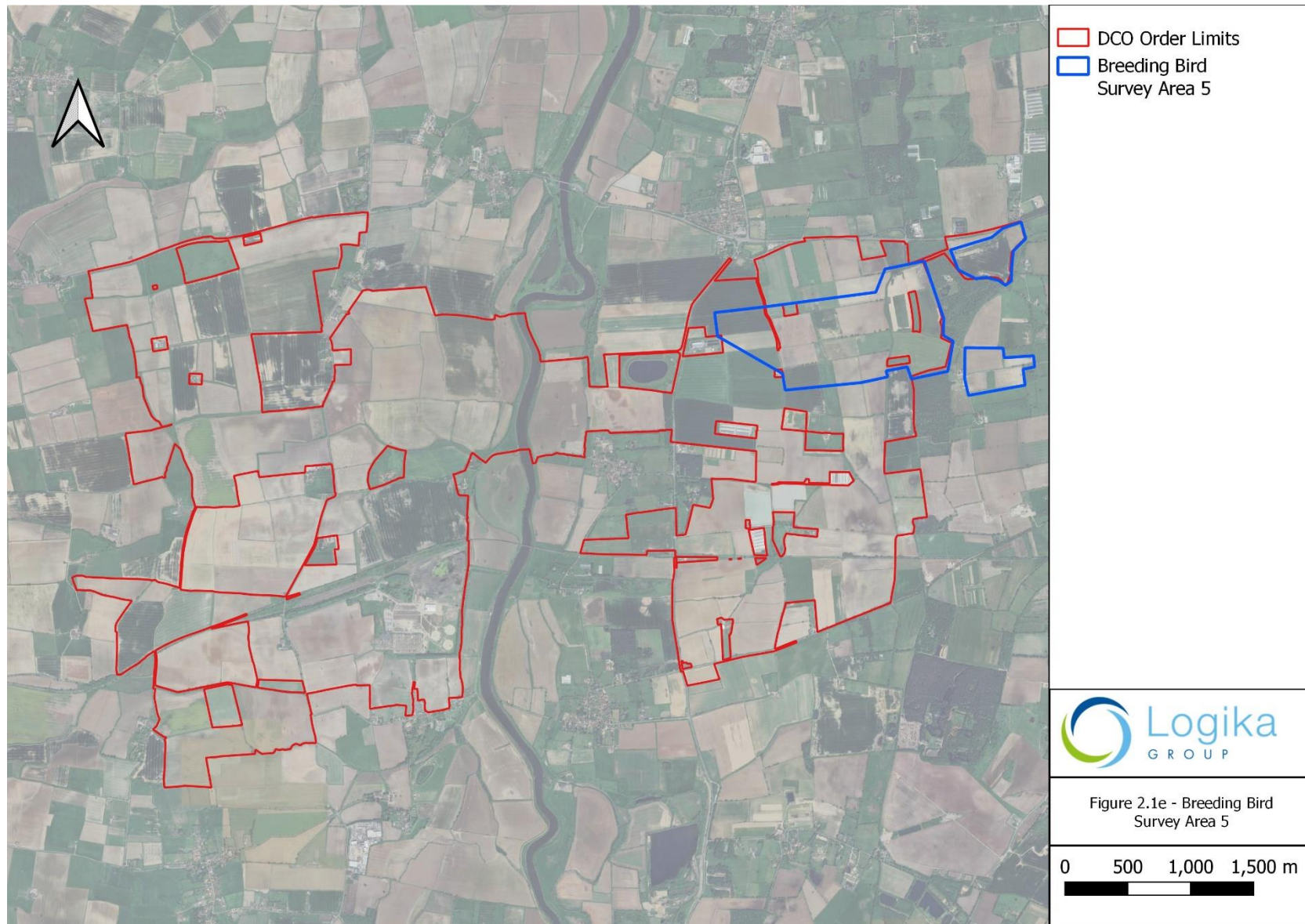


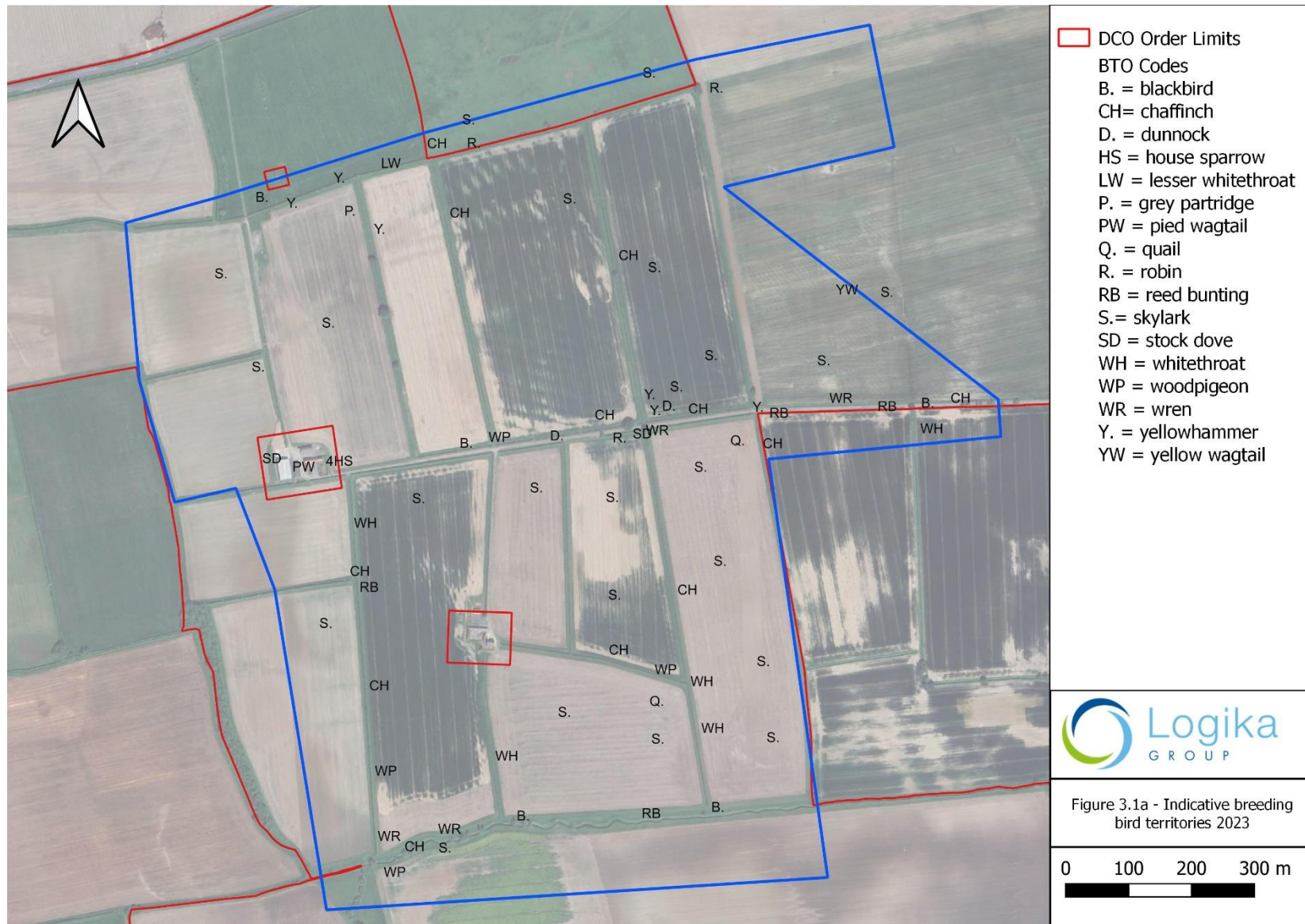




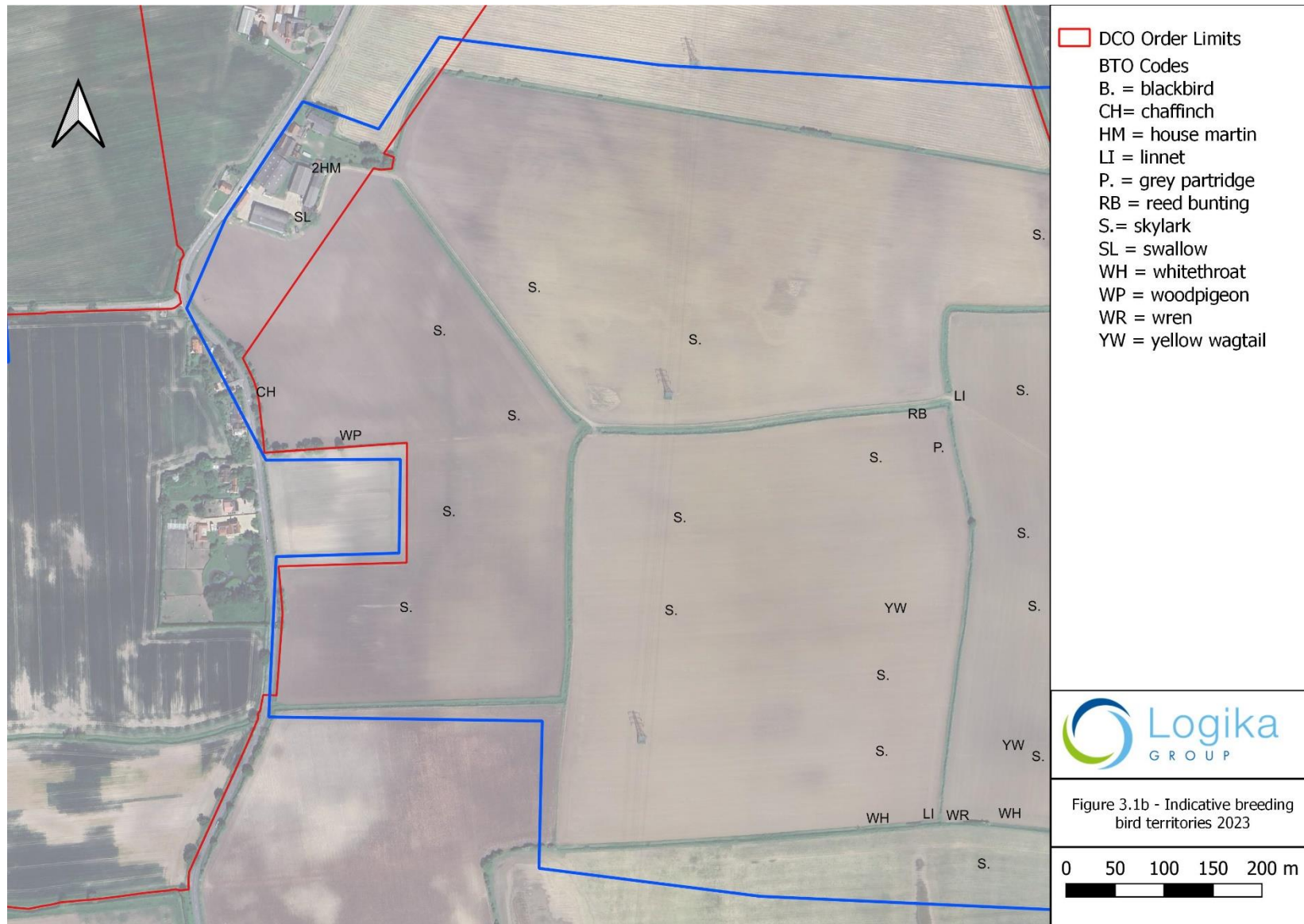




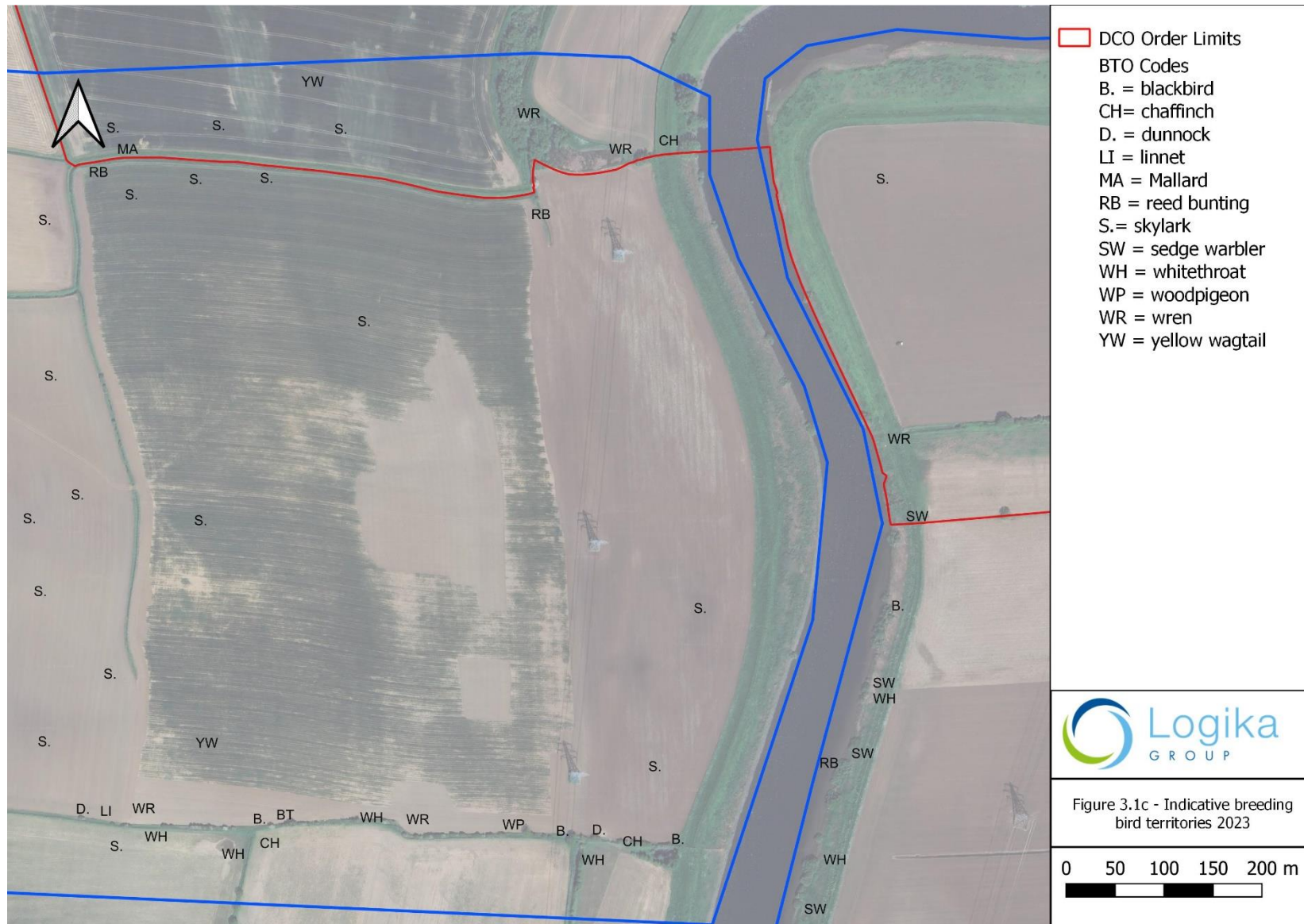


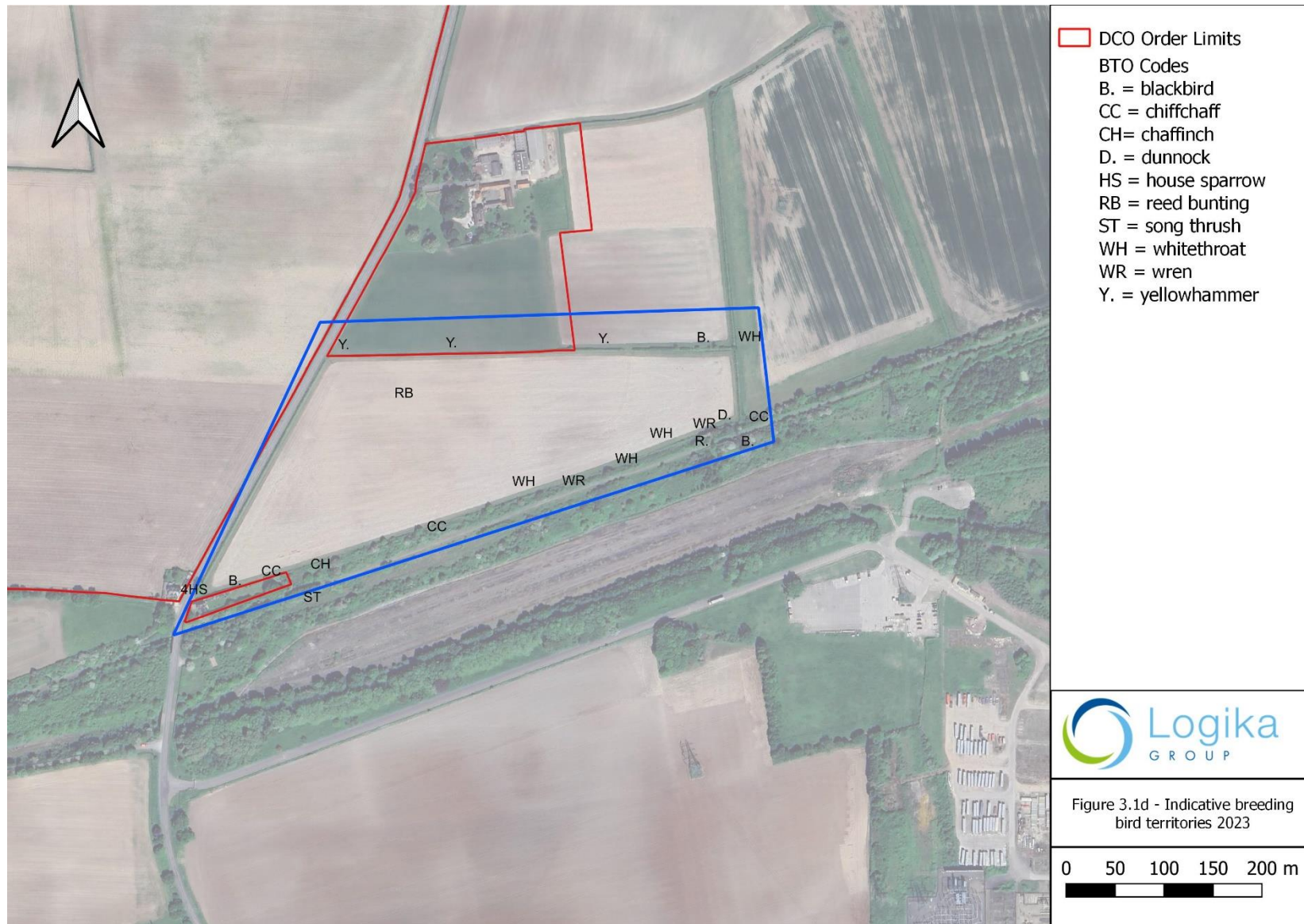




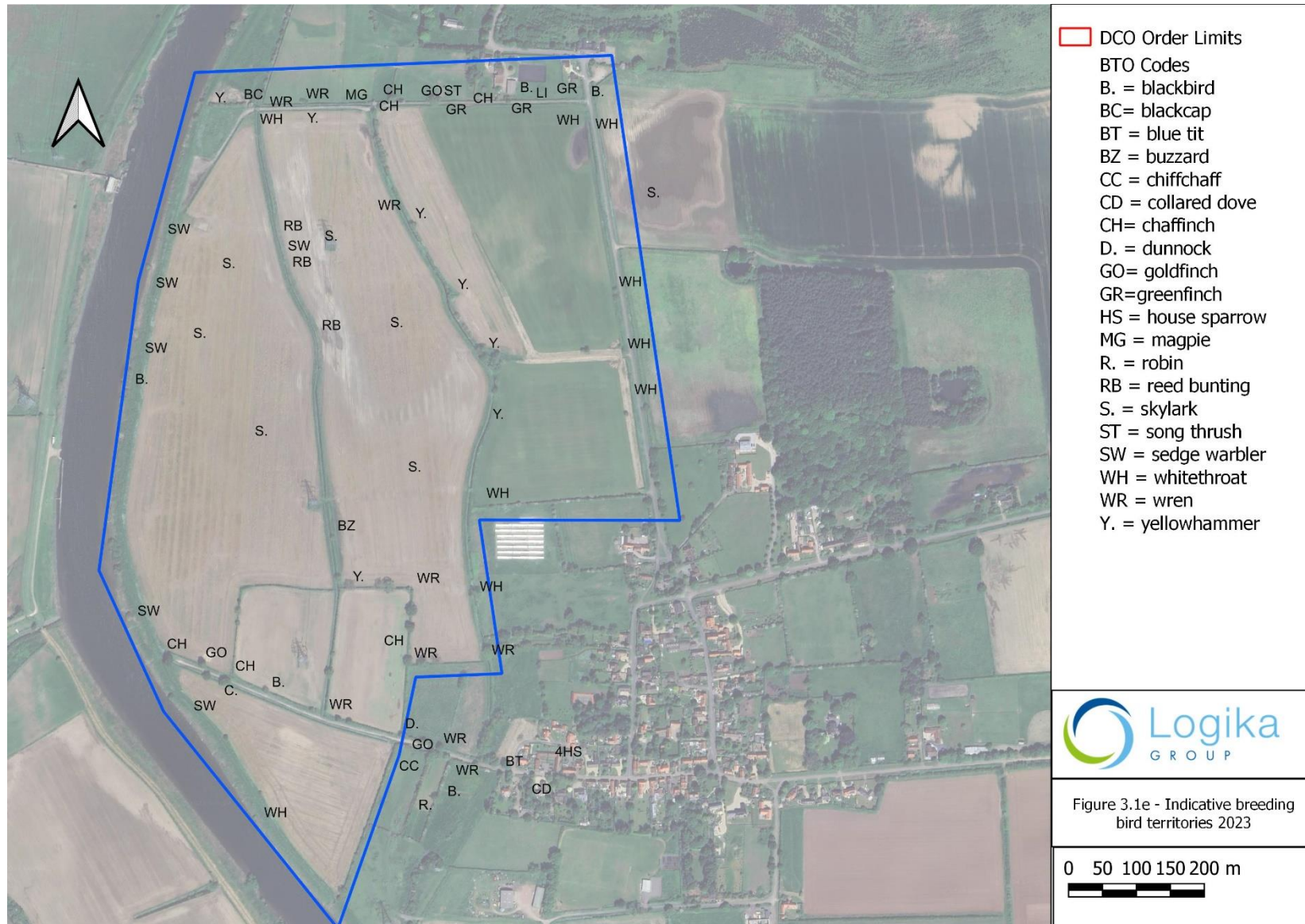


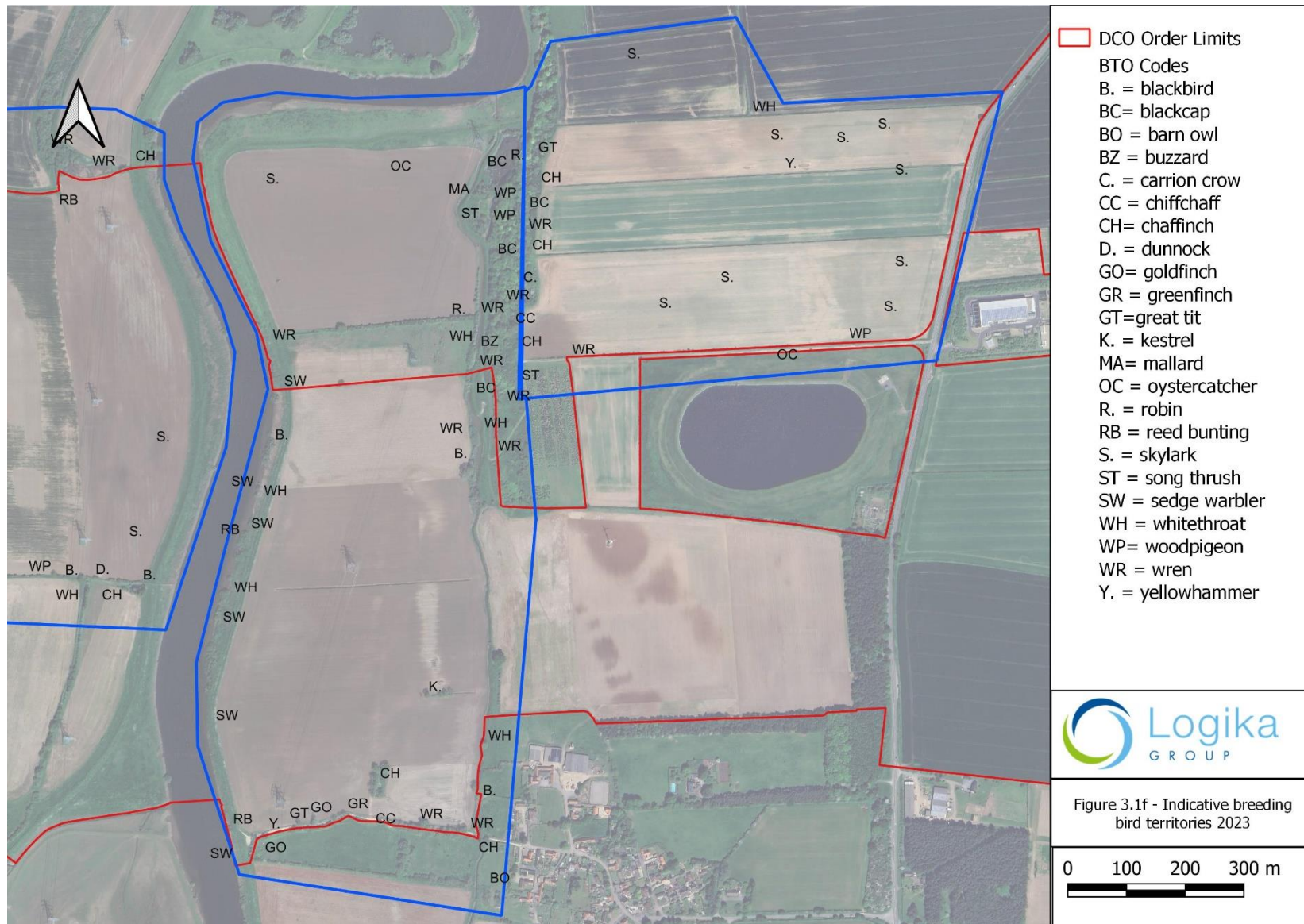




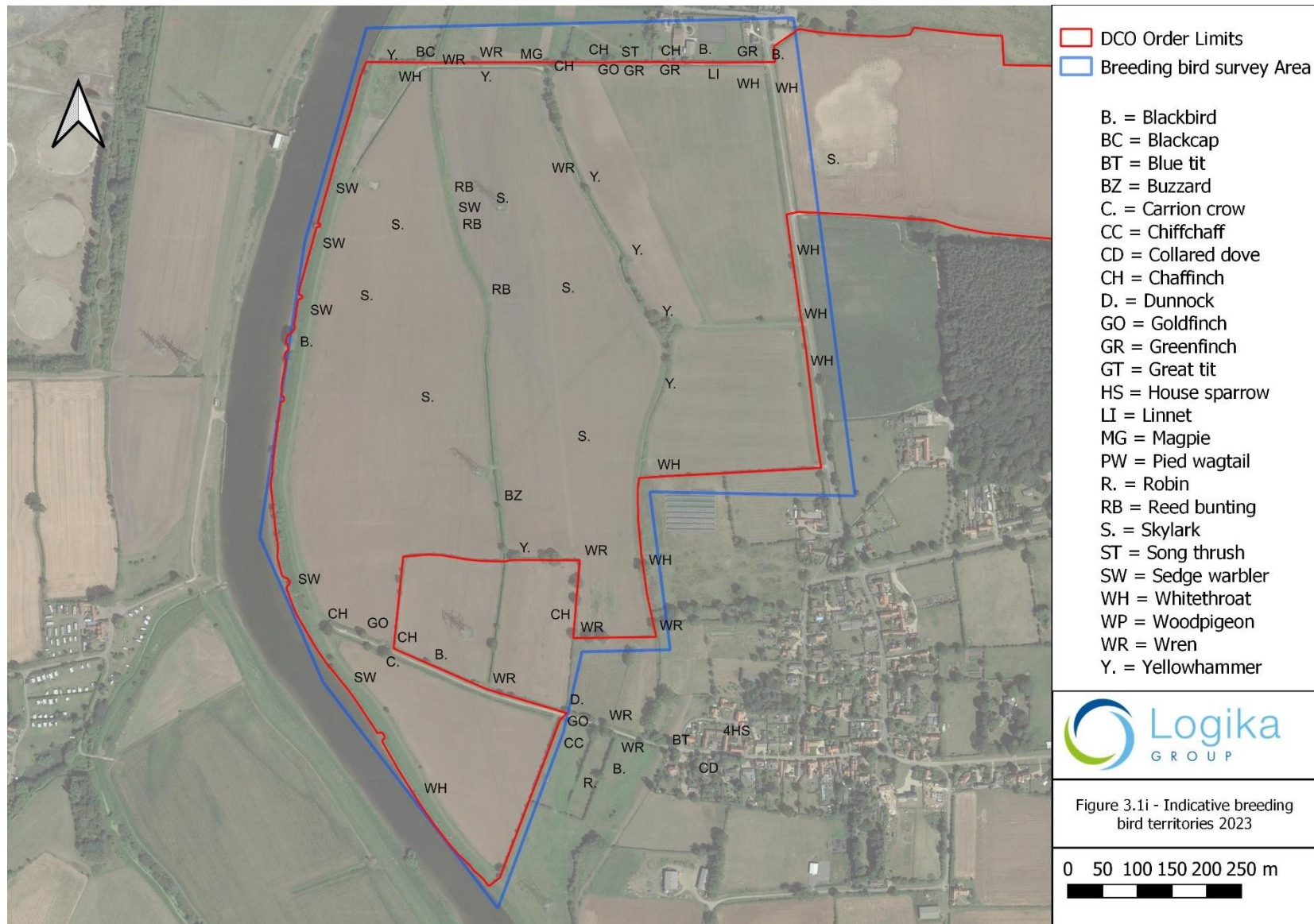


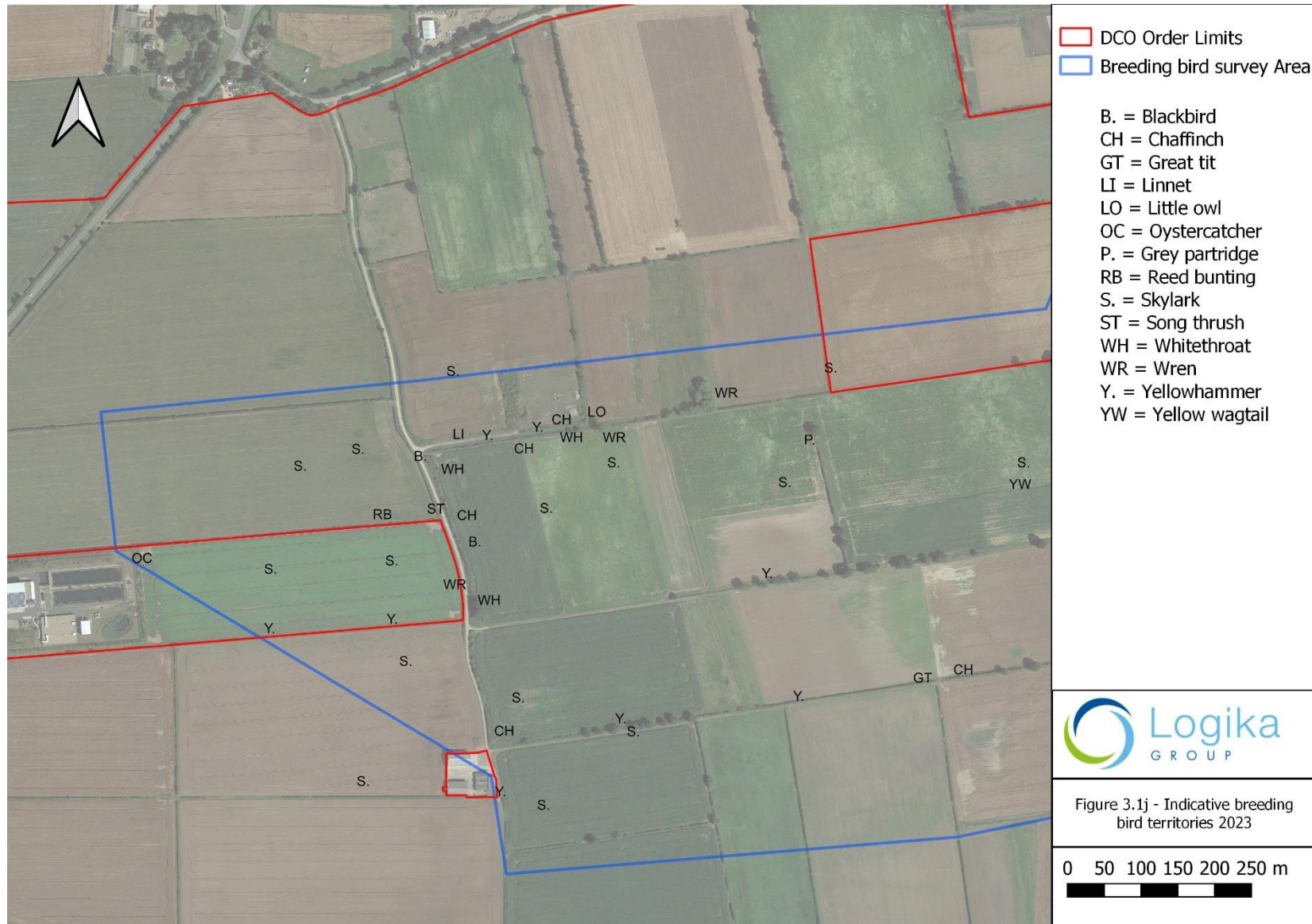




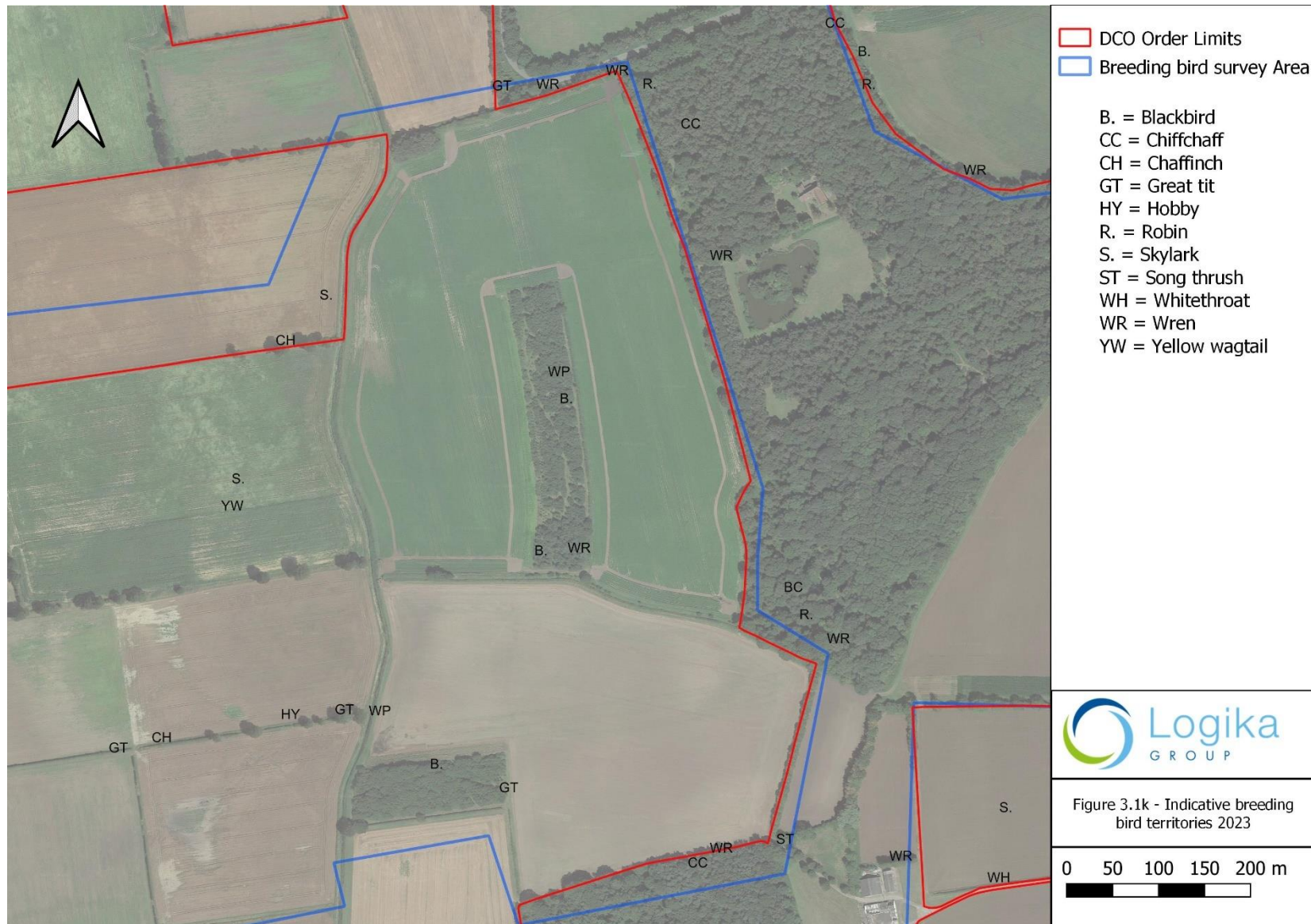




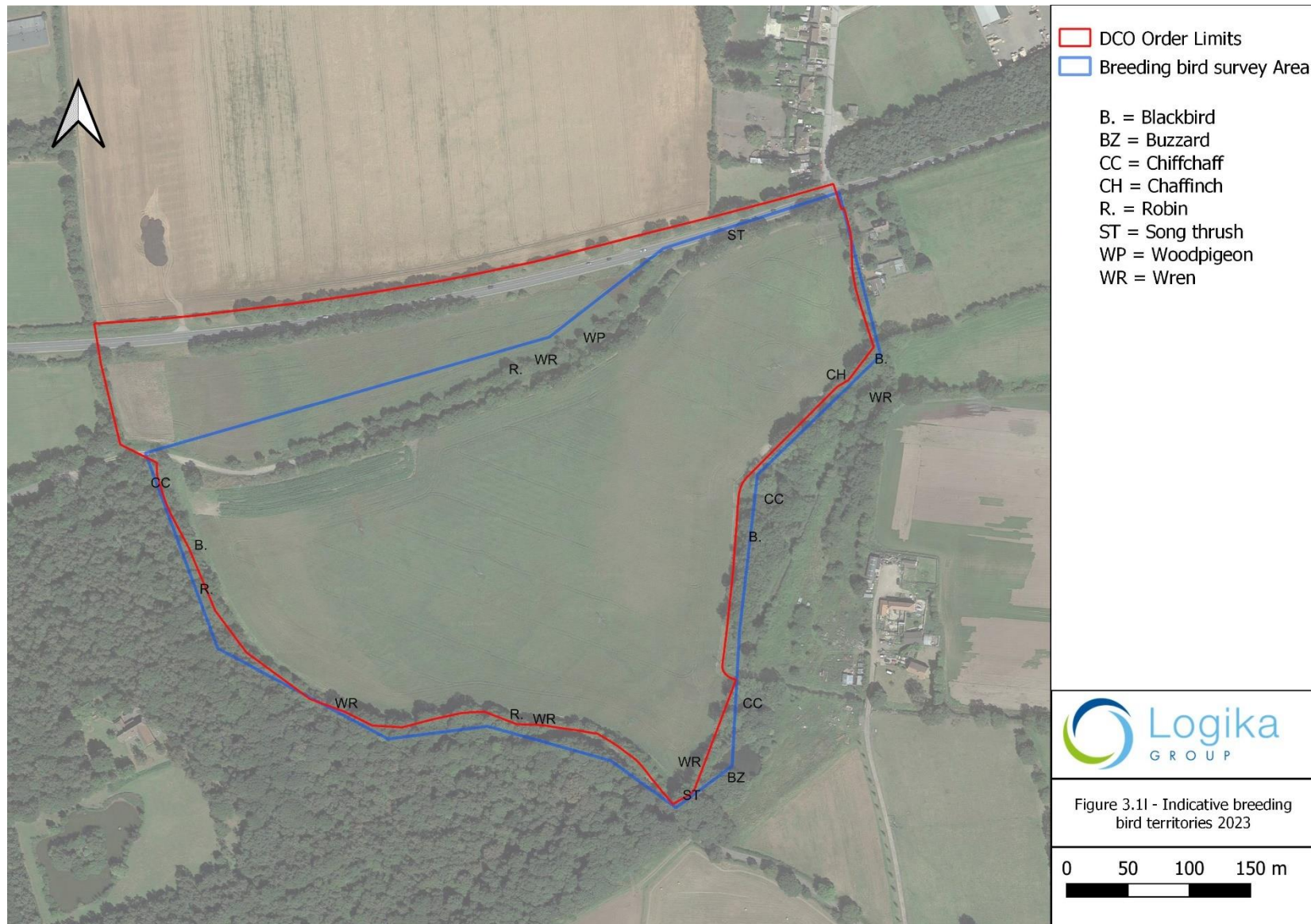


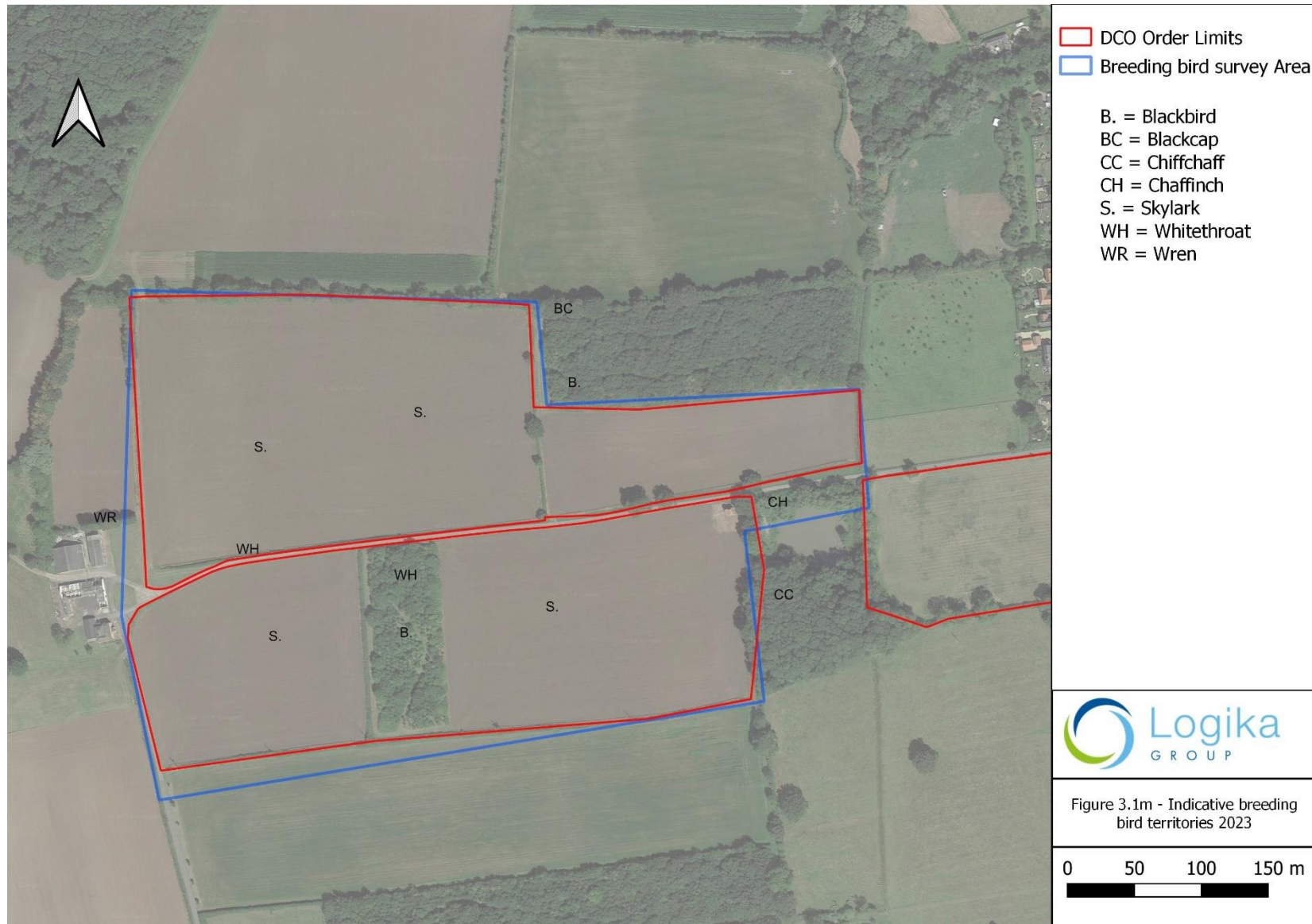












## Annex A - Full species records

Table B-1 – Complete list of species recorded during breeding bird surveys.

Species	Scientific name
Barn owl	<i>Tyto alba</i>
Blackbird	<i>Turdus merula</i>
Blackcap	<i>Sylvia atricapilla</i>
Black-headed gull	<i>Chroicocephalus ridibundus</i>
Blue tit	<i>Cyanistes caeruleus</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Buzzard	<i>Buteo buteo</i>
Canada goose	<i>Branta canadensis</i>
Carrion crow	<i>Corvus corone</i>
Cetti's warbler	<i>Cettia cetti cetti</i>
Chaffinch	<i>Fringilla coelebs</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal tit	<i>Periparus ater</i>
Collared dove	<i>Streptopelia decaocto</i>
Common tern	<i>Sterna hirundo</i>
Coot	<i>Fulica atra</i>
Cormorant	<i>Phalacrocorax carbo</i>

Species	Scientific name
Corn bunting	<i>Emberiza calandra</i>
Cuckoo	<i>Cuculus canorus</i>
Dunnock	<i>Prunella modularis</i>
Goldcrest	<i>Regulus regulus</i>
Goldfinch	<i>Carduelis carduelis</i>
Great spotted woodpecker	<i>Dendrocopos major</i>
Great tit	<i>Parus major</i>
Greenfinch	<i>Chloris chloris</i>
Green woodpecker	<i>Picus viridis</i>
Grey heron	<i>Ardea cinerea</i>
Greylag goose	<i>Anser anser</i>
Grey partridge	<i>Perdix perdix</i>
Grey wagtail	<i>Motacilla cinerea</i>
Herring gull	<i>Larus argentatus</i>
Hobby	<i>Falco subbuteo</i>
House martin	<i>Delichon urbicum</i>
House sparrow	<i>Passer domesticus</i>
Jackdaw	<i>Corvus monedula</i>
Jay	<i>Garrulus glandarius</i>



Species	Scientific name
Kestrel	<i>Falco tinnunculus</i>
Lapwing	<i>Vanellus vanellus</i>
Lesser black-backed gull	<i>Larus fuscus</i>
Lesser whitethroat	<i>Curruca curruca</i>
Linnet	<i>Carduelis cannabina</i>
Little egret	<i>Egretta garzetta</i>
Little owl	<i>Athene noctua</i>
Magpie	<i>Pica pica</i>
Mallard	<i>Anas platyrhynchos</i>
Mandarin	<i>Aix galericulata</i>
Meadow pipit	<i>Anthus pratensis</i>
Mistle thrush	<i>Turdus viscivorus</i>
Moorhen	<i>Gallinula chloropus</i>
Mute swan	<i>Cygnus olor</i>
Oystercatcher	<i>Haematopus ostralegus</i>
Peregrine	<i>Falco peregrinus</i>
Pheasant	<i>Phasianus colchicus</i>
Pied wagtail	<i>Motacilla alba yarrellii</i>
Quail	<i>Coturnix coturnix</i>

Species	Scientific name
Red-legged partridge	<i>Alectoris rufa</i>
Reed bunting	<i>Emberiza schoeniclus</i>
Reeves pheasant	<i>Symaticus reevesii</i>
Robin	<i>Erithacus rubecula</i>
Rook	<i>Corvus frugilegus</i>
Sand martin	<i>Riparia riparia</i>
Sedge warbler	<i>Acrocephalus schoenobaenus</i>
Skylark	<i>Alauda arvensis</i>
Song thrush	<i>Turdus philomelos</i>
Sparrowhawk	<i>Accipiter nisus</i>
Starling	<i>Sturnus vulgaris</i>
Stock dove	<i>Columba oenas</i>
Swallow	<i>Hirundo rustica</i>
Swift	<i>Apus apus</i>
Tawny owl	<i>Strix aluco</i>
Treecreeper	<i>Certhia familiaris</i>
Turtle dove	<i>Streptopelia turtur</i>
Whitethroat	<i>Curruca communis</i>
Willow warbler	<i>Phylloscopus trochilus</i>

Species	Scientific name
Woodpigeon	<i>Columba palumbus</i>
Wren	<i>Troglodytes troglodytes</i>
Yellowhammer	<i>Emberiza citrinella</i>
Yellow wagtail	<i>Motacilla flava flavissima</i>



## Annex B – Full survey details

Full survey details of the breeding bird surveys are shown below in **Table C.1**.

*Table C-1 Full survey details of breeding bird surveys.*

Date	Visit number	Survey Area	Start time	End time	Weather conditions
10/05/2023	1	1,2	06:00	11:15	6/8 Oktas cloud, Beaufort 0 west-northwest, visibility > 3km, precipitation: none, 9°C
11/05/2023	1	2,3	06:00	10:45	5/8 Oktas cloud, Beaufort 2-3 north-west, visibility > 3km, precipitation: none, 9°C
18/05/2023	1	4,5	05:45	10:10	8/8 Oktas cloud, Beaufort 0 southwest, visibility > 3km, precipitation: none, 10°C
19/05/2023	1	5	05:50	09:20	1/8 Oktas cloud, Beaufort 2 west-south-west, visibility > 3km, precipitation: none, 14°C

Date	Visit number	Survey Area	Start time	End time	Weather conditions
24/05/2023	2	1	05:50	7:10	4/8 Oktas cloud, Beaufort 1 north-west, visibility > 3km, precipitation: none, 17°C
25/05/2023	2	2	05:50	09:45	0/8 Oktas cloud, Beaufort 0 north-west, visibility > 3km, precipitation: none, 11°C
01/06/2023	2	4	05:45	09:40	3/8 Oktas cloud, Beaufort 1 north-north-east, visibility > 3km, precipitation: none, 11°C
02/06/2023	2	5	05:45	09:40	1/8 Oktas cloud, Beaufort 1 north-west, visibility > 3km, precipitation: none, 13°C
14/06/2023	3	1,2	05:30	12:00	0/8 Oktas cloud, Beaufort 2 north-east, visibility > 3km, precipitation: none, 22°C

Date	Visit number	Survey Area	Start time	End time	Weather conditions
15/06/2023	3	3	06:15	08:20	5/8 Oktas cloud, Beaufort 2 north-east, visibility > 3km, precipitation: none, 12°C
21/06/2023	3	4	06:00	09:10	0/8 Oktas cloud, Beaufort 1 south-west, visibility > 3km, precipitation: none, 18°C
22/06/2023	3	5	06:00	09:30	5/8 Oktas cloud, Beaufort 1 south-west, visibility > 3km, precipitation: none, 19°C
28/06/2023	4	1,2	06:15	14:45	7/8 Oktas cloud, Beaufort 1 west, visibility 500m-1km, precipitation: none, 20°C
29/06/2023	4	4	06:00	10:20	5/8 Oktas cloud, Beaufort 1 north, visibility > 3km, precipitation: none, 15°C

Date	Visit number	Survey Area	Start time	End time	Weather conditions
30/06/2023	4	5	05:45	12:45	8/8 Oktas cloud, Beaufort 0, visibility 500m-3km, precipitation: light rain, 15°C
01/07/2023	4	3	05:45	08:55	6/8 Oktas cloud, Beaufort 1 north-north-west, visibility 500m-3km, precipitation: none, 16°C
06/07/2023	5	1,2	06:25	13:55	4/8 Oktas cloud, Beaufort 2 south, visibility > 3km, precipitation: none, 15°C
07/07/2023	5	3	07:25	10:40	0/8 Oktas cloud, Beaufort 0, visibility > 3km, precipitation: none, 17°C
11/07/2023	5	4	6:10	10:40	8/8 Oktas cloud, Beaufort 2 north-west, visibility 500m-3km, precipitation: light drizzle, 17°C
12/07/2023	5	5	05:15	11:45	4/8 Oktas cloud, Beaufort 1 north, visibility 500m- 3km, precipitation: none, 15°C

Date	Visit number	Survey Area	Start time	End time	Weather conditions
17/07/2023	6	1,2	06:15	13:30	8/8 Oktas cloud, Beaufort 1 south, visibility 500m-3km, precipitation: heavy rain, 15°C
18/07/2023	6	4	10:05	11:50	8/8 Oktas cloud, Beaufort 0, visibility 500m-3km, precipitation: light rain, 15°C
19/07/2023	6	3	05:40	08:55	8/8 Oktas cloud, Beaufort 0, visibility <500m, precipitation: light drizzle, 14°C
20/07/2023	6	5	05:30	11:25	5/8 Oktas cloud, Beaufort 1 south, visibility 500m-3km, precipitation: none, 12°C

## Annex C - Territory Mapping Criteria

A.6.5.1. Territory mapping criteria has been taken from Amar *et al.* (2006). This paper adapted the original methodologies of Marchant, (1983) and Gilbert *et al.* (1998) to focus on how to attribute territories using fewer visits than the original methodology dictates. The paper attributes indicative territory locations based on four CBC visits, whereas during the fieldwork for this project six survey visits were undertaken in order to provide a more robust assessment:

*At the end of the fieldwork all the registrations were transferred to 'species maps' on which the letter of the visit (A,B,C,D,E,F) was substituted for the species symbol, the registrations were plotted in exactly the same locations, and using exactly the same activity codes, as those on the original visit maps. The information on these maps was then used to make an assessment of numbers of breeding birds.*

*In view of the reduction of the number of visits from eight to 10 to six, modified criteria were used for analysing the census maps. The following principles were used to define territory clusters on the species maps:*

- 1. The minimum number of visit registrations (from different visits) used to form a territory was two, although as many registrations as possible were placed into a single territory.*
- 2. Registrations of songbirds alone and in song on two (or more) occasions could stand as a territory.*
- 3. A lone bird alarm-calling or giving other vocalisations thought to have strong territorial significance was acceptable as a territory if there were previous or subsequent sightings within the same approximate area.*
- 4. The presence of a nest in any state, including building, occupied, or recently (within the same season) used nest on just one visit, with no other registrations was acceptable as a territory.*
- 5. A lone songbird not in song could not count as a territory, regardless of whether it was located toward the middle of the plot or near the edges.*
- 6. A territory was not counted where there was just a single registration of a bird in mid-flight.*
- 7. The presence of a family on a single visit (juvenile birds with attendant parents) was not permitted as a territory, since they may have moved into the area from outside the CBC plot. Unless it is apparent that the nest location is within the vicinity i.e. the young are 'branched' or grounded and flightless.*
- 8. A lone pair was permitted as a territory, provided that the birds were not in mid-flight. In instances involving pairs of birds in flight, territories were only permitted when the pair was recorded taking off from a fixed point, e.g., a tree or the ground (but excluded when they had been seen in mid-flight). Such registrations were acceptable even if the sex of the individuals was not known, because this would follow the rationale already widely used and accepted in CBC territory analysis.*
- 9. For species that are semi-colonial, or occur in large groups where it may be hard to define separate individual territories (e.g., house sparrow) the numbers of birds per visit*

*were added up. The maximum count was then divided by two to give the number of territories.*

*All territories falling at least partly inside the survey area were included in the totals, even if some of the registrations forming the territory cluster fell outside the survey area boundaries.*





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