

Environmental Statement: Volume 2

Appendix 8-1: Ornithological Survey Report

May 2025



PINS Ref: EN010153

Document Ref: EN010153/DR/6.2

Planning Act 2008; and Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations Regulation 5(2)(a)

Frodsham Solar

on behalf of Axis P.E.D Ltd. for Cubico Sustainable Developments

Technical Appendix 8.1: Ornithological Survey Report





Document Control					
Project Name:	Frodsham Solar				
Project Number:	AxisL-043-3114				
Report Title: Technical Appendix 8.1: Ornithological Survey Report					

Issue	Date	Notes	Prepared	Reviewed
V1	01/10/2024	Draft Issue	Dr C Bonnington <i>DPhil MSc BSc (Hons.) FBNA FLS MRSB MCIEEM</i> Principal Ecologist	Thomas Goater MSc, BSc (Hons.) MCIEEM Technical Director
V2	09/10/2024	Amended following client review	Howard Fearn <i>MSc MCIEEM</i> Director	
V3	10/04/2025	Updates to 2024 and 2025 data	Kim Doneo <i>MSc MCIEEM</i> Principal Ornithologist	

This report has been prepared in accordance with the terms and conditions of appointment for the Bird Surveys [on request]. Avian Ecology Ltd. (6839201) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

CONTENTS

1	INTRODUCTION5)
1.1	Document Context5	•
1.2	Terminology and Site Context5	
1.3	Site Overview7	,
1.4	Legislation7	,
2	METHODOLOGY7	,
2.1	Desk study7	,
2.2	Non-Breeding Bird Field Surveys	3
2.3	Breeding Bird Field Surveys11	Ĺ
2.4	Limitations12	<u>}</u>
3	RESULTS13	}
3.1	Desk Study13	}
4	RESULTS16	;
4.1	Non-Breeding Bird Survey Results (Walk-Over)16	5
4.2	Non-Breeding Bird Survey Results (Vantage Point)28	3
4.3	Breeding Bird Survey Results28	3
4.4	Other species for Consideration28	3
FIGL	JRES	•
ANN	EX 8-1. BIRD SPECIES SUMMARY	
ANN	EX 8-2: BIRD SURVEY EFFORT	

ANNEX 8-3: NON-BREEDING BIRD SURVEY METADATA FOR WALKOVER AND VP SURVEYS
ANNEX 8-4: BREEDING BIRD SURVEY METADATA
ANNEX 8-5: THE DESK STUDY DATA – BTO DATA AND CAWOS RECORDS
ANNEX 8-6: THE DESK STUDY DATA — BREEDING BIRD SURVEY RESULTS FROM THE WINDFARM MONITORING REPORT(S)
ANNEX 8-7: VP FLIGHT ACTIVITY SURVEY RESULTS (YEAR 1, 2022-23)
ANNEX 8-8: BBS SURVEY RESULTS FOR YEAR 1 AND YEAR 2
ANNEX 8-9: WALK OVER RESULTS (NON-BREEDING BIRD SURVEYS) YEAR 1
ANNEX 8-10: WALK OVER RESULTS (NON-BREEDING BIRD SURVEYS) YEAR 2
ANNEX 8-11: WALK OVER RESULTS (NON-BREEDING BIRD SURVEYS) YEAR 3
ANNEX 8-12: MERSEY ESTUARY SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI) CITATION
ANNEX 8-13: MERSEY ESTUARY SPA CONSERVATION OBJECTIVES AND CITATION
ANNEX 8-14: INFORMATION SHEET ON RAMSAR WETLANDS (RIS): MERSEY ESTUARY
ANNEX 8-15: WEBS COUNT SECTORS

1 INTRODUCTION

1.1 Document Context

- 1.1.1 Avian Ecology Limited (AEL) was commissioned to undertake ornithological surveys in relation to a proposed renewable energy generating project, consisting of ground-mounted solar photovoltaic ('PV') arrays, together with associated infrastructure, and grid connection (the 'Proposed Development').
- 1.1.2 The Proposed Development comprises a new solar energy generating station and an associated onsite Battery Energy Storage System (BESS) on land at Frodsham Marsh, Frodsham, Cheshire West and Chester ('the Site'). The Proposed Development also includes the associated infrastructure for connection to the local electricity distribution network, as well as a private wire electricity connection that would enable local businesses to utilise the renewable energy generated by the Proposed Development.
- 1.1.3 For a detailed description of the Proposed Development, refer to **ES Vol 3 Figure 1-2: Proposed Development Areas[EN010153/DR/6.3].**
- 1.1.4 This appendix has been prepared to accompany ES Vol 1 Chapter 8: Ornithology [EN010153/DR/6.1].
- 1.1.5 This Appendix presents details of data gathering methodologies and results, gathered from ornithological desk studies and field surveys, to inform the design and assessment of the Proposed Development.
- 1.1.6 This Appendix should be read with reference to the following documents and figures:
 - ES Vol 1 Chapter 8: Ornithology [EN010153/DR/6.1]ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]
 - Outline Landscape and Ecological Management Plan [EN010153/DR/7.13];
 - Frodsham Solar: Information to inform Habitats Regulations Assessment [EN010153/DR/5.3]; and
 - Appendix B Outline Non Breeding Bird Mitigation Strategy (oNBBMS) [EN010153/DR/7.13] of the Outline Landscape and Ecological Management Plan [EN010153/DR/7.13]

1.2 Terminology and Site Context

1.2.1 To aid clarity, throughout this appendix and Chapter 8: Ornithology, the following terms are used to describe components of the Proposed Development located within Order Limits and the terms that were used to reference the survey area during the field surveys.

The Site (Order Limits)

1.2.2 The "Order Limits" is the boundary of which is shown in red as the Application Boundary on **ES Vol 3 Figure 1-2: Proposed Development Areas [EN010153/DR/6.3]** and all figures accompanying this chapter, therefore comprise the SADA, NBBMA, the Skylark Mitigation Area and the Main Site Access (with and without private wire connection). The areas described all fall within the Order Limits and are defined below:

The SADA

- the 'Solar Array Development Area (SADA)' comprising the area that would include solar photovoltaic (PV) modules and support frames, internal access tracks, cabling, inverters, transformers, the solar array substation (known as the 'Frodsham Solar Substation) and the BESS;
- SPEN/National Grid Substation: comprising the existing SPEN/National Grid Substation and access to the substation compound, and adjacent land associated with the grid connection from Frodsham Solar Substation to the SPEN Substation;
- 'Private Wire Connection' which includes land to facilitate future electricity connections to businesses located south-west of the Proposed Development; and,
- Main Site Access without Private Wire Connection: comprising the access road without private wire connection to the west of the SADA.

The Skylark Mitigation Area (SMA)

• The Skylark Mitigation Area comprises of land where 'Skylark Plots' will be established and will remain during the operational lifetime of the Proposed Development

The Non-Breeding Bird Mitigation Area (NBBMA)

- The Non-Breeding Bird Mitigation Area comprises of land primarily within Cell 3 (cells are discussed below in Table 1-1), which currently forms part of the operational Frodsham Wind Farm mitigation. This area will remain during the operational lifetime of the Proposed Development.
- 1.2.3 For avoidance of doubt, **Table 1-1** below provides a structured summary of the key areas within and beyond the Order limits, categorised by Location Type (within or outside of the Order Limits). Each area is listed alongside its associated field numbers, where applicable, to support accurate and ease of cross-referencing across the field surveys and results. See **Figure 13** as reference.

Table 1-1 key areas within the Order Limits and will be referenced throughout the report.

Location Type	Area Name with reference to the Proposed Development	Field and Cell Numbers (references used during the field surveys)		
Within the Order Limits	The SADA which is split into the eastern and western extents. Brook Furlong dissects these extents.	The Eastern extent of the SADA: field parcels 10–25 and 28–35 The western extent of the SADA: Cell 1, Cell 5 and north-east of Cell 2 (partial cover)		
	NBBMA	Cell 3 and extending beyond the Cell 3 boundary to the Manchester Shipping canal and north-west, bordering cell 2. The canal pools are also within the NBBMA.		
	Skylark Mitigation Area	F8		
Outside of the Order Limits	Manchester Shipping Canal			
	Cell 6			
	Cell 4	Frodsham Wind Farm		

Farmlands off-site	E1-E3, D1-D3, F1-F7 and F9-F11
Frodsham Score	
River Weaver	

1.3 Site Overview

- 1.3.1 The Site also referred to as the Order Limits, as illustrated by the red-line boundary shown **ES Vol 3 Figure 1-1: Site Location [EN010153/DR/6.3]**, comprises multiple fields, over several land parcels, containing mainly agricultural and pastoral land, located at the approximate central grid reference of SJ 51137 78829. The operational Frodsham Wind Farm is partly located in the centre of the Order Limits.
- 1.3.2 The Order Limits is bordered to the north, and north-east, by the River Weaver, to the north-west by part of the Manchester Ship Canal and to the south-east by the M56.

1.4 Legislation

- 1.4.1 All wild birds, their nests and eggs are, with few exceptions, protected under the Wildlife and Countryside Act 1981 (as amended)¹. Over eighty species or groups of species are listed under Schedule 1 of the Act, which are afforded additional protection with increased penalties for offences committed.
- 1.4.2 Additionally, a further forty-nine bird species are listed as Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities ('NERC') Act (2006)², and are therefore a material consideration within the planning process.
- 1.4.3 The Conservation of Habitats and Species Regulations 2017 (as amended) ('The Habitats Regulations') bring into English law the EC Habitats Directive and elements of the EU Wild Birds Directive and provide for the designation and protection of 'European sites' (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), the protection of 'European species' and the adaptation of planning and other control measures associated with the protection of European sites. The Habitat Regulations additionally requires that the Habitat Regulations Assessment process be implemented where a project may impact a European site.

2 METHODOLOGY

2.1 Desk study

2.1.1 A desk study was undertaken to identify any known existing features or ornithological species of importance within the Order Limits and surrounding environment to a maximum of 10km of the Order Limits.

2.1.2 The desk study has comprised:

¹ Available at: https://www.legislation.gov.uk/ukpga/1981/69 (Accessed 20/03/2025).

² Available at: https://www.legislation.gov.uk/ukpga/2006/16/contents (Accessed 20/03/2025).

- A review of the DEFRA 'MAGIC' website¹ to identify the proximity of the Order Limits to any national or internationally designated sites for nature conservation designated for bird species (out to 10km).³
- A review of existing wetland bird records (all year round) from the following British Trust for Ornithology (BTO); Wetland Bird Survey ('WeBS') Sectors (see **Annex 8-15** of this document) for a plan of these Sectors)⁴:
 - o 'Frodsham Sludge Lagoons (Location Code: 45351)';
 - 'Weaver Estuary (Location Code: 46410)';
 - o 'Lordship Lane Fields (Location Code: 45317)';
 - 'Manchester Ship Canal, Eastham to Frodsham (Location Code: 45420)'; and
 - o 'Weston Marshes' (Location Code: 45424)
- A review of existing casual bird records within 1km of the grid references: SJ 51576 78849, SJ 49935 78906 and SJ 49257 78160 (in order to provide the best coverage of land within the Order Limits) obtained from the Cheshire and Wirral Ornithological Society ('CAWOS')⁵;
- A review of prior ornithology surveys undertaken by RSK between April 2021 and February 2022 to support the Proposed Development;
- A review of ornithology monitoring reports (and the monitoring survey results therein) from between 2018 and 2021 produced for the operational Frodsham Wind Farm (Planning Ref: 0/00597/DECC); and,
- A review of the baseline ornithology reports (and survey results therein undertaken between October 2021 and February 2022 and 2024) which supported the HyNet Carbon Dioxide Pipeline DCO (CWACC Planning Ref: 22/04113/NIP).
- 2.1.3 Only contemporary records dated from *c*.2015 onwards (unless stated otherwise) were considered. Only 'Target Species' are considered, with Target Species defined respectively in **Sections 2.2** and **2.3** for breeding and non-breeding species methodologies.

2.2 Non-Breeding Bird Field Surveys

Non-Breeding Bird Survey Methodology

- 2.2.1 In the absence of specific bird survey guidance for solar farm developments, two methods were adopted for the non-breeding bird surveys to determine the usage of the Order Limits and the immediate surrounding area covered by Areas by Target Species. These were:
 - (1) 'Walk-over' surveys; and,
 - (2) Vantage Point (VP) Flight Activity Surveys.
- 2.2.2 All surveys were undertaken during daylight hours, and across the survey period surveys were typically timed to coincide with the high tide period (surveys within 2 hours of the high tide time), when SPA qualifying species and other wetland birds are more likely to be foraging or loafing on terrestrial

³ Defra (Department for Environment, Food & Rural Affairs) (n.d.). *MAGIC: Multi-Agency Geographic Information for the Countryside*. Available at: https://magic.defra.gov.uk/ [Accessed 15 Apr. 2025].

⁴ https://app.bto.org/websonline (Accessed 18/07/2024).

⁵ https://www.cawos.org/ (Accessed 18/07/2024).

habitats which are adjacent to estuarine/riverine habitats, such as those on the Order Limits. However, some surveys were timed outside this period, to cover a greater range of tidal conditions, which may influence bird habitat use.

2.2.3 All surveys were carried out by suitably experienced ornithologists.

Walk-over Surveys

- 2.2.4 The walkover surveys adopted the 'look-see' methodology detailed in Bibby *et al.* (2000⁶) and Gilbert *et al.* (1998⁷) whereby surveyors observed each field, walked the boundaries, and stopped at intervals and scanned the fields for Target Species with binoculars, within the Year 1, 2 and 3 Non-breeding Bird Survey Areas (NBBSAs). All Target Species heard or seen within the NBBSAs were recorded onto base maps. Other species (Secondary Species) within the NBBSAs were tallied, although less emphasis was placed on these species for the assessment. Suitable habitats for Target Species surveyed within the NBBSAs consisted of arable/pasture fields and waterbodies. Habitats, such as woodland and scrubland were considered unsuitable for Target Species and thus were omitted from the survey.
- 2.2.5 Survey coverage is shown in **Figure 3a-3b.**

VP Flight Activity Surveys

- 2.2.6 The VP flight activity surveys followed the NatureScot guidance (SNH, 2017⁸) which although is intended for wind farm developments, is considered appropriate to use for the Proposed Development, in the absence of guidance specific to solar farm developments. Surveys were carried out over a 3hr period, and flights and activity of Target Species were recorded onto field maps. On days where successive VP surveys were carried out, a 30-minute break was taken to minimise observer fatigue. Any activity by Secondary Species were also recorded every 15 minutes, but detailed flights of these species were not recorded.
- 2.2.7 The VP Flight Activity Survey Area is shown in **Figure 4a-4b** and is principally shown by the VP viewshed coverage that covers a high proportion of the eastern part of the Order Limits.
- 2.2.8 In September 2022, VP flight activity surveys were undertaken from two VP locations:
 - VP1 SJ 48851 77493; and,
 - VP2 SJ 50731 78830.
- 2.2.9 From October 2022 to March 2023, to provide better coverage of the Order Limits, VP1 was relocated to a new location (VP1a) at SJ 51360 79189. Figure 4a-4b respectively show the VP locations used in September 2022 and between October 2022 and March 2023, and the VP viewshed coverage which appropriately covered the Order Limits. Up to six hours of survey were carried out from each VP per month.

Survey Area and Effort Evolution

- 2.2.10 VP Flight Activity Surveys were carried out in Year 1 only (September 2022 to March 2023).
- 2.2.11 Walk-over surveys were completed throughout Year 1 to 3:
 - Year 1: September 2022 March 2023

⁶ Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. (2000). Bird Census Techniques. 2nd ed. London: Academic Press.

⁷ Gilbert G, Gibbons D.W. and Evans J. (1998). *Bird Monitoring Methods*. RSPB Sandy.

⁸ SNH (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. March 2017. V2.

- Year 2: September 2023 March 2024
- Year 3: October 2024 March 2025
- 2.2.12 As the project progressed, the survey area was updated to reflect changes in the Order Limits boundary. The table below (Table 2-2) details the areas surveyed each year, indicating which were within or outside the evolving Site boundary.
- 2.2.13 All survey metadata is detailed in Annex 8-3.

Table 2-2. The areas surveyed during the non-breeding bird surveys. See Annex 8-18 as reference.

Survey Year	Survey Period	Areas Surveyed within the Order Limits	Areas Surveyed outside of the Order Limits	Methods used and Survey Visit Frequency
1	09/09/2022 – 25/11/2022	The SADA (western extent): Cells 1, 2, and 5	-	VP and Walk-over
		The SADA (eastern extent) Field parcels: 10-25, 28-37	-	Surveys were conducted weekly in September and October 2022 and fortnightly from November 2022 to March 2023. VP surveys were conducted monthly at each location.
1	02/12/2022 – 28/03/2023	The SADA (western extent): Cells 1, 2, and 5	Field parcels: D1, D2, D3, E1, E2, E3, F3-F11	_
		Field parcels (eastern extent): 10- 25, 28-37, F8	-	
2	25/09/2023- 28/03/2024	The SADA (western extent): Cells 1, 2, and cell 3 (NBBMA)	Cell 6	Walk-over
			Field parcels: 26, 27	Surveys were completed monthly between September and October and fortnightly between November and March.
3	25/10/2024- 10/03/2025	The SADA (western extent): Cells 1, 2, and 5	Cell 6 Field parcels: 26, 27, D1, D2, D3, E1, E2, E3,	Walk-over
		The NBBMA: cell 3 The SADA (eastern extent): Field parcels: 10-25, 28-37, F8	F3-F11	Surveys were conducted twice per month, with one additional nocturnal survey carried out during the core wintering period (November to February).

Non-Breeding Bird Species Definitions

2.2.14 **Target Species** included all wetland birds such as waders, waterfowl, and Annex I/Schedule 1 raptors and owls. As such these were defined to include qualifying features of the Mersey Estuary SPA, Ramsar Site and SSSI, as well as those which fall within the waterbird assemblage.

2.2.15 **Secondary Species** are defined as those that comprise of notable flocks of non-wetland birds, gulls, terns, herons, egrets, rail species, grebes (excluding great crested grebe, which was treated as a Target Species due to its association with the Mersey Estuary SPA), cormorants, sawbill ducks, Red and Amber-listed Birds of Conservation Concern (BoCC5; Stanbury *et al.*, 2021) that did not meet the Target Species criteria, and Schedule 1 passerines.

2.3 Breeding Bird Field Surveys

Breeding Bird Survey (BBS) Methodology

- 2.3.1 Breeding Bird Surveys' (BBS) were undertaken in 'Year 1' (April to June 2023) and 'Year 2' (April to July 2024).
- 2.3.2 During Year 1, the methodology employed was based upon a scaled-down version of the BTO Common Bird Census (CBC) technique, as detailed in Gilbert *et al.* (1998^{Error! Bookmark not defined.}).
- 2.3.3 During Year 2, the methodology employed was updated to follow those methodologies set out in Bird Survey Guidelines (2024)⁹. The updated methodology consisted of six BBS carried out between April and July. Following this guidance, one of the BBS (a late June survey) was undertaken around 'dusk', which is considered 'during the last few hours of the day and extending beyond sunset for at least an hour'. Similar to Year 1, each survey was recorded on either separate days or carried out by two surveyors covering half of the survey area each. For health and safety reasons, the 'dusk' survey was carried out by a second surveyor acting as a health and safety second.
- 2.3.4 All bird registrations were recorded on suitably scaled field maps using standard BTO species codes and behaviour notations (such as singing, carrying food, active nest).
- 2.3.5 Following the completion of all surveys within each year, the approximate locations of breeding bird territories within the Year 1 and Year 2 BBS Survey Areas were determined using standard territory mapping techniques to identify areas within which birds consistently displayed breeding behaviours (following Gilbert *et al.* 1998^{Error! Bookmark not defined.). The territory mapping method is based on the observation that many species are territorial during the breeding season. This is most marked in passerines, where territories are often determined by conspicuous song, display and territorial disputes with neighbouring birds of the same species. The expected outcome of this technique is that mapped registrations fall into clusters, approximately coinciding with breeding territories.}
- 2.3.6 Records of birds just visiting (i.e. landing for a short period and not considered utilising the Order Limits) or birds flying over the Year 1 and Year 2 BBS Survey Areas were also made. However, these records have been discounted from further consideration and analysis, given they are of birds which were not breeding within the Year 1 and Year 2 BBS Survey Areas and are therefore not considered relevant to the assessment.
- 2.3.1 All BBS were undertaken by a field team of suitably experienced ornithologists.
- 2.3.2 Full details of the breeding bird surveys, and the associated metadata can be found in the Annex 2.

Survey Area

2.3.3 Table 2.3 presents the areas of which were covered during the breeding bird surveys during Year 1 and Year 2 (Annex 8-4). Survey coverage is displayed in **Figures 5a** and **5b**.

⁹ Bird Survey & Assessment Steering Group. (2024). Bird Survey Guidelines for assessing ecological impacts, https://birdsurveyguidelines.org (Accessed 23rd September 2024)

Table 2.3. Survey area covered during Year 1 and Year 2 of the surveys.

Survey Year	Survey Period	Areas Surveyed within the Order Limits boundary	Areas Surveyed outside of the Order Limits boundary	Survey Visit Frequency
1	11/04/2023- 14/06/2023	The SADA: Cells 1, 2, and 5		3 survey visits, once per month
	14,00,2023	The SADA: Field parcels: 10-25, 28-37	-	month
2	24/04/2024- 31/07/2024	The SADA: Cells 1, 2 and 5	Cells: 6	6 visits spread evenly across 4 months
	31/0//2024	The NBBMA: Cell 3		across 4 months
		The SADA: Field parcels: 10-25, 28-37	-	

Breeding Bird Species Definitions

- 2.3.4 **Target Species** includes Birds of Conservation Concern (BoCC5) Amber and Red List species (Stanbury *et al.*, 2021), particularly native ground-nesting birds likely to be most impacted by the Proposed Development. The definition also encompasses Schedule 1 and Annex I species (such as raptors and owls), and all native wetland species, including waterfowl, waders, and rails. Although listed as Green under BoCC5, reed warbler was also considered a Target Species due to its strong association with the Order Limits wetland habitats.
- 2.3.5 **Secondary Species** include species which fall within the Green List Species of the BoCC5.

2.4 Limitations

- 2.4.1 Non-Breeding Bird Surveys and BBS are considered to represent a snapshot in time whereby it is accepted that some birds that use the Order Limits or adjacent habitats may not be present during the surveys. In addition, it is accepted that the cropping regime and human disturbance through agricultural activities and similar may change the species composition using the Order Limits and adjacent habitats during the survey periods.
- 2.4.2 Some of the BBS extended until 13:00hrs given the considerable extent of the Survey Area. This is not considered a substantive limitation given that those BBS which finished later were still recording Target Species after mid-morning.
- 2.4.3 During the Non-Breeding Bird Surveys only part of the SADA (the western extent) was surveyed during Year 2, as shown in **Figures 3b**. However, with the results from the three years pooled, it is considered that an accurate reflection of the non-breeding bird assemblage usage of the Order Limits has been determined.
- 2.4.4 Due to design evolution the Order Limits boundary has altered with resulting Survey Areas for the ornithological surveys differing between survey years. This includes Cell 3 (the NBBMA) being only surveyed during Year 2 and Year 3 Non-Breeding Bird Surveys, and not during the respective Year 1 surveys (see Figures 3a and 3b), and although fully surveyed during the Year 2 BBS (see Figure 5b), Cell 3 was not surveyed during the Year 1 BBS (see Figure 5a). Similarly, the north-eastern extent of the Order Limits (the SPEN) associated with the River Weaver was not surveyed during the Year 1 BBS but was surveyed during the Year 2 BBS. Some of the north-eastern extent of the Order Limits was however surveyed during Year 1 Non-Breeding Bird Surveys (but not in Year 2). Nonetheless, it is considered that the survey coverage achieved of the Order Limits over the two years of ornithology surveys has resulted in an accurate representation of the non-breeding and breeding bird assemblages located within, and adjacent to, the Oder Limits, being determined.

- 2.4.5 The proposed Main Access Route (which forms part of the Order Limits) passes from Cell 3 (NBBMA) south around the edge of Ince Marshes to the village of Elton and is not covered as part of the Breeding or Non-breeding Bird Survey Areas. Omission of this part of the Order Limits from ornithology surveys is not considered a substantive limitation given the route is existing track (including tracks associated and occasionally used by HGVs and 4x4 vehicles in relation to the operational Frodsham Wind Farm (as well as by farm traffic). Only minor works along the track are anticipated, e.g., laying of cabling/replacing potholes, all within the width of the current carriageway.
- 2.4.6 Three hours of survey were undertaken from VP1 in September, with six hours undertaken at VP2 during Year 1 Non-Breeding Bird Surveys. This modest variation in total hours undertaken at each VP is not considered to be a limitation with the overall level of survey effort undertaken between September and March providing an accurate reflection of non-breeding ornithological activity associated with the Order Limits. Furthermore, the VP Flight Activity Surveys represent a supplementary survey to the walkover survey, with most results from Non-Breeding Bird Surveys identified from the walkover surveys during Years 1 to 3.
- 2.4.7 The location of one of the VPs (VP1) used in September 2022, was relocated in October 2022 to a new location (VP1a). This is not considered a limitation, given that the walkover surveys and VP Flight Activity Surveys combined have provided an accurate estimate of the activity and usage of the Order Limits by Target Species and Secondary Species during the non-breeding season.

3 RESULTS

3.1 Desk Study

Statutory and Non-Statutory Sites

- 3.1.1 On review of the Multi-Agency Geographic Information for the Countryside ('MAGIC')¹⁰ website, the Order Limits is located within 10km of the following international statutory designated sites with ornithological qualifying features:
 - Mersey Estuary A Site of Special Scientific Interest (SSSI);
 - Mersey Estuary Special Protection Area (SPA);
 - Mersey Estuary Wetland of International Importance (Ramsar Site);
 - Midland Mere and Mosses Phase 1 (Ramsar Site); and
 - Midland Mere and Mosses Phase 2 (Ramsar Site).
- 3.1.2 More distant international statutory designated sites which are approximately 6.0km away from the Order Limits (Midland Mere and Mosses Phase 1 and 2) are not considered on the basis that features (qualifying species and assemblages) overlap with those for the Mersey Estuary SPA and Ramsar water assemblage and it is therefore not possible to differentiate between populations at such a range.
- 3.1.3 Additionally, one nationally significant Sites of Special Scientific Interest (SSSI) is present within 10km of the Order Limits with ornithological qualifying features listed within the citation. This is the Mersey Estuary SSSI. The location of these designated sites is provided in **Figure 1** and **Figure 2**.

¹⁰ Available at: https://magic.defra.gov.uk/ (Accessed 10/04/2025).

3.1.4 The ornithological features of the Mersey Estuary SSSI are consistent with those of the Mersey Estuary SPA and Ramsar Site. A summary of the above sites' qualifying features is presented in **Table 1.1**.

Table 3.1: Designated sites with ornithological qualifying interests.

Site Name (and Designation)	Approximate Distance and Direction from the Order Limits	Qualifying Features
Mersey Estuary SSSI ¹¹	Within the north of the Order Limits.	This SSSI is an important roosting site for wildfowl and waders at high tide. Throughout the winter the area supports large numbers of wildfowl and waders. The birds feed on the rich invertebrate fauna of the intertidal sediments as well as plants and seeds from the saltmarsh and nearby agricultural fields. The site is a valuable staging post for migrating birds in spring and autumn. The site supports (internationally) important numbers of pintail, teal, shelduck, wigeon and dunlin, with nationally important numbers of curlew, redshank and golden plover. See Annex 8-12 for details
Mersey Estuary SPA ¹²	72m north- west.	This SPA is designated for the following ornithological qualifying features: Shelduck (non-breeding); Teal (non-breeding); Pintail (non-breeding); Golden plover (non-breeding); Dunlin (non-breeding); Black-tailed godwit (non-breeding); Redshank (non-breeding). Waterbird assemblage, including great crested grebe, shelduck, wigeon, teal, pintail, ringed plover, golden plover, grey plover, lapwing, dunlin, black-tailed godwit, curlew and redshank. See Natural England document Annex 8-13 for further details.
Mersey Estuary Ramsar Site ¹³	72m north- west.	Internationally important numbers of wintering waterfowl feed and roost on site, and nationally important numbers occur during passage periods. The latter include ringed plover, redshank and dunlin. During the winter internationally important numbers of shelduck, teal, pintail, dunlin and redshank are present, and nationally important numbers of wigeon, grey plover, black-tailed godwit and curlew. (Criteria 2c, 3a, 3c). See Annex 8-14 for details.

3.1.5 Non-statutory designated sites with listed ornithological interests located within 1km of the Order Limits are provided in **Table 3-2**.

Table 3.2: Non-statutory designated sites with listed ornithological interests (LWS: Local Wildlife Site).

https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001398 [Accessed 10 Apr. 2025].

https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9005131 [Accessed 10 Apr. 2025].

¹¹ Natural England (n.d.). *Mersey Estuary SSSI Site Detail*. Available at:

¹² Natural England (n.d.). *Mersey Estuary SPA – Site General Detail*. Available at:

¹³ Natural England (n.d.). *Mersey Estuary Ramsar – Site General Detail*. Available at: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK11041 [Accessed 10 Apr. 2025].

Site Name	Approximate Distance and Direction from the Order Limits	Description
Frodsham, Helsby and Ince Marshes LWS	Within the Order Limits.	Neutral grassland, floodplain, wetlands, wildlife corridors, other qualifiers, saltmarsh, birds, invertebrates, vascular plants.
Upper Mersey Estuary LWS	300m north.	Intertidal sand and mudflats, saltmarsh, estuarine and wetland birds.
Clifton Lagoon LWS	485m east	Grassland of industrial origin, invertebrates, breeding and wetland birds.

Local Records

- 3.1.6 Extensive ornithological records were obtained from a range of desk-based sources from systematic data (WeBS), causal records (CAWOS) (see Annex 8-5) and previous surveys completed within or near to the Order Limits. These data provide a strong evidence base for understanding how various parts of the Order Limits are used by bird species that are qualifying features of the Mersey Estuary SPA, Ramsar site, and SSSI.
- 3.1.7 Several areas within the Order Limits (notably Cells 1, 2, 3, and 5) fall within zones identified by Natural England (NE) as having a high likelihood of supporting SPA species, as referenced in NECR483 Edition 1: Identification of Functionally Linked Land (FLL) in the Northwest of England Phase 2¹⁴. While not all areas of the Order Limits are covered by these mapped zones, records indicate that bird activity extends into adjacent areas, suggesting usage beyond formally identified boundaries. In contrast, the Manchester Ship Canal (bordering Cell 3 and the NBBMA) is not considered suitable habitat for SPA species and is not associated with the same levels of use.
- 3.1.8 Historical management of Cells 2, 3, and part of Cell 5 under the Frodsham Wind Farm (FWF) consent has further enhanced their value for bird species. These areas are actively managed to support key non-breeding bird populations and will continue to be maintained for this purpose until 2042, under the current mitigation requirements. This management likely contributes to the consistent presence of SPA-associated species recorded across these areas. The 'Year 5 Monitoring Report' (Atmos, 2022) stated that monitoring reveals that flight activity remains highest in the canal deposit dump (Cell 6) offsite (outside of the redline boundary), with birds moving to and from that area. A large flock of 1,500 black-tailed godwit was recorded in Cell 6, and flocks of up to 500 lapwing were present on Cell 6 and Cell 3 within the NBBMA. Species recorded during VP flight activity surveys included avocet, curlew, black-tailed godwit, lapwing and golden plover.
- 3.1.9 The Order Limits also includes two British Trust for Ornithology (BTO) WeBS Core Count Sectors (see Annex 8-15 for sectors)—Frodsham Sludge Lagoons (sector 45351) and Weston Marshes (sector 45424)—both classified as "Very High Priority" for coordinated monitoring due to their importance for wetland birds. These areas, particularly the Frodsham Sludge Lagoons, have yielded high peak counts for key species. BTO WeBS data confirmed that five species—black-tailed godwit, lapwing, teal, golden plover, and dunlin—have all exceeded peak counts of 1,000 individuals within or near the Order Limits (part of the criteria of FLL). Black-tailed godwit was especially abundant, with a recorded peak of 3,885 birds.

¹⁴ Natural England (2023). Identification of functionally linked land supporting North West SPAs: Phase 2 – Mapping and qualifying evidence. Natural England Commissioned Report NECR483. Available at: https://publications.naturalengland.org.uk/file/5919201792622592 [Accessed 10 Apr. 2025].

- 3.1.10 While WeBS data cover broader sectors, additional context from the non-breeding bird surveys undertaken by HyNet (2021–2022¹⁵ and 2024) highlight those areas such as Cell 6 (outside the Order Limits), and to a lesser extent Cells 2, 3, and part of Cell 5, consistently supported higher species richness and abundance than other parts of the Order Limits. In contrast, the Main Development Area (e.g., Weston Marshes and Transect 7b) exhibited notably lower peak counts, with lapwing and teal rarely exceeding 130 and 50 individuals, respectively. This spatial variation was consistent across survey years.
- 3.1.11 Further desk study data were sourced from the Cheshire and Wirral Ornithological Society (CAWOS), which reported numerous observations of qualifying features and other wetland species across the wider Mersey Estuary area. Although these records are not spatially precise, they support the interpretation that SPA-associated species frequently use habitats across a broad landscape context, including areas in and around the Order Limits.
- 3.1.12 Notable aggregated counts from the wider estuary include peak observations of 68,000 dunlin, 10,000 pink-footed geese, 7,568 shelduck, 7,000 lapwing, and 4,800 black-tailed godwit, among others. While these figures are not specific to the Order Limits, they demonstrate the regional importance of the area for supporting significant populations of SPA qualifying species.
- 3.1.13 In summary, desk-based data show that Cells 1, 2, 3, 6, and part of Cell 5 consistently support higher densities and diversity of SPA-associated bird species than other parts of the Order Limits, such as the SADA.

4 RESULTS

4.1 Non-Breeding Bird Survey Results (Walk-Over)

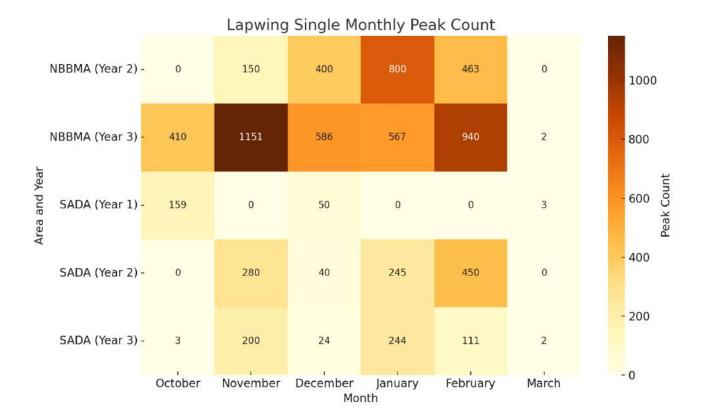
- 4.1.1 The following results detail the qualifying species part of the Mersey Estuary SPA and Ramsar site, including those part of the waterbird assemblage, that were consistently recorded across all three years of surveys.
- 4.1.2 Monthly peak counts and the specific locations where these species were observed are illustrated in heat tables below .
- 4.1.3 The raw survey data from which the information in heat tables are derived are shown in Figures 6a to 86h for Year 1, Figure 8a to 8g for Year 2, and Figure 14a to 14f for Year 3. In-flight only records are provided in the accompanying Figures 7a to 7h and 10a to 10d for Year 1, Figure 9a to 9g for Year 2

Lapwing

4.1.4 Lapwing showed a clear preference for Cells 1, 2 within the SADA, and 3 within the NBBMA, with Cell 3 being the most consistently utilised—particularly during the core winter months—where peak counts exceeded the 1% threshold of the Mersey Estuary SPA and Ramsar population. Moderate numbers were occasionally recorded at the River Weaver bend and Frodsham Score, both of which lie outside the Order Limits boundary (see **Table 4-1** for species recorded outside of the Order Limits).

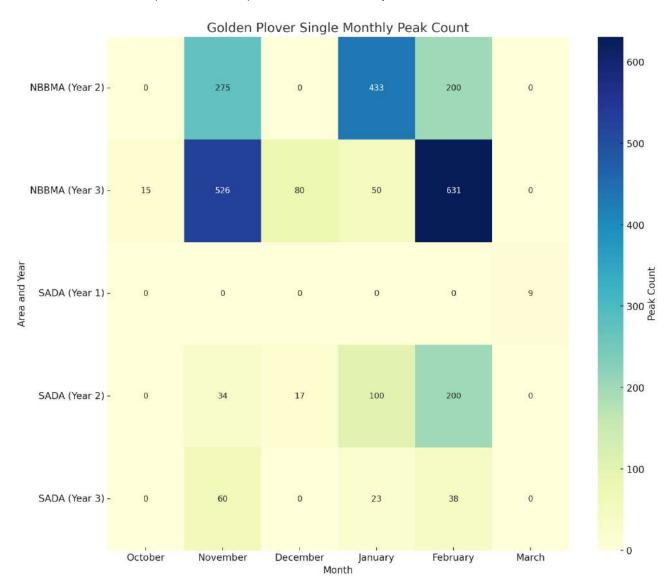
¹⁵ Arcadis (2022). HyNet Decarbonisation Project: Baseline Ornithology Report – Winter 2021/22. Prepared for Cadent Gas Ltd. Available at: https://cadent-nwhp-pier.s3.eu-west-

^{2.}amazonaws.com/Appendix+5C+HyNet+Decarbonisation+Project+Baseline+Ornithology+Report+Winter+2021-22+PDF+(1).pdf [Accessed 15 Apr. 2025].



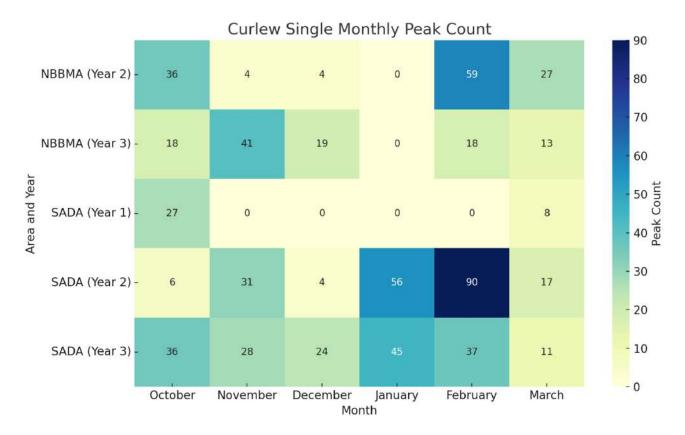
Golden plover

4.1.5 Golden Plover were consistently recorded in Cell 3 within the NBBMA boundary, with peak counts regularly exceeding the 1% threshold throughout the winter period. This species was only observed within the cells (Cells 1, 2 and 5) of the SADA boundary.



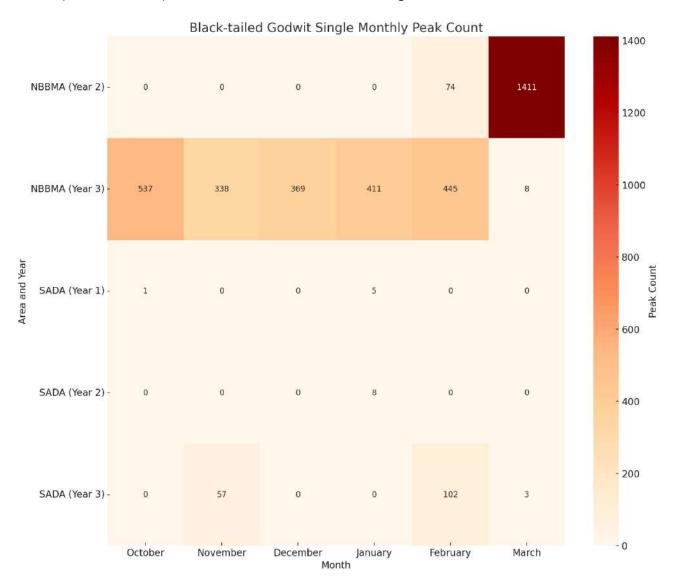
Curlew

4.1.6 Curlew were broadly distributed across the SADA boundary, with Cells 2 and 3 showing the highest utilisation. However, the highest peak count (200) were recorded in the Frodsham Score area, located outside the Order Limits boundary, indicating that this offsite location supports a greater concentration of curlew during the non-breeding season (Table 4-1).



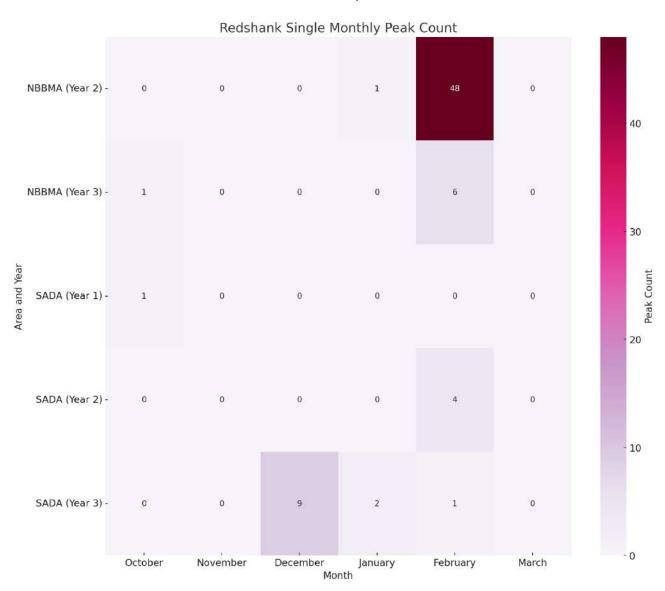
Black-tailed godwit

4.1.7 Black-tailed Godwit were almost exclusively recorded within the NBBMA, where peak counts consistently exceeded the 1% threshold of the Mersey Estuary SPA and Ramsar population during the winter period. The largest count was recorded within Cell 6 during Year 1 during the migratory period (2000 individuals) and the numbers were not observed again thereafter.



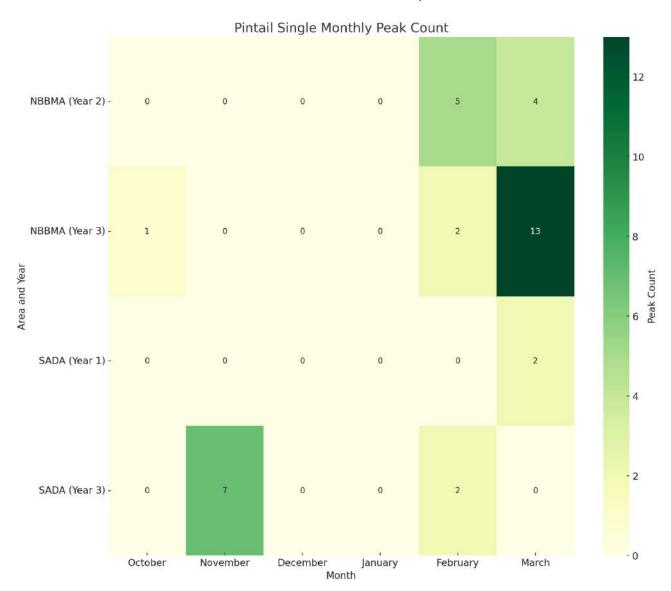
Redshank

4.1.8 Redshank were recorded in low numbers within the Order Limits, with occasional observations in the NBBMA during the winter period. Although no counts exceeded the 1% threshold of the Mersey Estuary SPA and Ramsar population within the Order Limits, the threshold was exceeded in Cell 6, which is located outside the Order Limits boundary.



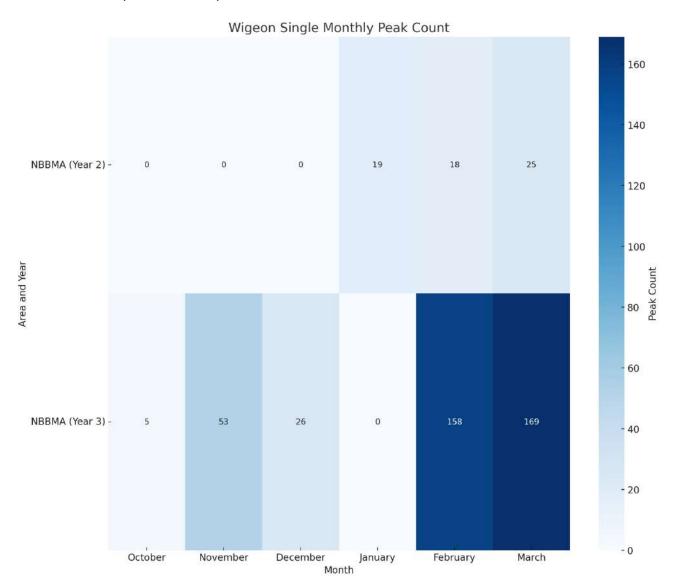
<u>Pintail</u>

4.1.9 Pintail were recorded in low numbers within the Order Limits, with occasional counts approaching or exceeding the 1% threshold of the Mersey Estuary SPA and Ramsar population (≥3 individuals). These observations were limited to isolated records, primarily in Cell 3. The highest counts, however, were recorded in Cell 6, located outside the Order Limits boundary.



Wigeon

4.1.10 Wigeon were recorded in low to moderate numbers within the Order Limits, with counts occasionally exceeding the 1% threshold of the Mersey Estuary SPA and Ramsar population (≥21 individuals). These higher counts were observed in Cell 3 within the NBBMA during the later winter months, particularly in February and March of year 3.



<u>Teal</u>

4.1.11 Teal were regularly recorded across the Order Limits, with notable concentrations in Cell 3 within the NBBMA, particularly during the core winter months. Counts exceeding the 1% threshold of the Mersey Estuary SPA and Ramsar population (≥44 individuals) were recorded in multiple years, indicating that the Order Limits boundary—especially Cell 3—supports regular utilisation by this species. Higher peak counts were also recorded in Cell 6, outside the Order Limits boundary.



Outside of the Order Limits records throughout Year, 1, 2 and 3

Table 4-1 – Peak Count Years 1-3 (2022-25) Field Survey Result Summary – outside of the Order Limits

Offsite Area	Year		Target Species						
		Lapwing	Golden plover	Curlew	Black-tailed godwit	Redshank	Pintail	Wigeon	Teal
Cell 6	1	116	-	-	2,000	300	20	-	350
	2	-	200	59	260	14	10	12	359
	3	120	-	-	-	200	46	-	800
Frodsham	1	200	-	200	20	30	-	-	10
Score	2	-	-	-	-	-	-	-	-
	3	-	-	-	18	-	-	-	-
Manchester	1	-	-	-	-	80	-	-	45
Ship Canal	2	-	-	-	-	-	-	-	-
	3	200	-	50	-	9	-	-	189
River Weaver	1	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-
	3	180	-	-	-	-	-	-	-
Skylark	1	-	-	-	-	-	-	-	-
Mitigation Area	2	-	-	-	-	-	-	-	-
	3	1	-	-	89	-	-	-	-

SPA 1% threshold exceedance

4.1.12 Table 4-2 below presents the peak counts for each species recorded over the three survey years within the SADA and NBBMA boundary, along with instances where counts exceeded the 1% threshold of the Mersey Estuary SPA and Ramsar populations.

Table 4-2.: Target Species recorded during Walkover Surveys (Year 1 to Year 3), along with 1% threshold exceedance for both the SADA and NBBMA.

Area	Species	Year	October	November	December	January	February	March
SADA	Golden plover. Mersey Estuary SPA 5 year mean population: 2068	Yr 1 peak (%)	-	-	-	-	-	9/0.44%
		Yr 2 peak (%)	-	34/1.64%	17/0.82%	100/4.84%	200/9.67%	-
		Yr 3 peak (%)	-	60/2.90%	-	23/1.11%	38/1.84%	-
	Lapwing. Mersey Estuary SPA 5 year mean population: 6201	Yr 1 peak (%)	159/2.56%	-	50/0.81%	-	-	3/0.05%
		Yr 2 peak (%)	-	280/4.52%	40/0.65%	245/3.95%	450/7.26%	-
		Yr 3 peak (%)	3/0.05%	200/3.23%	24/0.39%	244/3.94%	111/1.79%	2/0.03%
	Curlew. Mersey Estuary SPA 5 year mean population: 1541	Yr 1 peak (%)	27/1.75%	-	-	-	-	8/0.52%
		Yr 2 peak (%)	6/0.39%	31/2.01%	4/0.26%	56/3.63%	90/5.84%	17/1.10%

		Yr 3 peak (%)	36/2.34%	28/1.82%	24/1.56%	45/2.9%	37/2.40%	11/0.71%
	Black-tailed Godwit. Mersey Estuary SPA 5 year mean population: 3579	Yr 1 peak (%)	1/0.03%	-	-	5/0.14%	-	-
		Yr 2 peak (%)	-	-	-	8/0.22%	-	-
		Yr 3 peak (%)	-	57/1.59%	-	-	102/2.85%	3/0.08%
	Redshank. Mersey Estuary SPA 5 year mean population: 9018	Yr 1 peak (%)	1/0.01%	-	-	-	-	-
		Yr 2 peak (%)	-	-	-	-	4/0.04%	-
		Yr 3 peak (%)	-	-	9/0.10%	6/0.07%	1/0.01%	-
	Shelduck. Mersey Estuary SPA 5 year mean population: 13704	Yr 1 peak (%)	-	-	-	-	-	-
		Yr 2 peak (%)	-	-	10/0.07%	-	1/0.01%	8/0.06%
		Yr 3 peak (%)	-	-	-	-	-	1/0.01%
	Pintail. Mersey Estuary SPA 5 year mean population: 218	Yr 1 peak (%)	-	-	-	-	-	2/0.92%
		Yr 2 peak (%)	-	-	-	-	-	-
		Yr 3 peak (%)	-	7/3.21%	-	-	2/0.92%	-
	Teal. Mersey Estuary SPA 5 year mean population: 4394	Yr 1 peak (%)	4/0.09%	-	17/0.39%	52/1.18%	52/1.18%	35/0.80%
		Yr 2 peak (%)	-	-	-	-	50/1.14%	6/0.14%
		Yr 3 peak (%)	-	92/2.09%	-	20/0.46%	60/1.37%	53/1.21%
NBBMA	Golden plover. Mersey Estuary SPA 5 year mean population: 2068	Yr 1 peak (%)	-	-	-	-	-	-
		Yr 2 peak (%)	-	275/13.30%	0/0.00%	433/20.94%	200/9.67%	0/0.00%
		Yr 3 peak (%)	15/0.73%	526/25.44%	80/3.87%	50/2.42%	631/30.51%	-
	Lapwing. Mersey Estuary SPA 5 year mean population: 6201	Yr 1 peak (%)	-	-	-	-	-	-
		Yr 2 peak (%)	-	150/2.42%	400/6.45%	800/12.90%	463/7.47%	-

	Yr 3 peak (%)	410/6.61%	1151/18.56%	586/9.45%	567/9.14%	940/15.16%	2/0.03%
Curlew. Mersey Estuary SPA 5 year mean population: 1541	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	36/2.34%	4/0.26%	4/0.26%	0/0.00%	59/3.83%	27/1.75
	Yr 3 peak (%)	18/1.17%	41/2.66%	19/1.23%	0/0.00%	18/1.17%	13/0.84
Black-tailed Godwit. Mersey Estuary SPA 5 year mean population: 3579	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	-	-	-	-	74/2.07%	1411/39
	Yr 3 peak (%)	537/15.00%	338/9.44%	369/10.31%	411/11.48%	445/12.43%	8/0.22%
Redshank. Mersey Estuary SPA 5 year mean population: 9018	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	-	-	-	-	48/0.53%	-
	Yr 3 peak (%)	1/0.01%	-	-	-	6/0.07%	-
Shelduck. Mersey Estuary SPA 5 year mean population: 13704	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	-	-	-	1/0.01%	2/0.01%	11/0.08
	Yr 3 peak (%)	-	1/0.01%	2/0.01%	-	2/0.01%	7/0.05%
Wigeon. Mersey Estuary SPA 5 year mean population: 2059	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	-	-	-	19/0.92%	18/0.87%	25/1.21
	Yr 3 peak (%)	5/0.24%	53/2.57%	26/1.26%	0/0.00%	158/7.67%	169/8.2
Pintail. Mersey Estuary SPA 5 year mean population: 218	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	-	-	-	-	5/2.29%	4/1.83%
	Yr 3 peak (%)	1/0.46%	-	-	-	2/0.92%	13/5.96
Teal. Mersey Estuary SPA 5 year mean population: 4394	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	177/4.03%	56/1.27%	0/0.00%	114/2.59%	291/6.62%	235/5.3

	Yr 3 peak (%)	534/12.15%	562/12.79%	550/12.52%	434/9.88%	343/7.81%	272/6.19%
Great crested grebe. Mersey Estuary SPA 5 year mean population: 65	Yr 1 peak (%)	-	-	-	-	-	-
	Yr 2 peak (%)	-	1/1.54%	-	-	-	-
	Yr 3 peak (%)	-	-	-	-	-	2/3.08%

4.2 Non-Breeding Bird Survey Results (Vantage Point)

4.2.1 A total of 26 Target Species were recorded during the VP Flight Activity Surveys undertaken in Year 1 (2022–2023). The majority of records relate to birds in flight, although observations of birds on the ground were also included, as the surveys aimed to capture overall usage of the Order limits. While not all grounded records were located within the Order Limits boundary, several notable instances of ground use were recorded across multiple fields. Species such as Lapwing, Golden Plover, Black-tailed Godwit, Avocet, and Dunlin were recorded in high numbers (<500), with peak counts exceeding 1,000 individuals for golden plover, black-tailed godwit and dunlin. A full breakdown of records, including peak counts and additional comments on grounded sightings, is provided in Annex 8-7.

4.3 Breeding Bird Survey Results

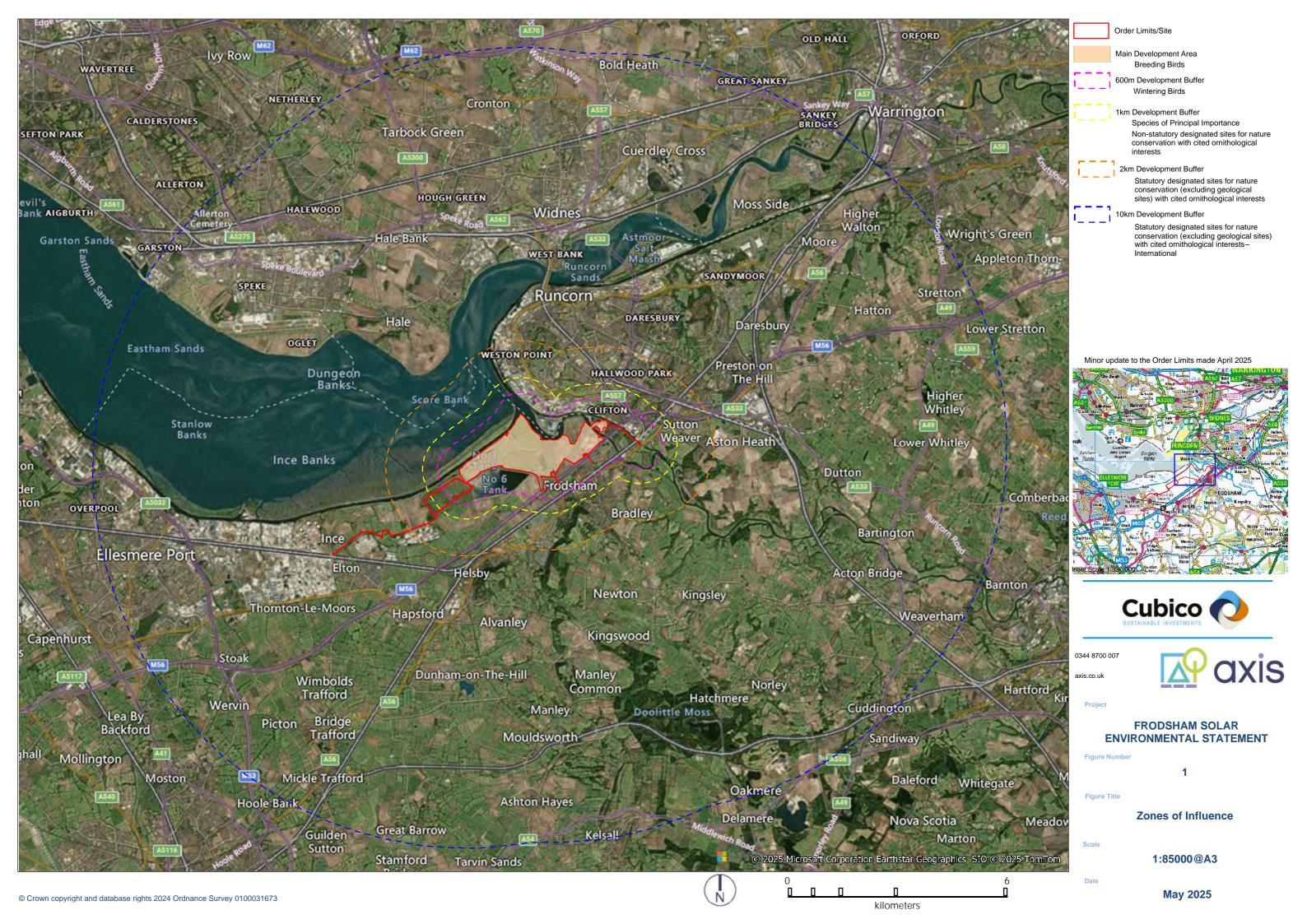
- 4.3.1 A total of 21 Target Species were recorded during the Breeding Bird Surveys (BBS) across the two survey years, with 20 species in Year 1 (2023) and 15 species in Year 2 (2024). Full results are summarised in Annex 8-8 with spatial distributions shown in Figures 11a and 11b. The surveys recorded a variety of breeding species associated with both field boundary vegetation and open field habitats.
- 4.3.2 The most commonly recorded breeding species were wren (with a peak of 71 breeding pairs) and Cetti's warbler (48 pairs), both associated with field boundary and margin vegetation across the Order Limits. Other frequently recorded passerines included whitethroat (32 pairs), reed bunting (32 pairs), sedge warbler (28 pairs), and song thrush (14 pairs), with distribution concentrated in the east and central areas of the Order Limits.
- 4.3.3 Only two ground-nesting species were recorded in considerable numbers: skylark (21 pairs in Year 2), mostly in central open fields and Cell 3 (the NBBMA), and lapwing (peak of 9 pairs in Year 1), located in open fields in the east of the Order Limits and within Cell 3. Additional ground-nesting or open-field associated species included meadow pipit (3 pairs in Year 2) and moorhen (1 pair in Year 1), though these were recorded in lower numbers.

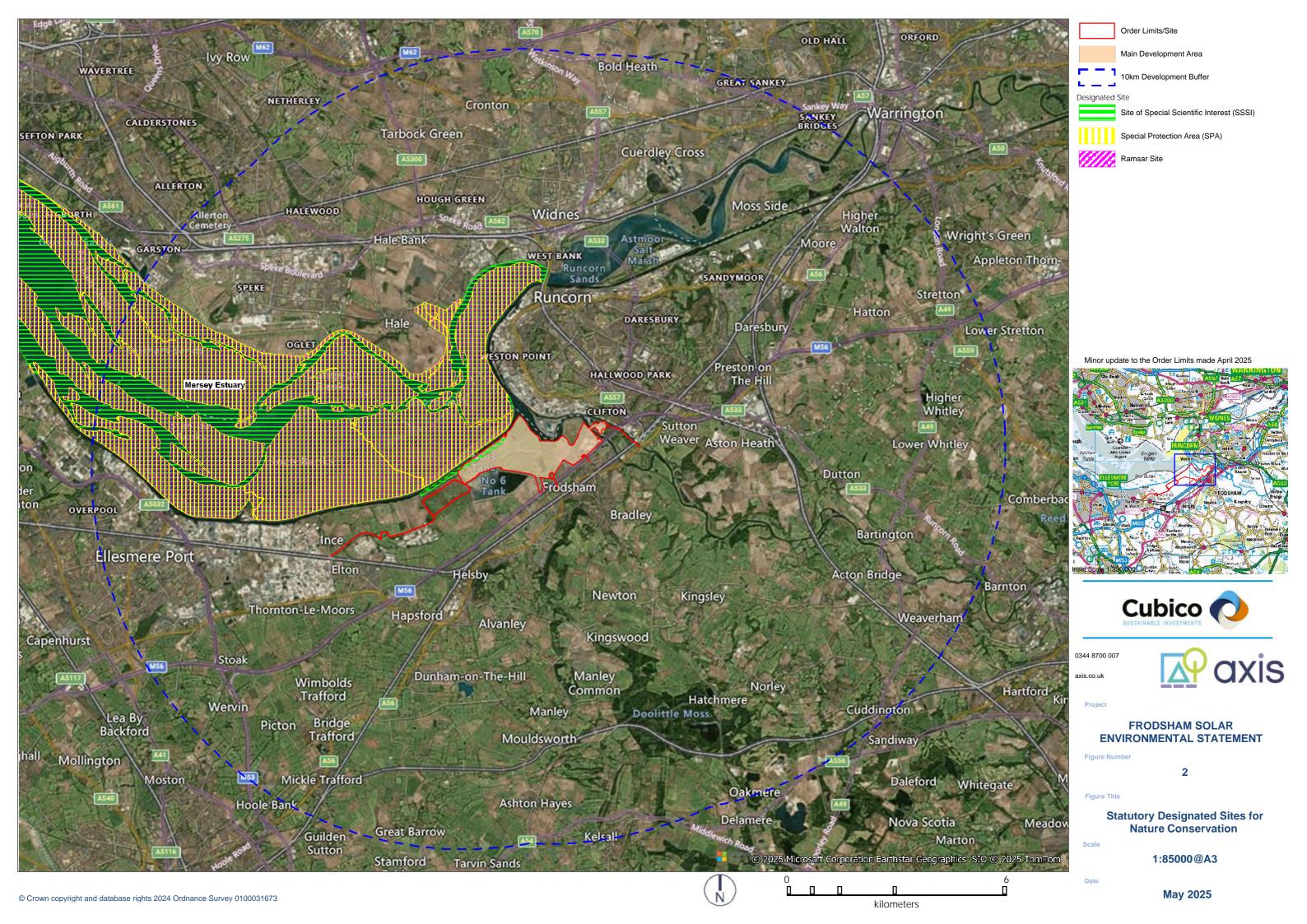
4.4 Other species for Consideration

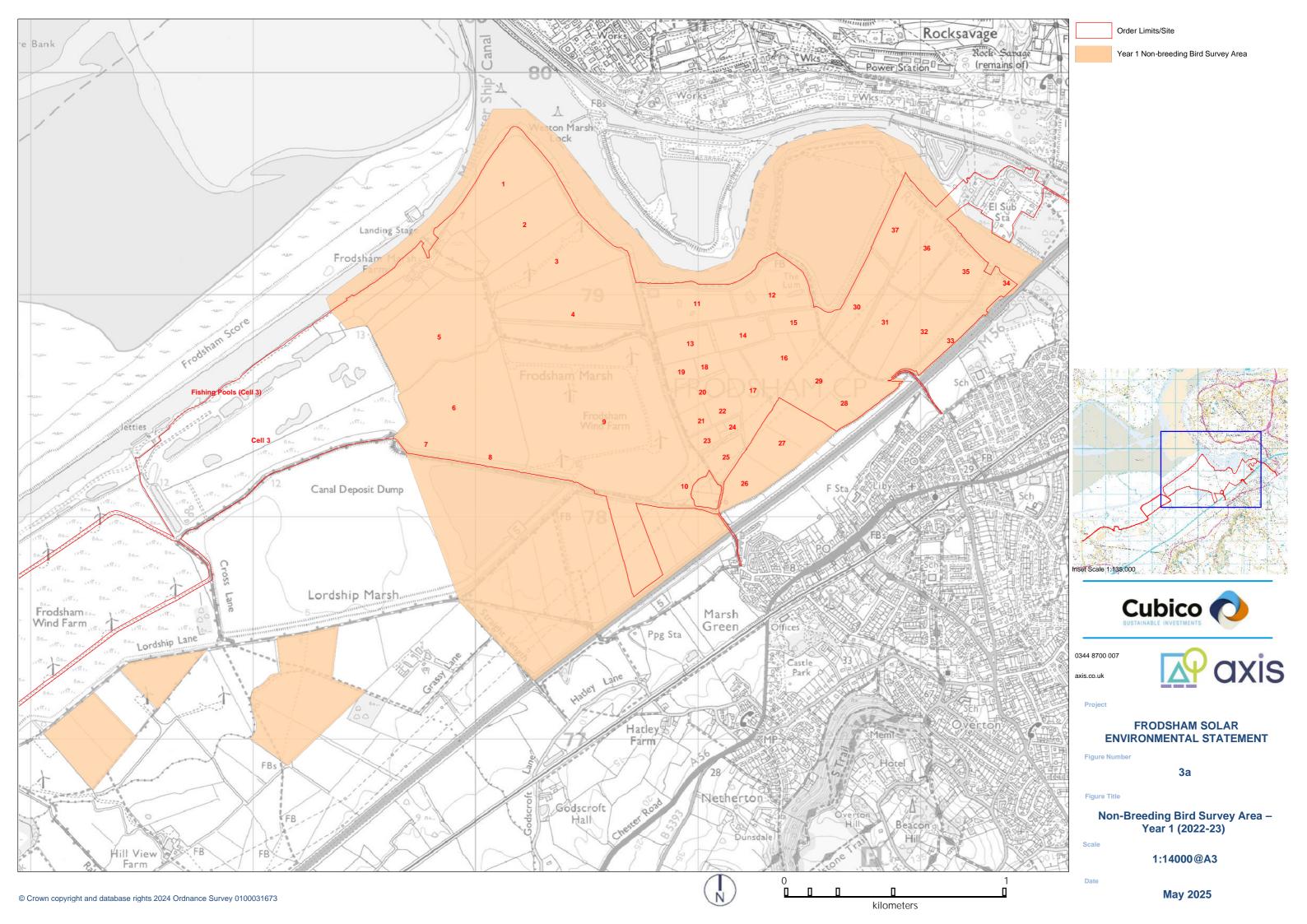
4.4.1 Hen Harrier was recorded within the SADA during Year 3, with sightings in January, February, and March. Marsh Harrier was also recorded during Year 3 of the NBBMA, with observations in October and December. This species is known to roost (overwinter) outside of the Order Limits, as supported by findings from the Hynet surveys referenced in the desk study. In addition, activity indicative of breeding Marsh Harrier was noted outside of the Order Limits, in the Frodsham Marsh region.

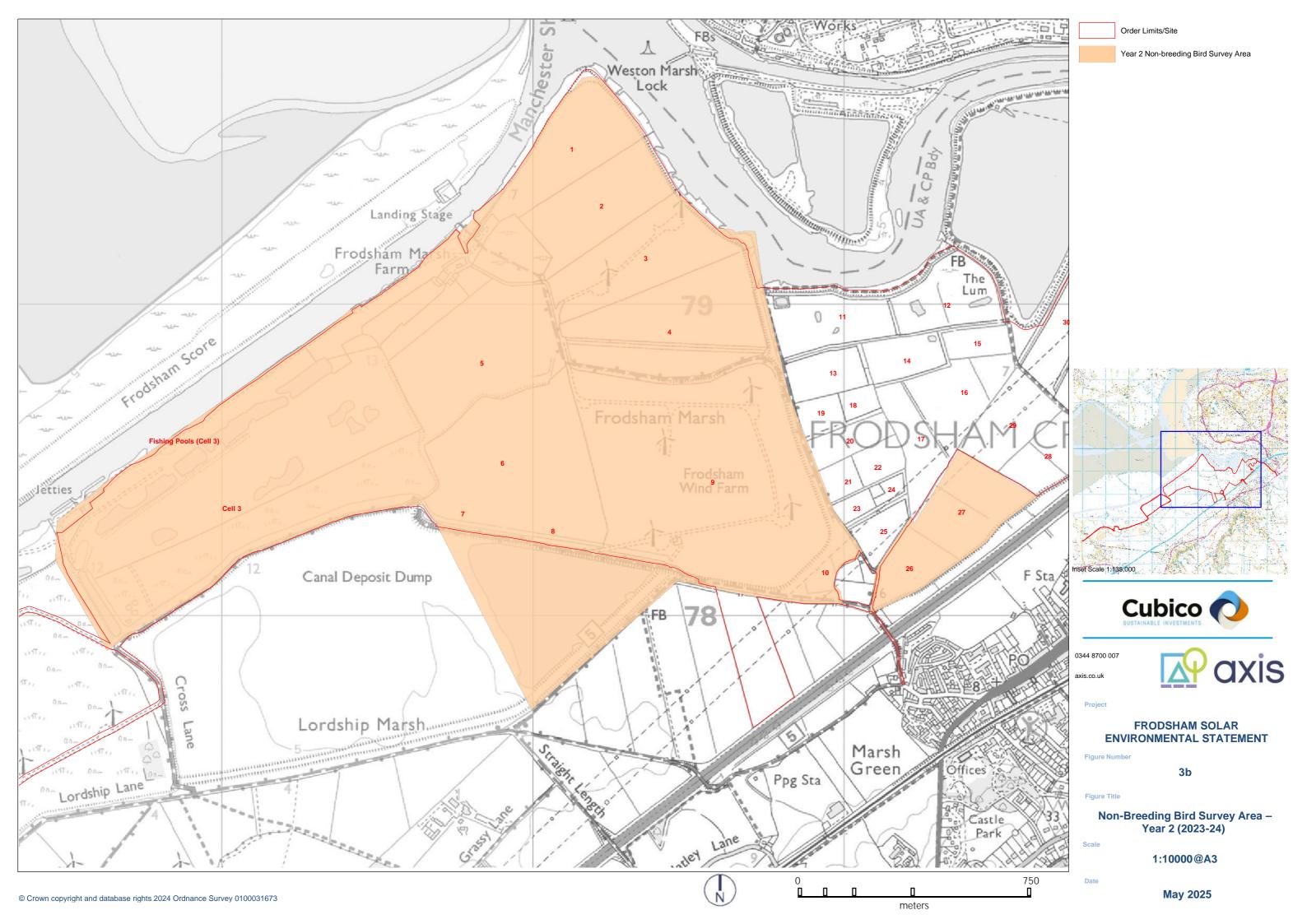
- 4.4.2 Merlin was recorded in the SADA during Year 1. Barn Owl was not observed during any of the field surveys conducted over the three-year period; however, anecdotal evidence suggests potential breeding within the Marsh Farm area which is located inside of the NBBMA. Kingfisher was recorded in Year 3 within the SADA, with sightings in November and February. These were infrequent, with a peak count of two individuals in November, suggesting occasional presence.
- 4.4.3 Avocet was not recorded during the breeding bird surveys but was observed during the non-breeding period, particularly throughout the VP surveys during 2022/23. Additionally, Avocet breeding records are present in the desk study data, specifically from the Frodsham Wind Farm Monitoring report (2018–2021), as referenced in Annex 8-6, which suggests potential opportunistic breeding outside of the Order Limits.

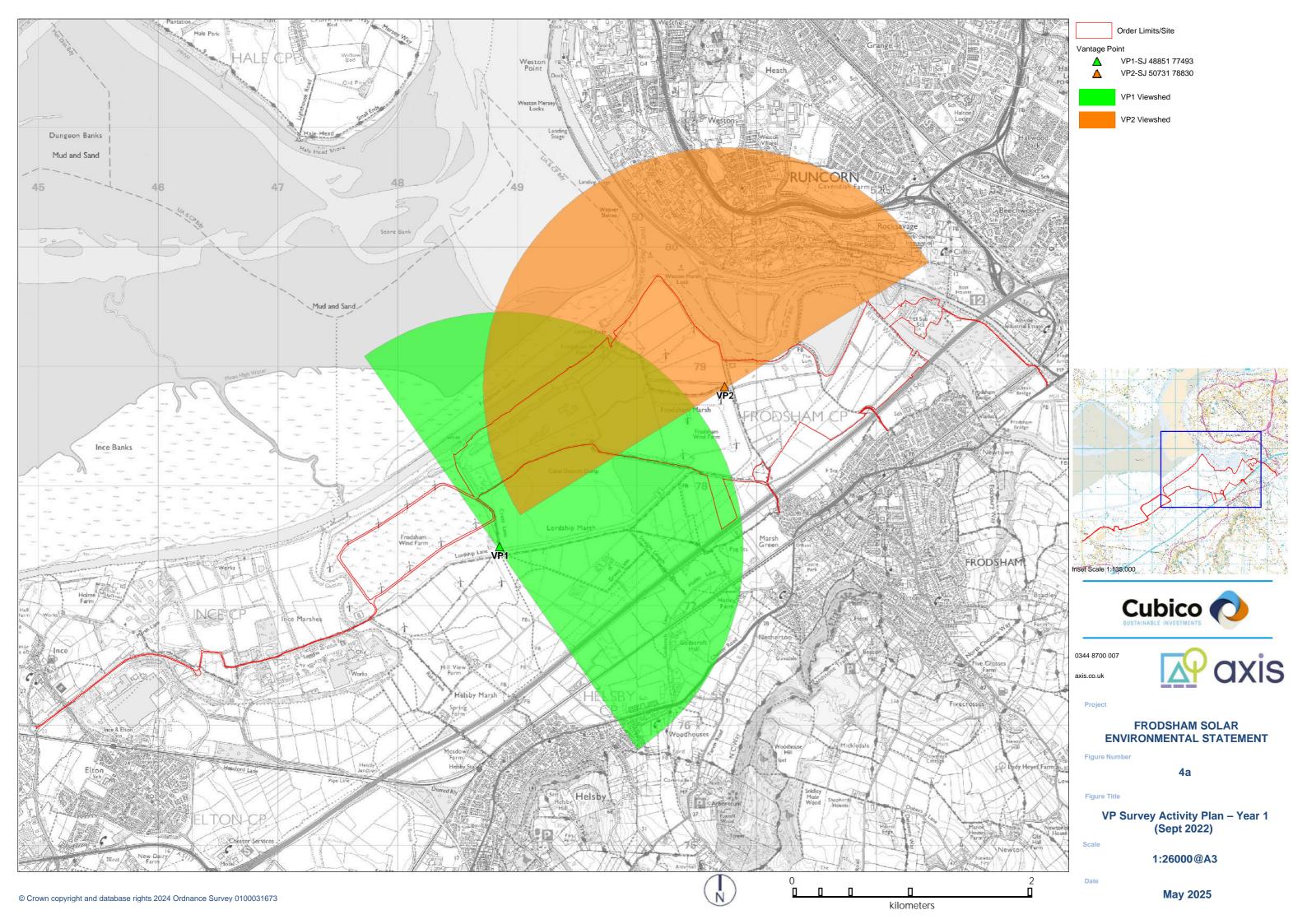
FIGURES

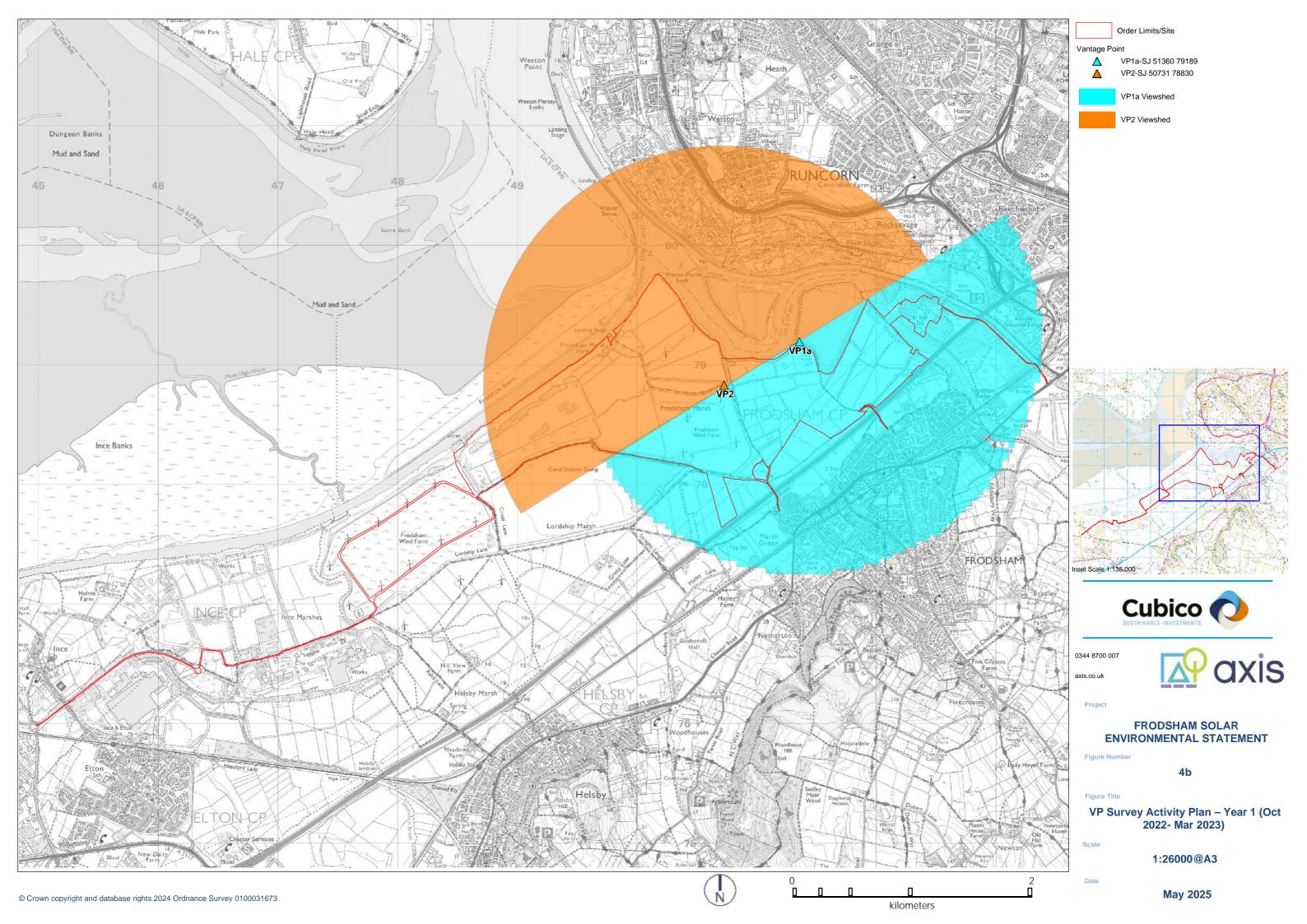


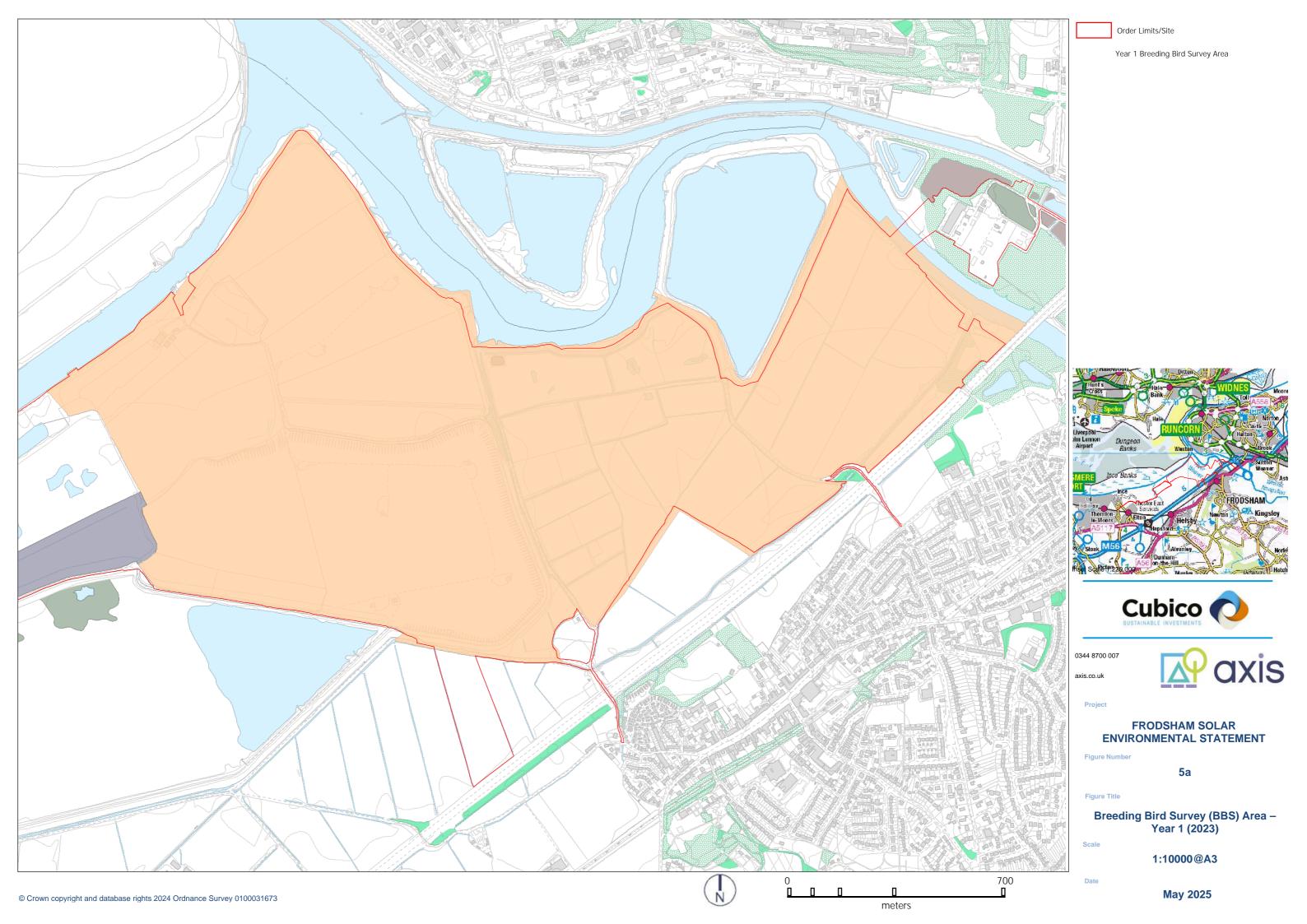


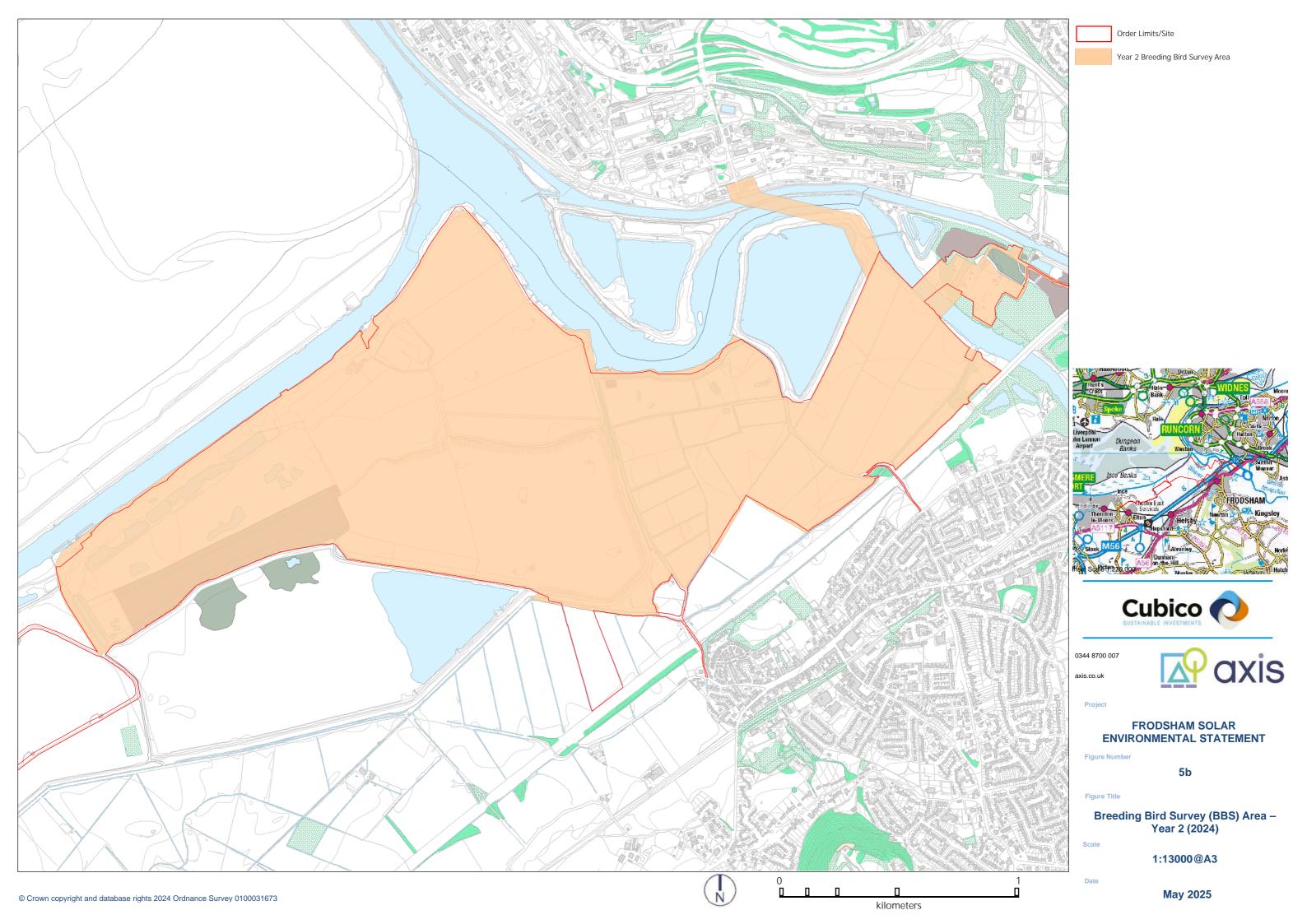


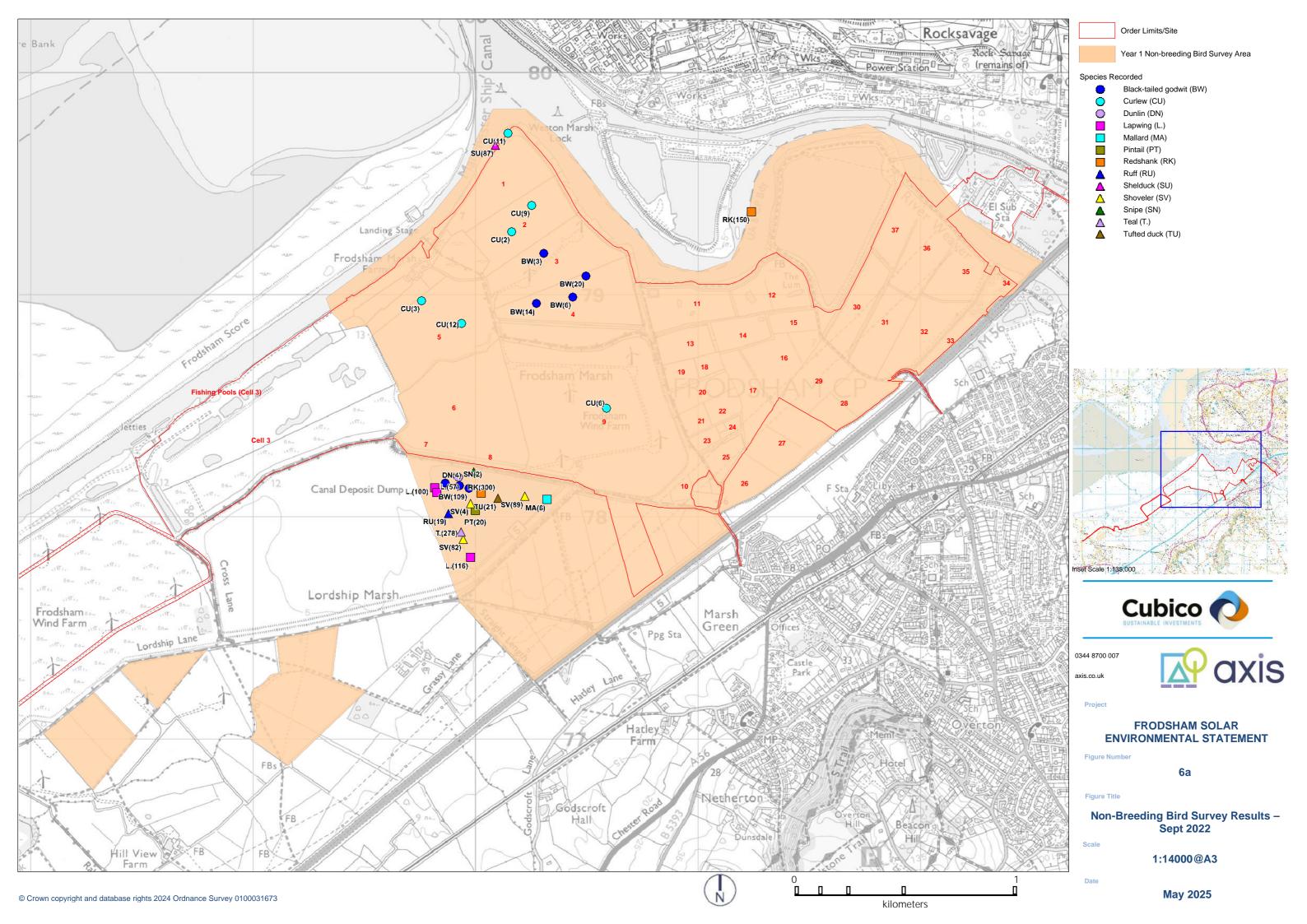


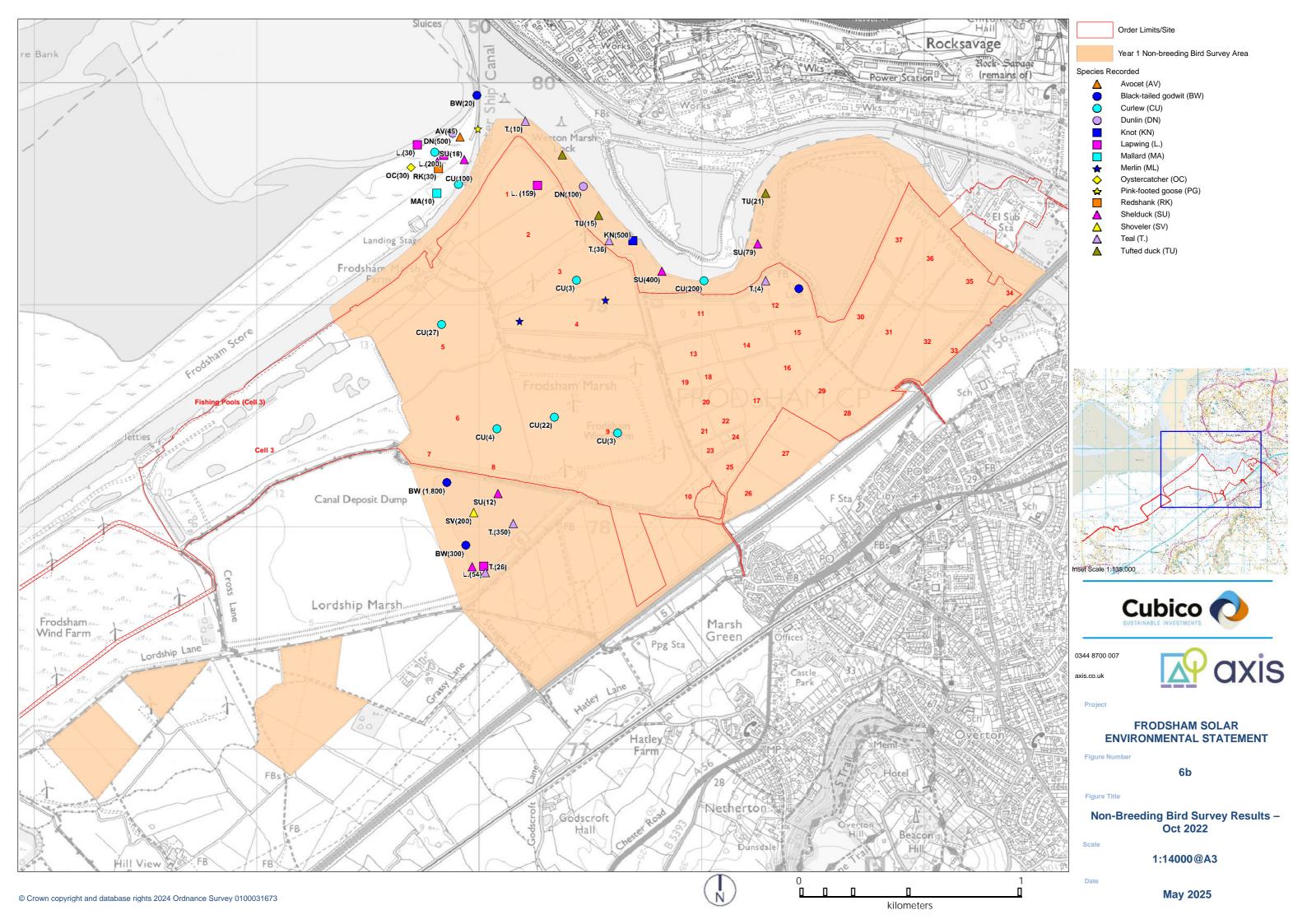


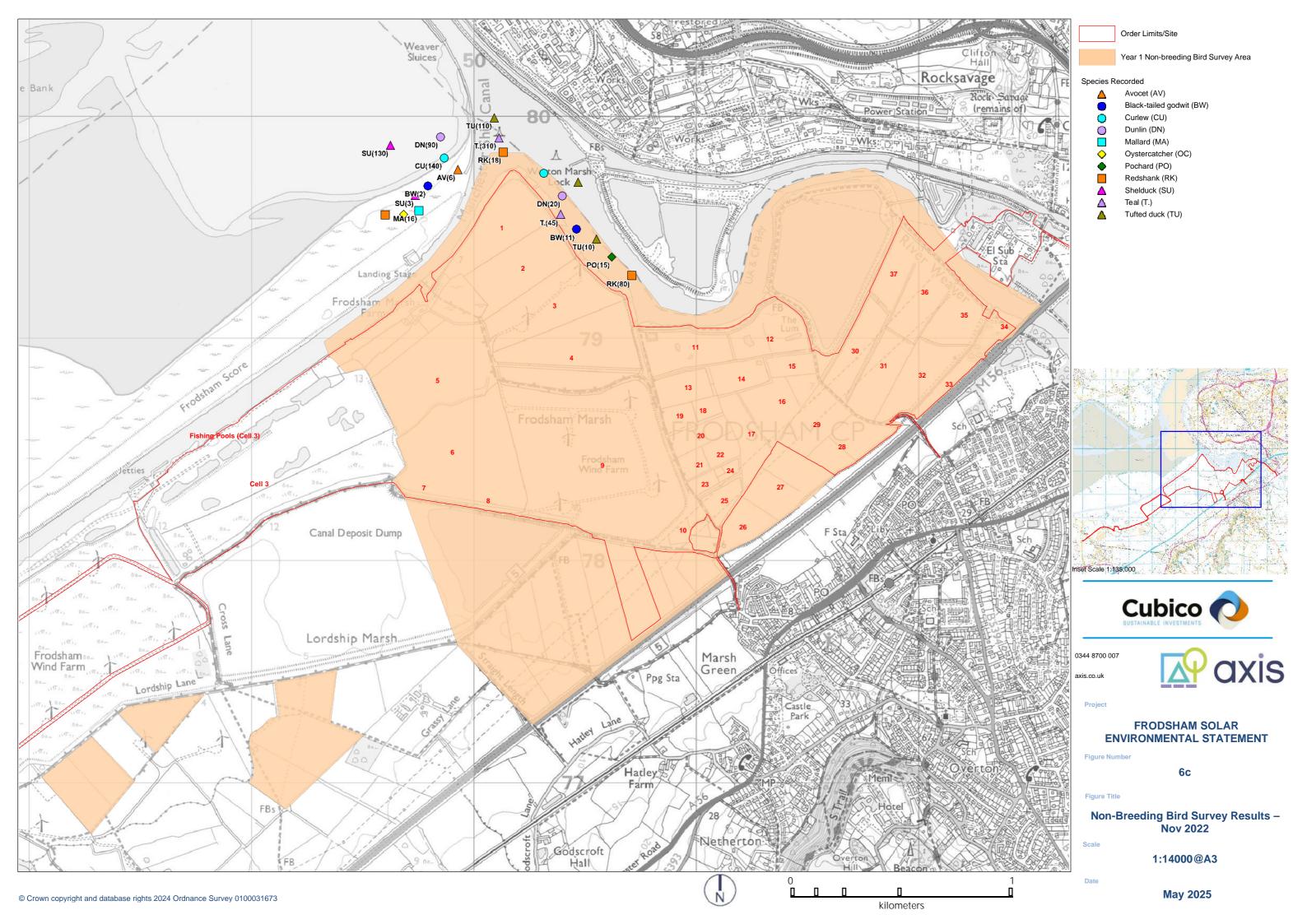


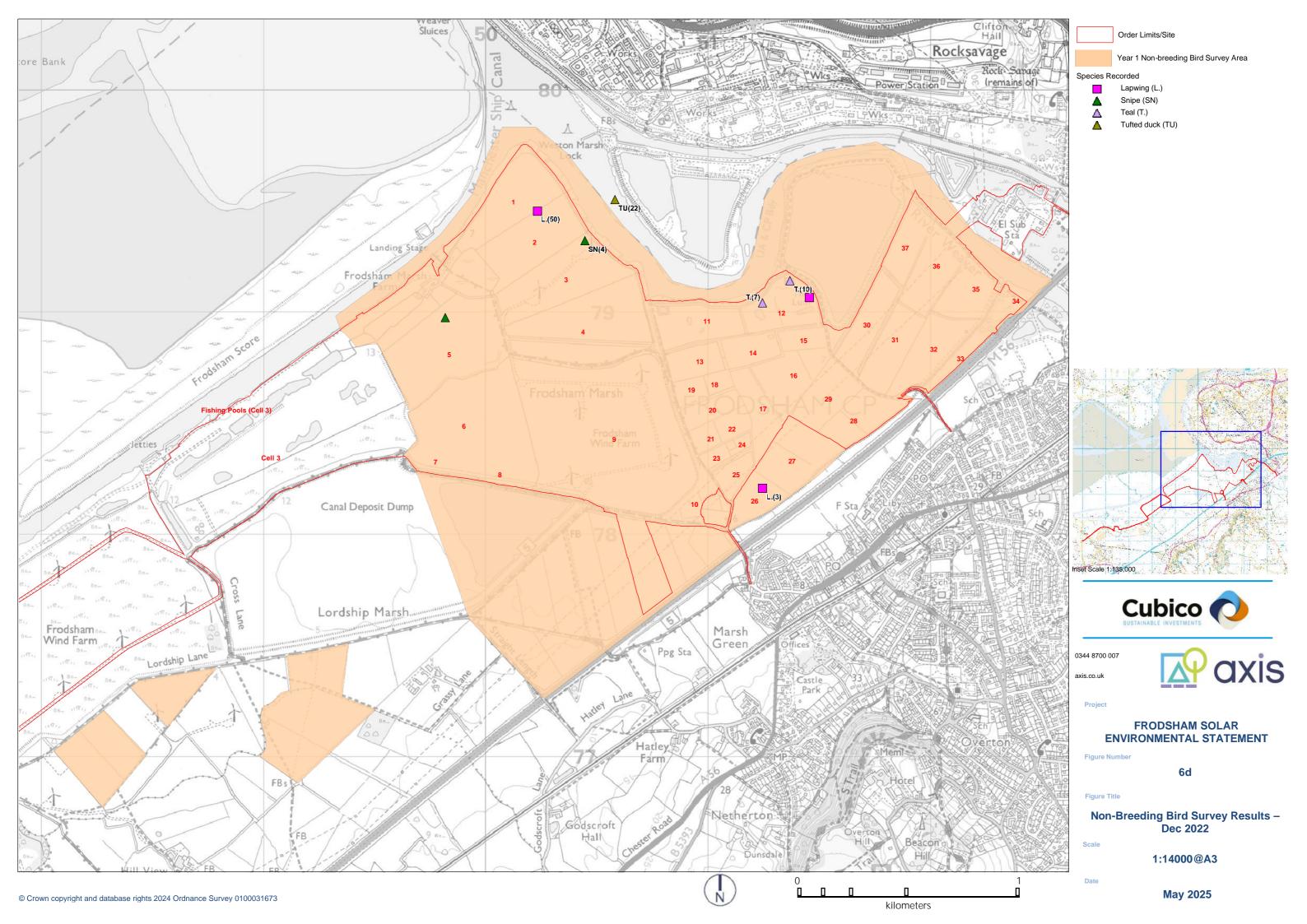


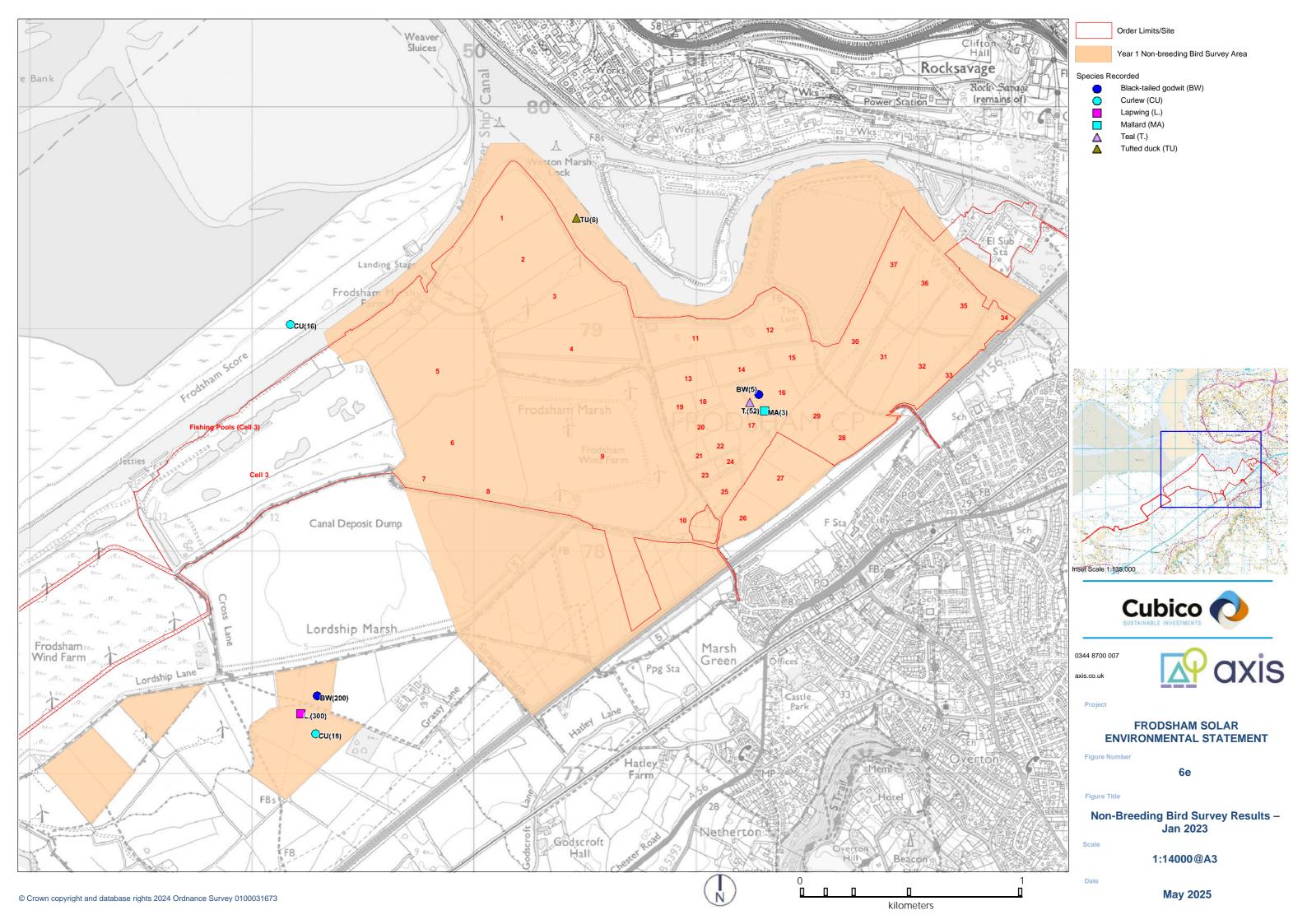


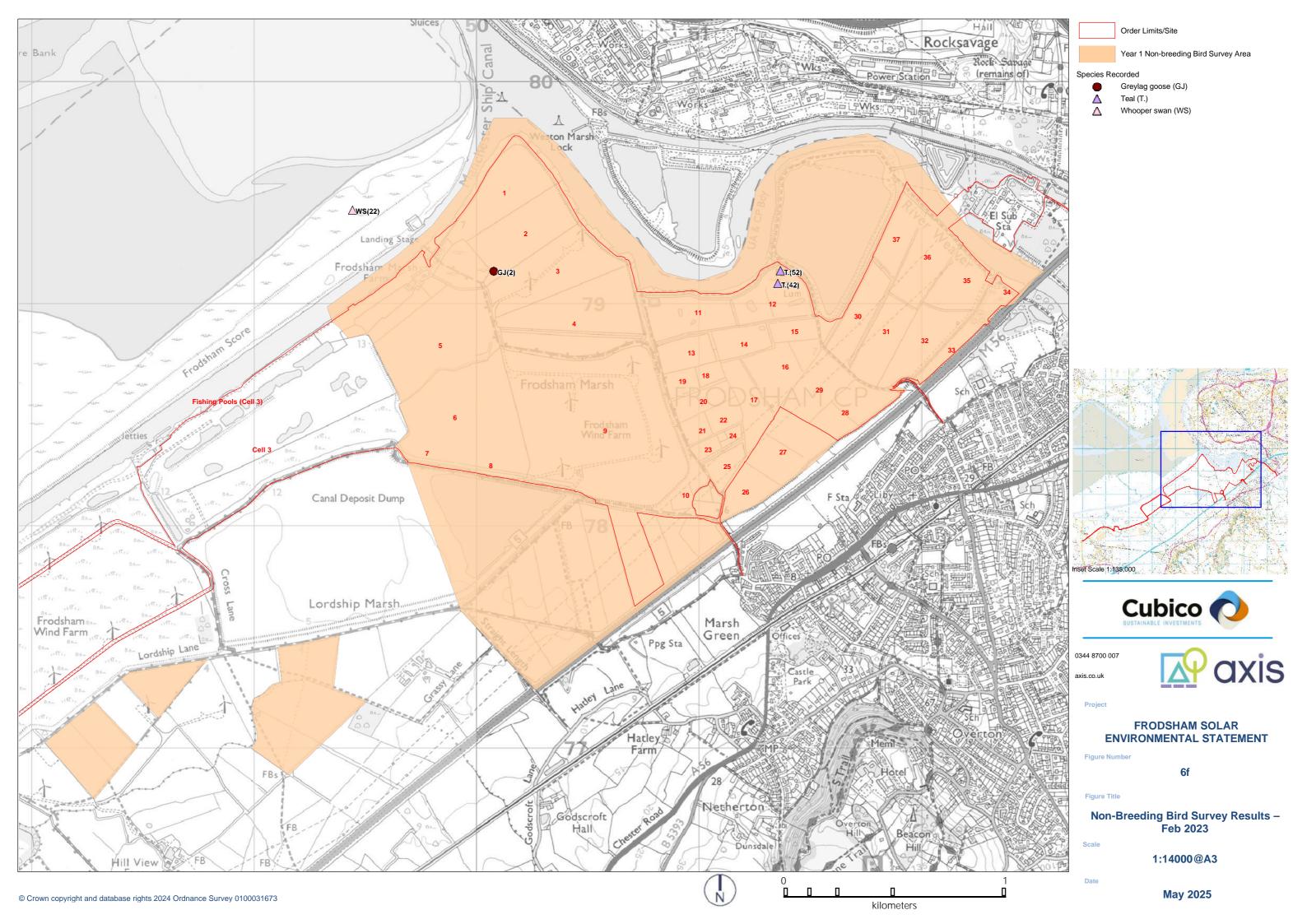


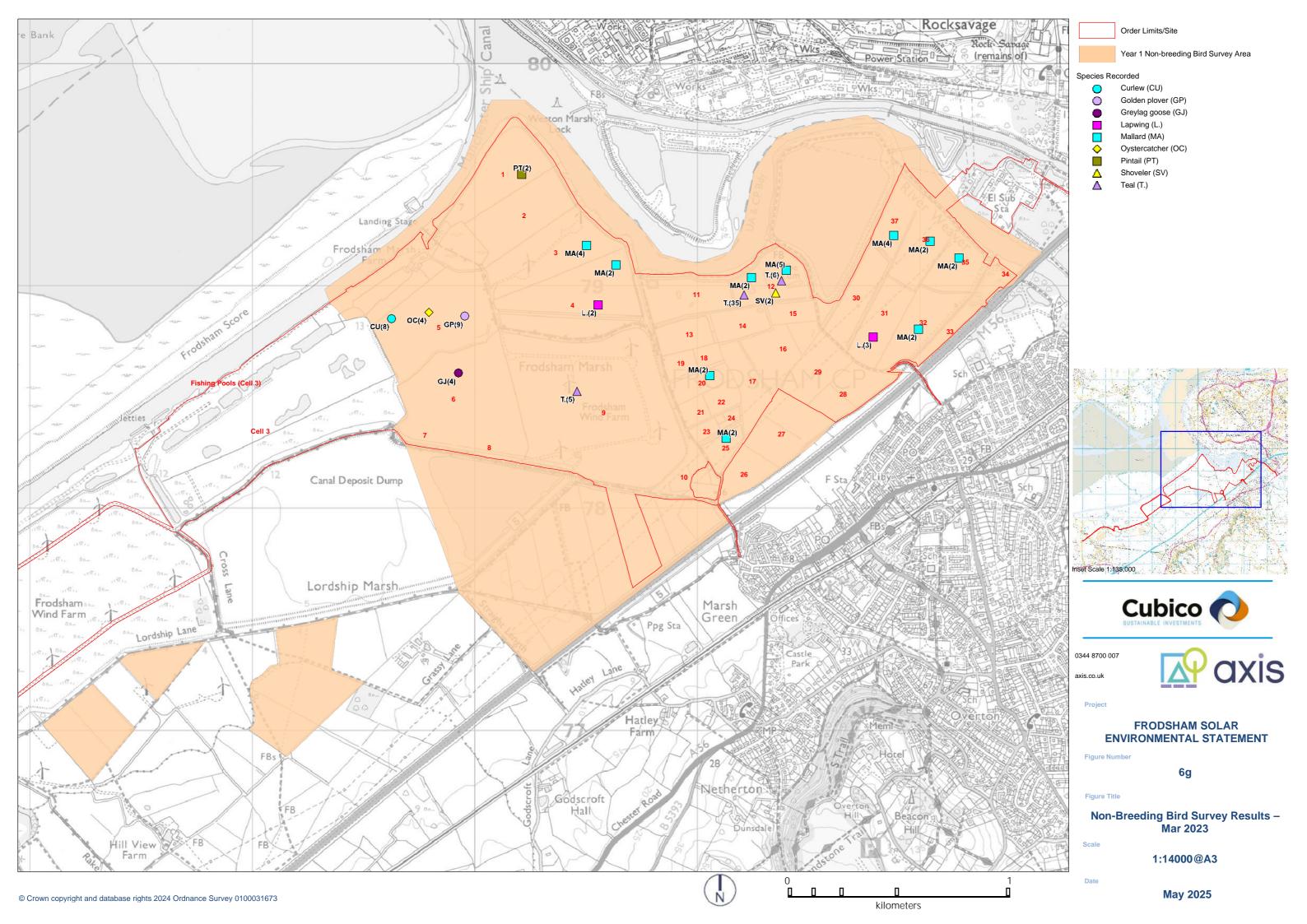


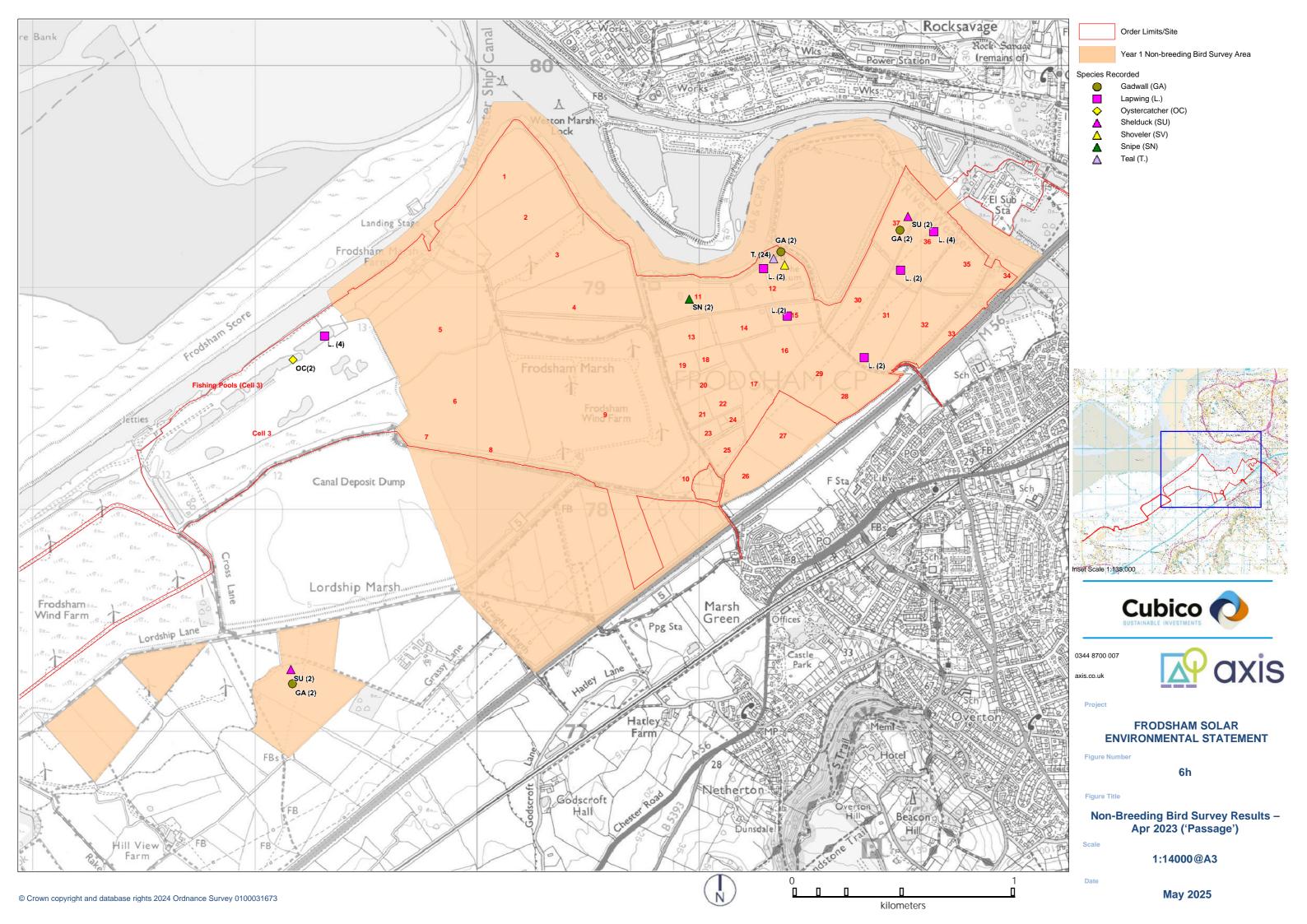


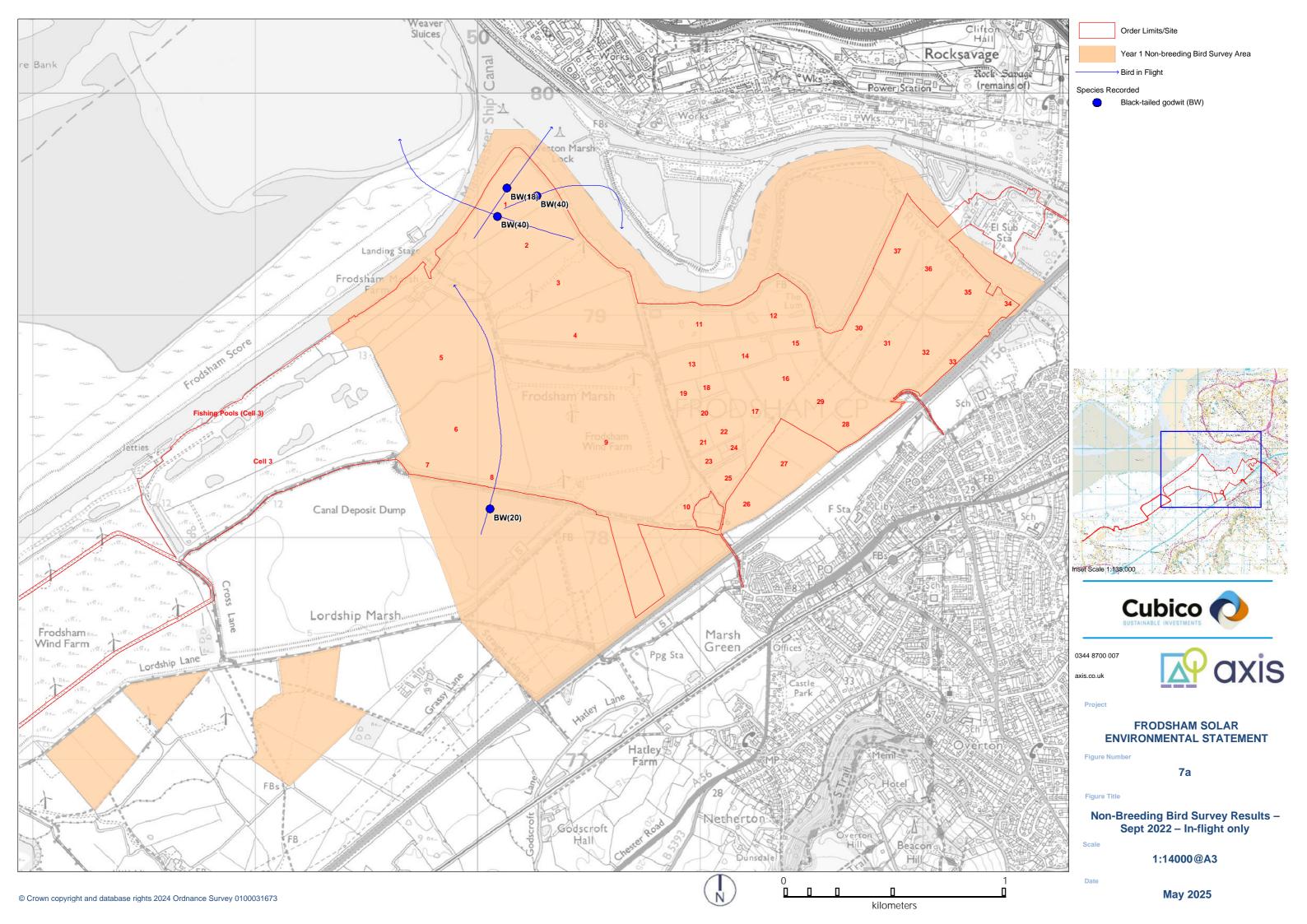


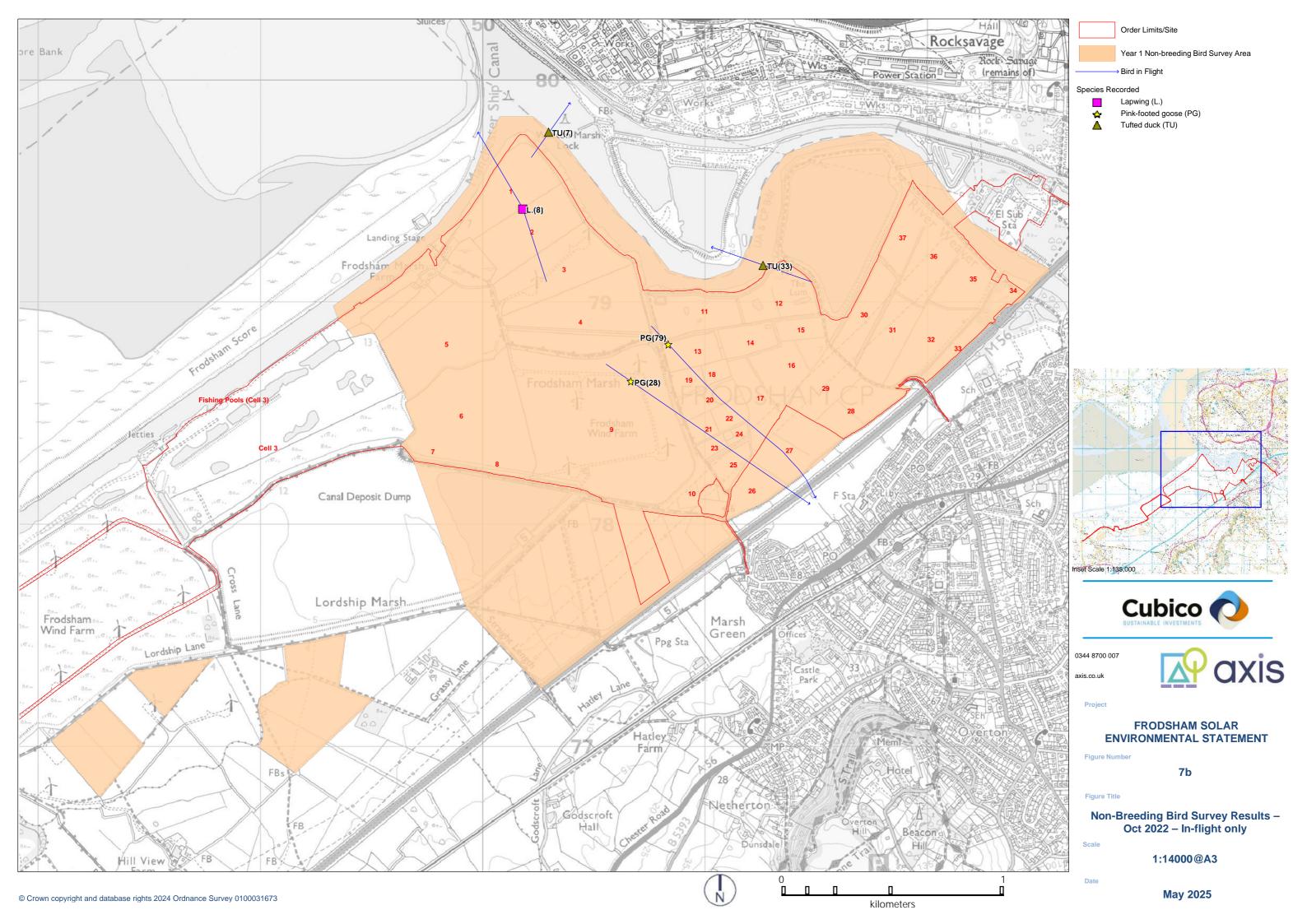


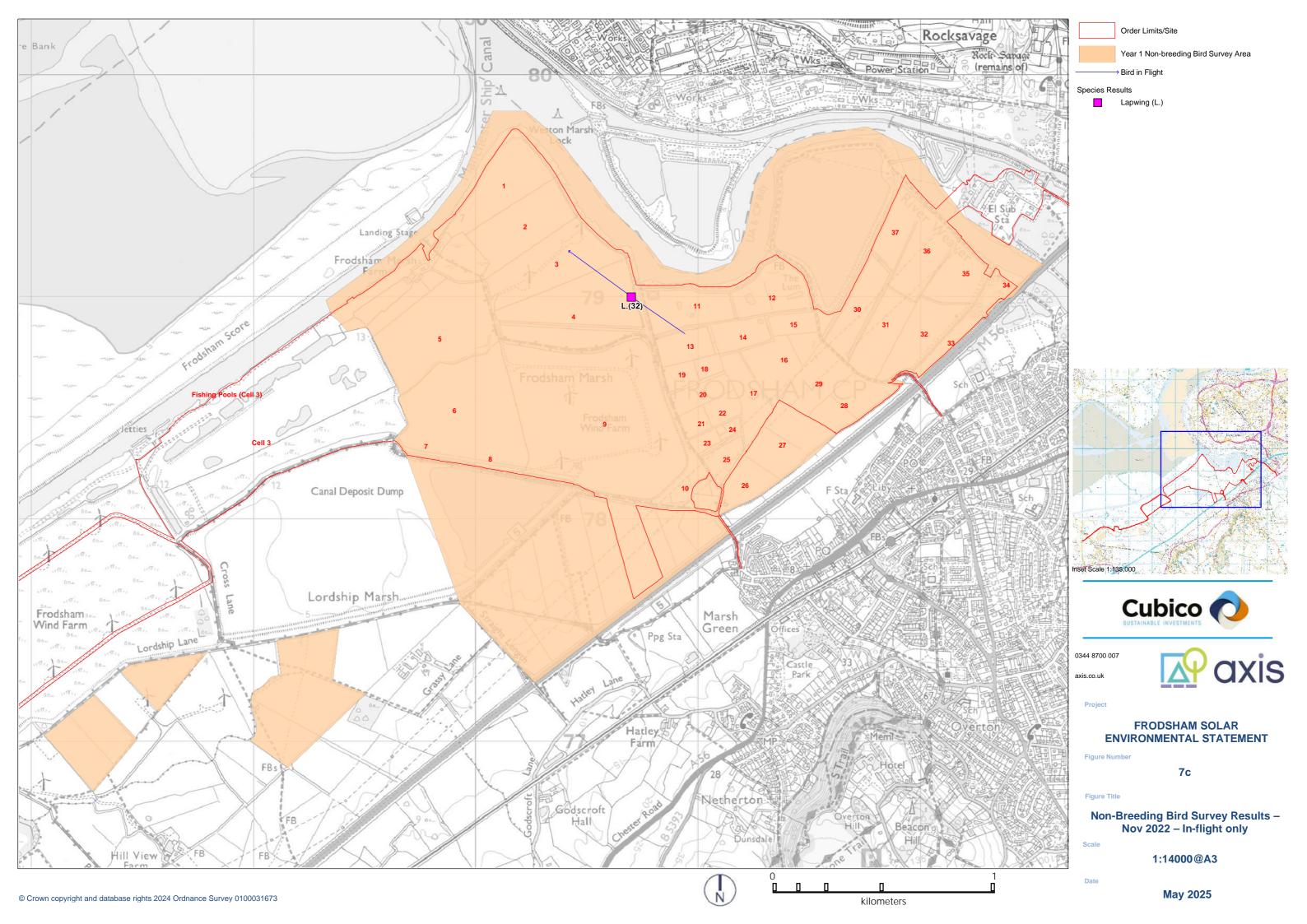


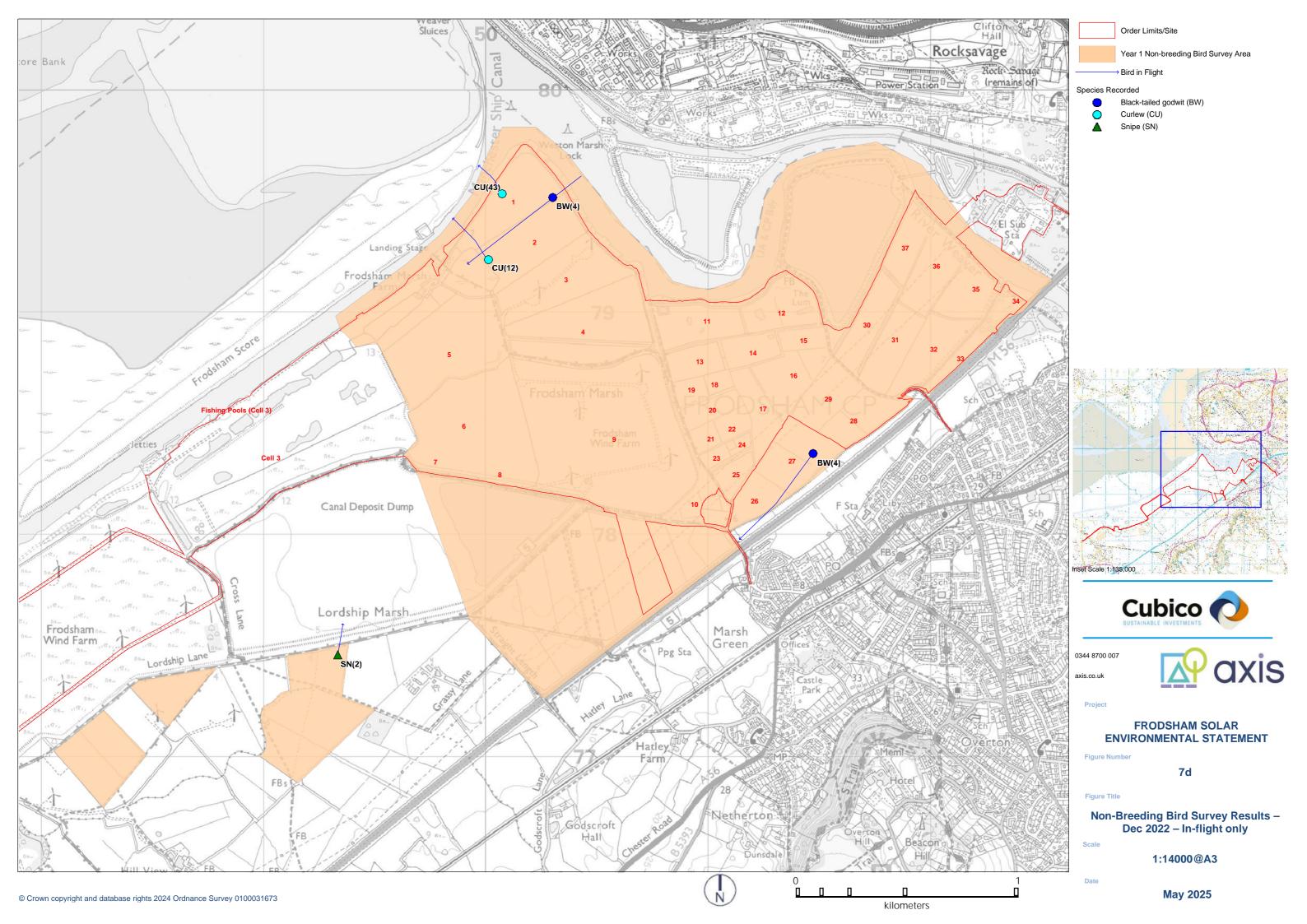


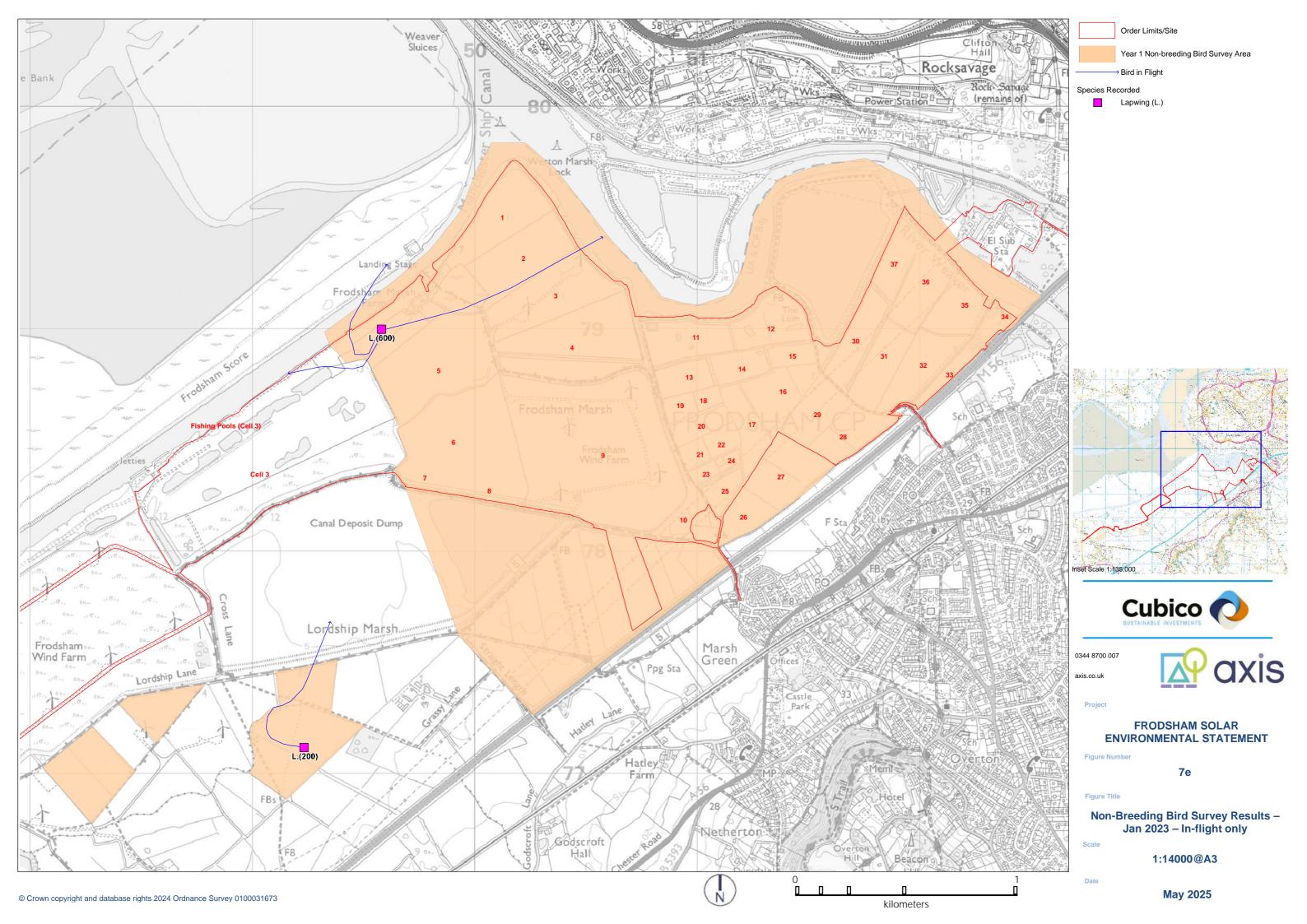


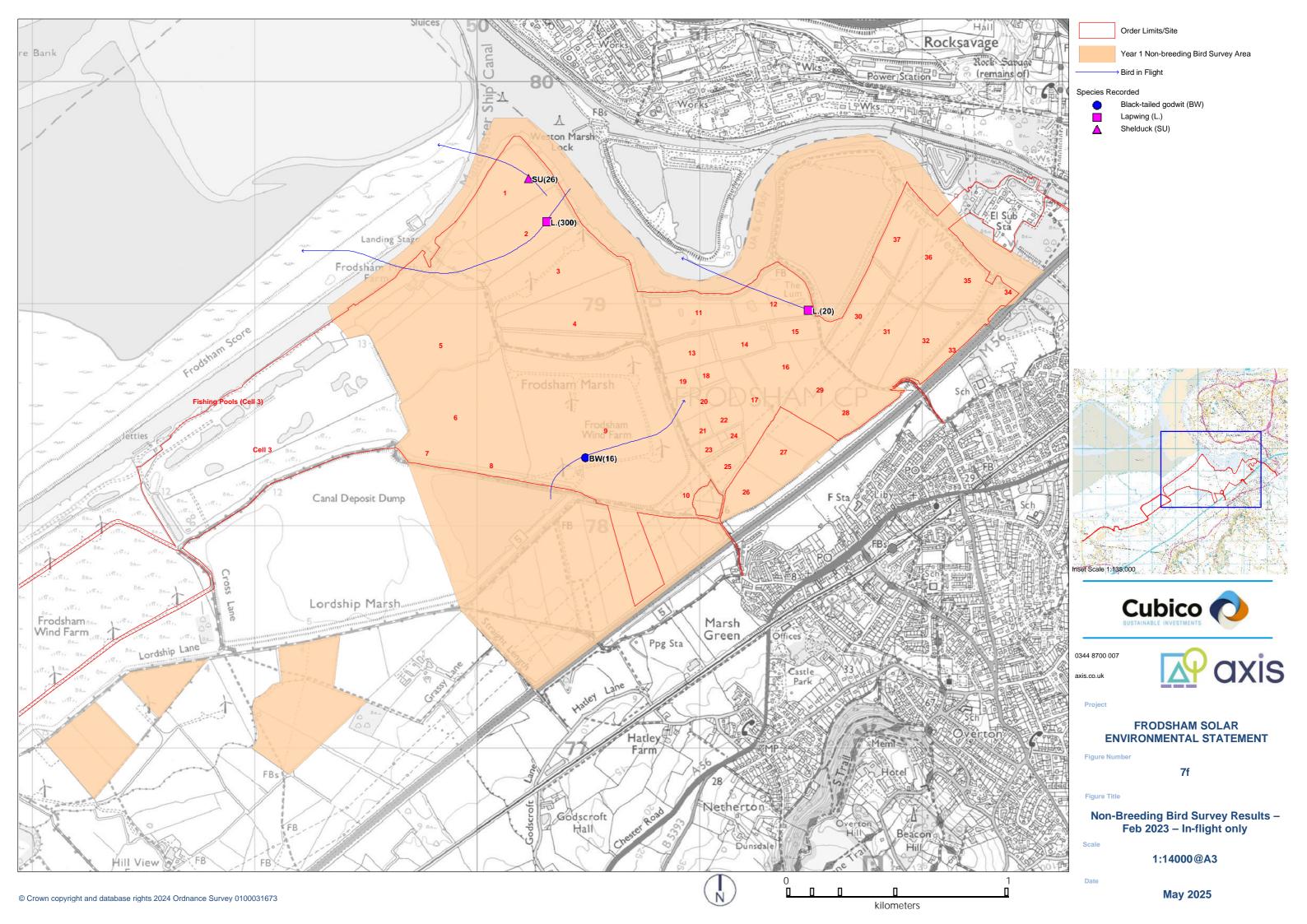


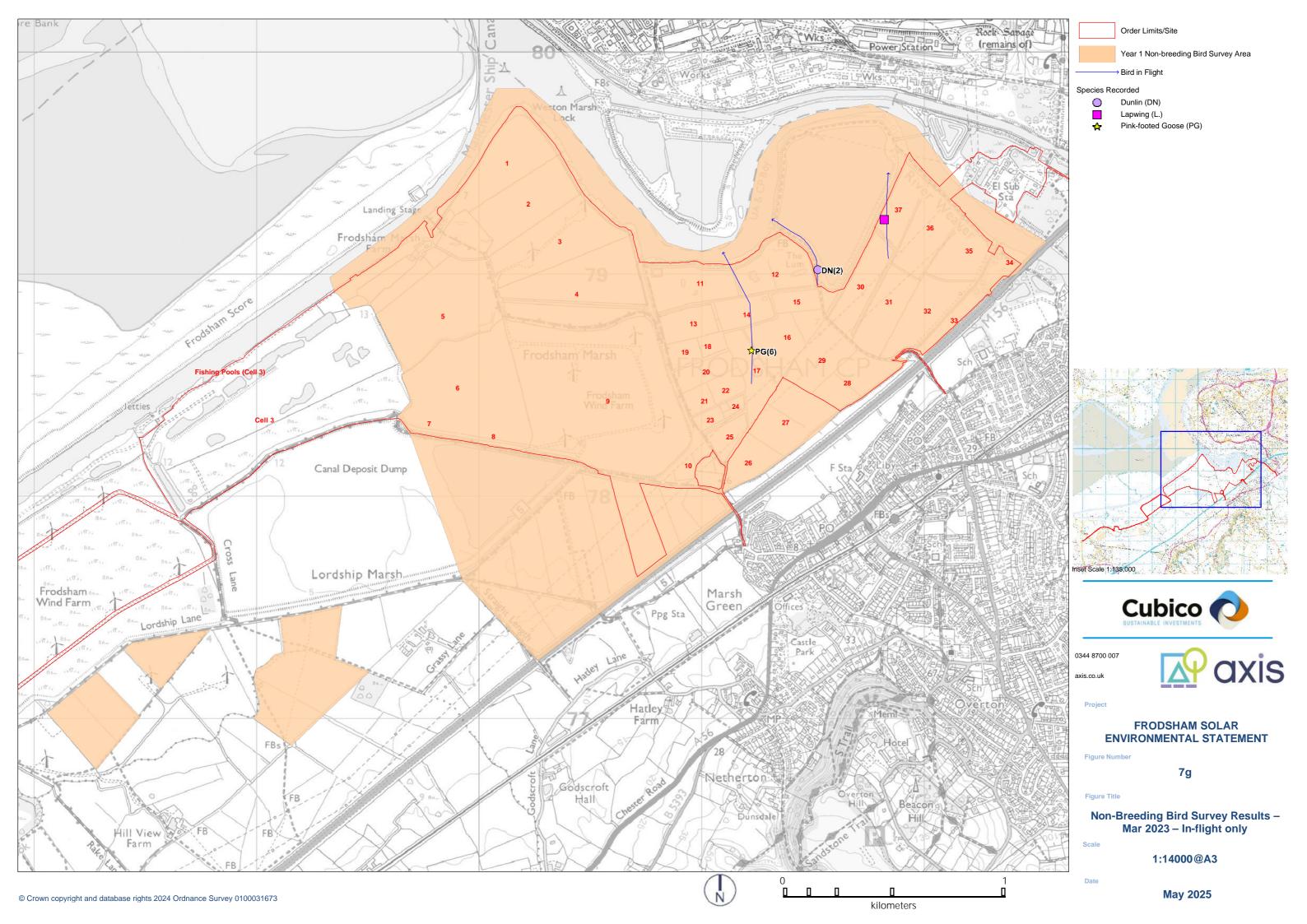


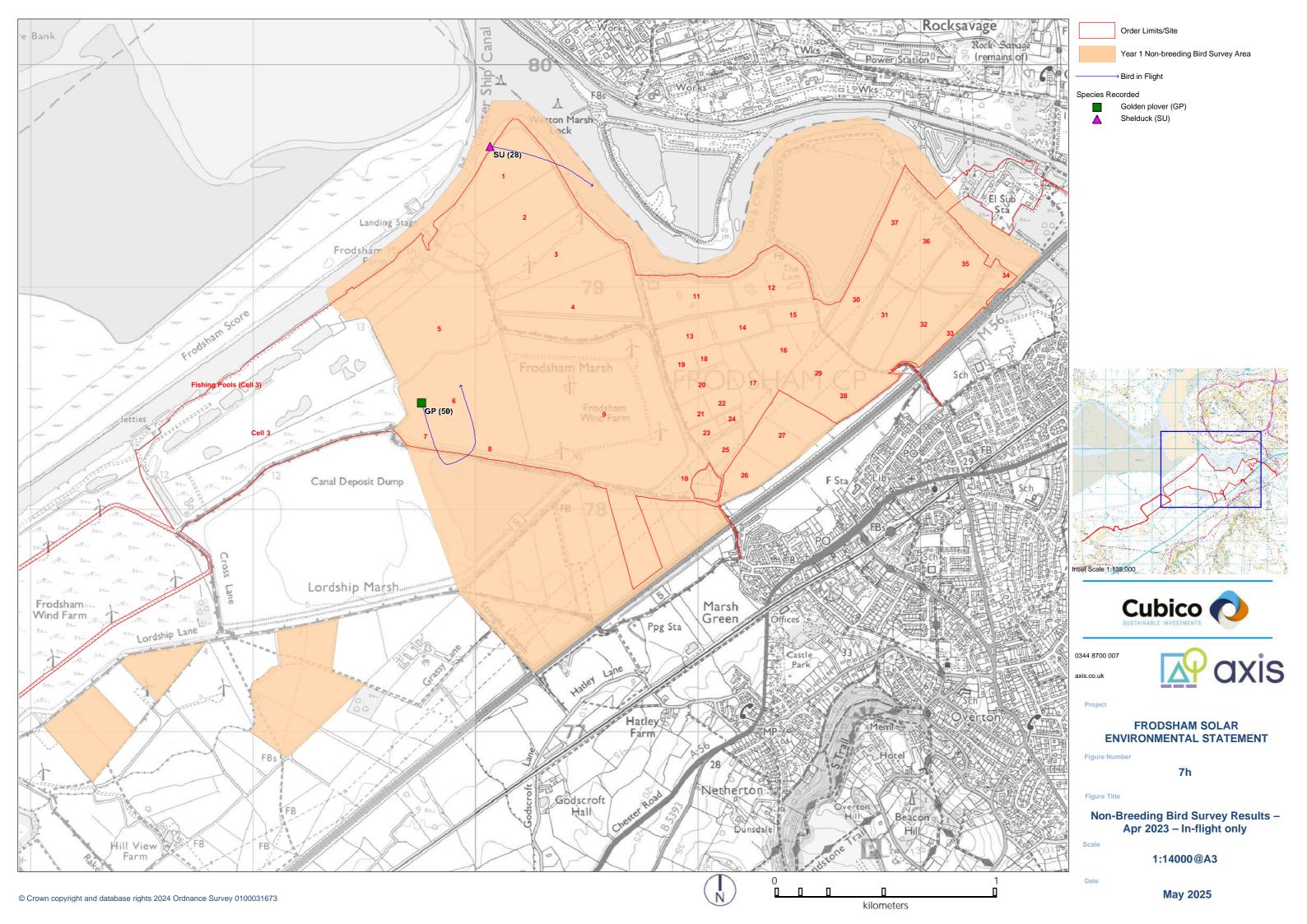


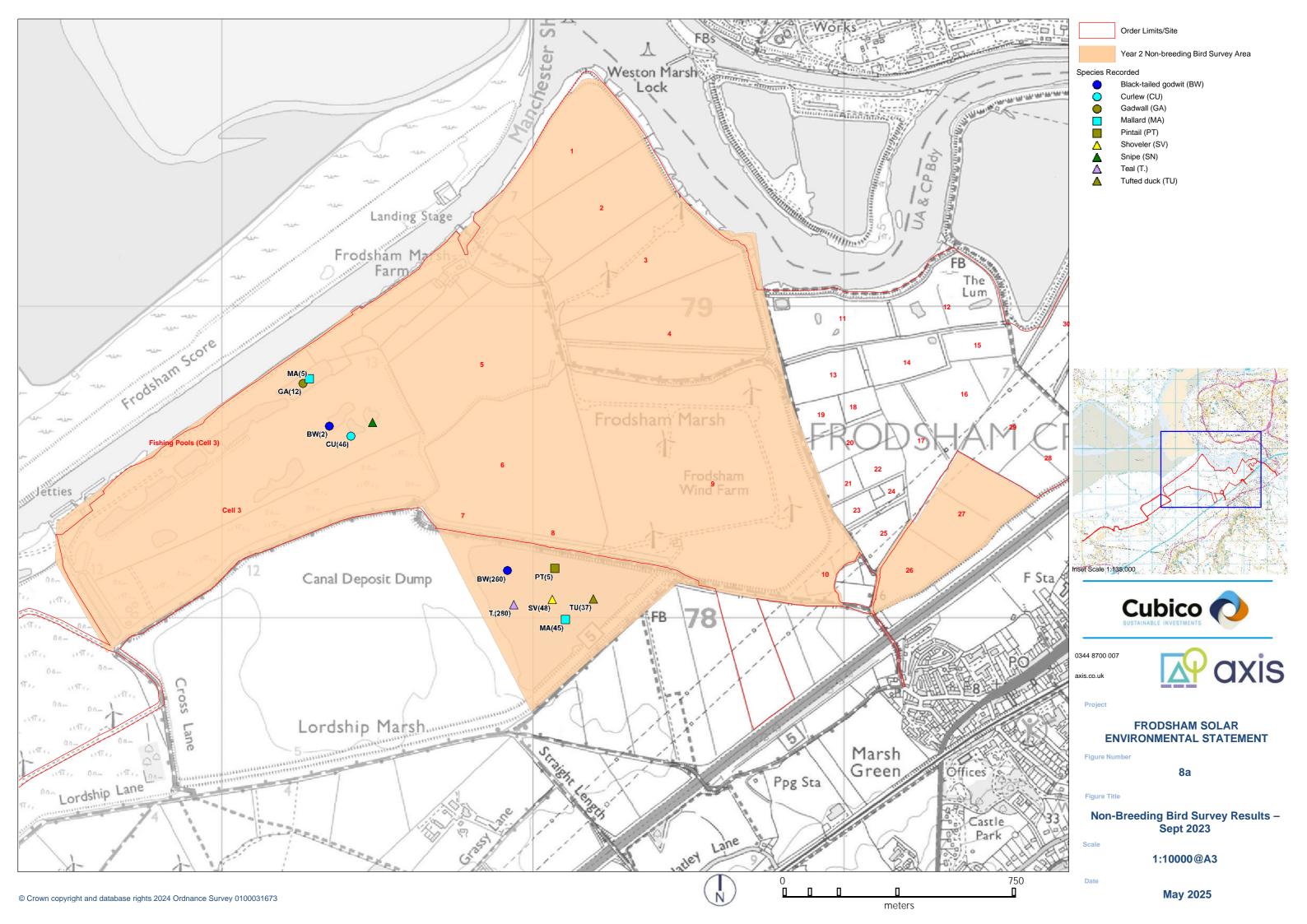


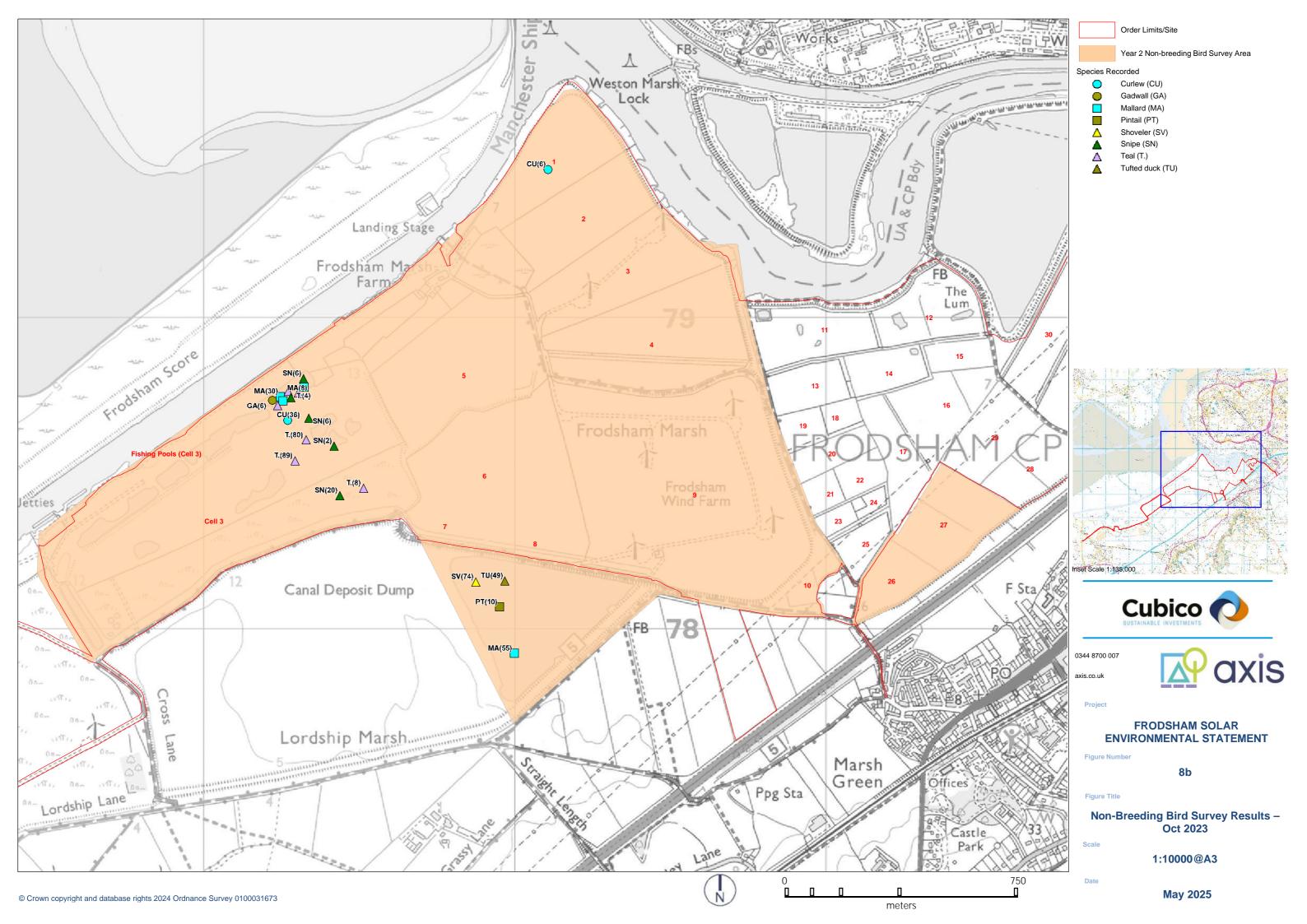


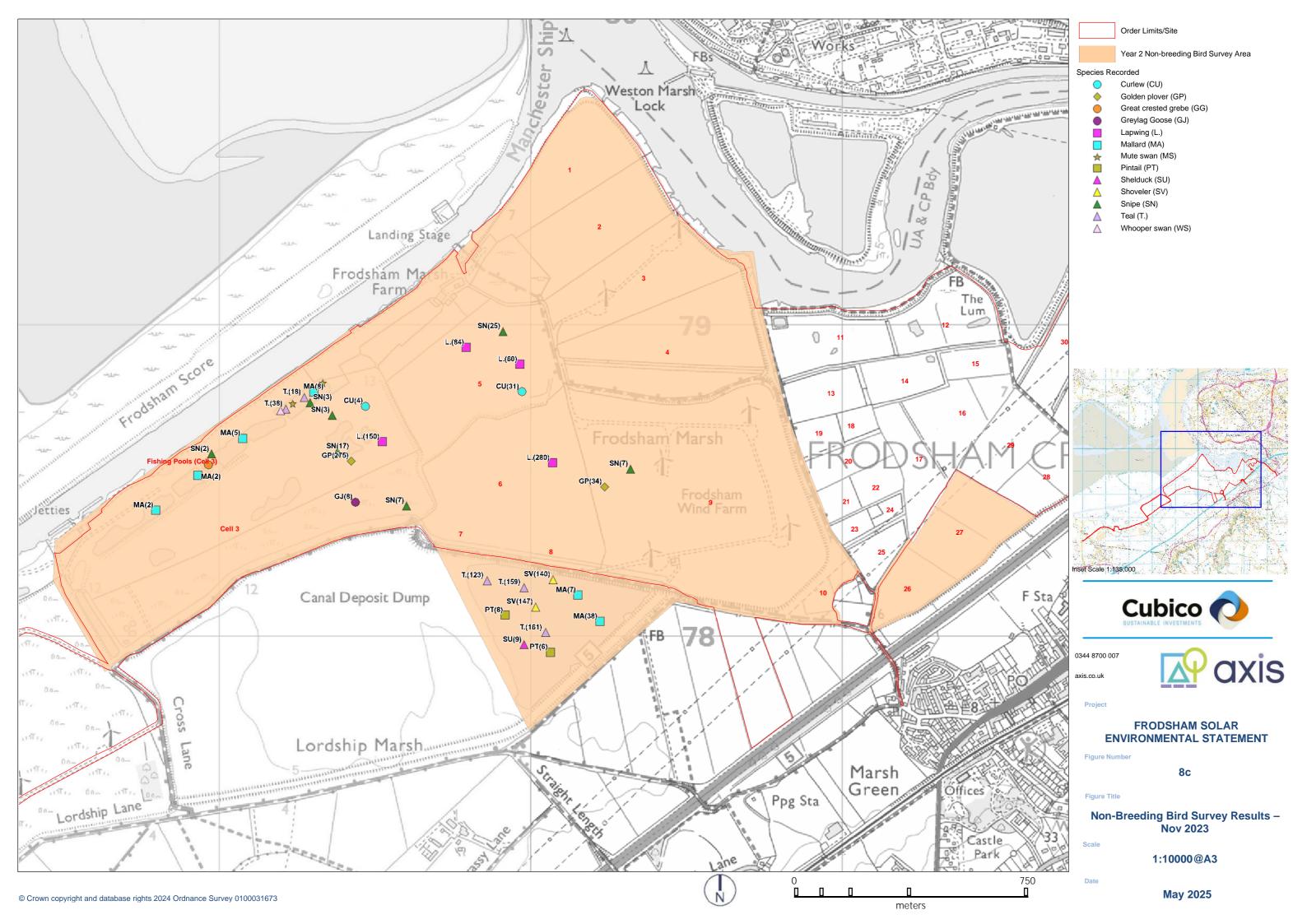


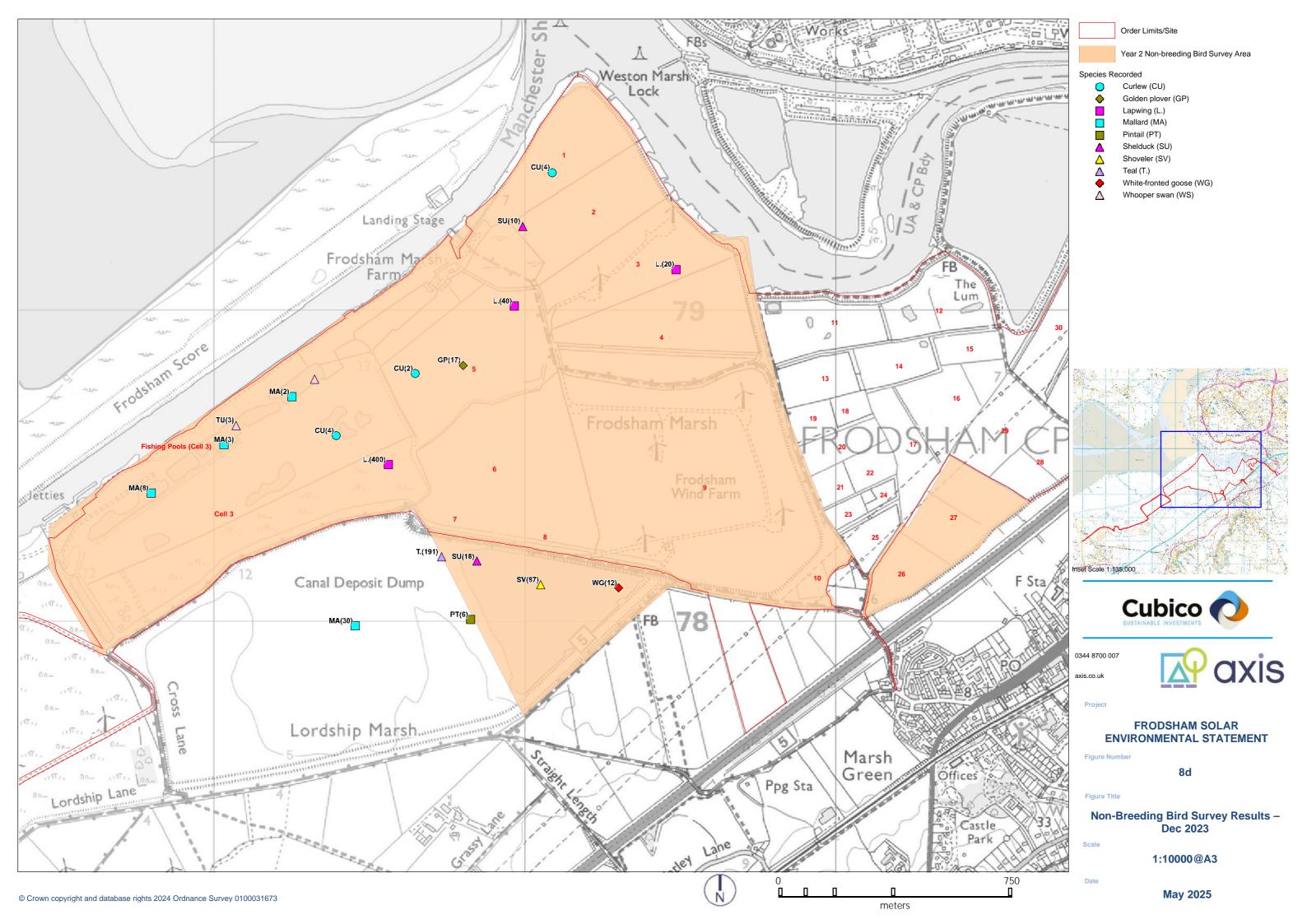


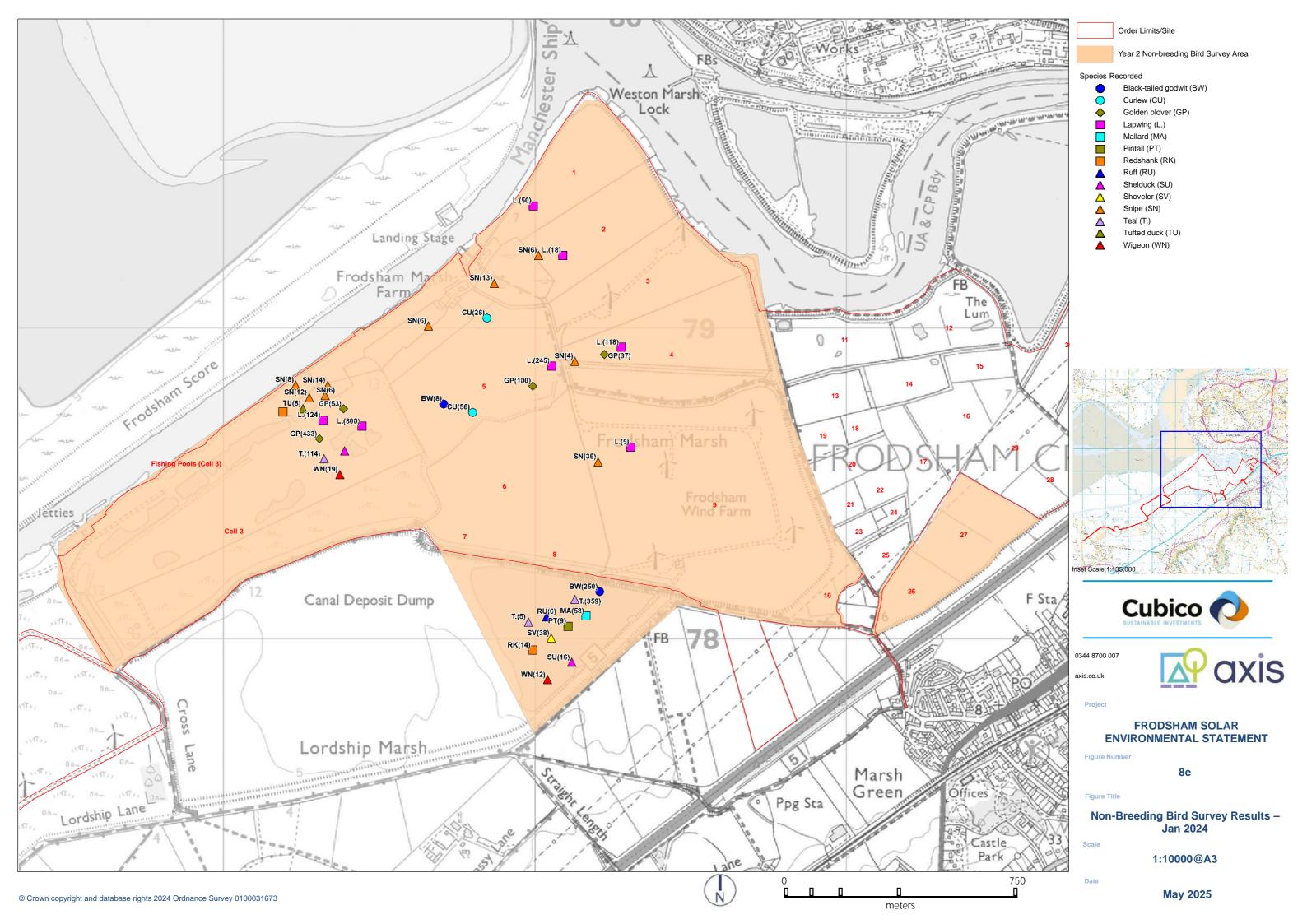


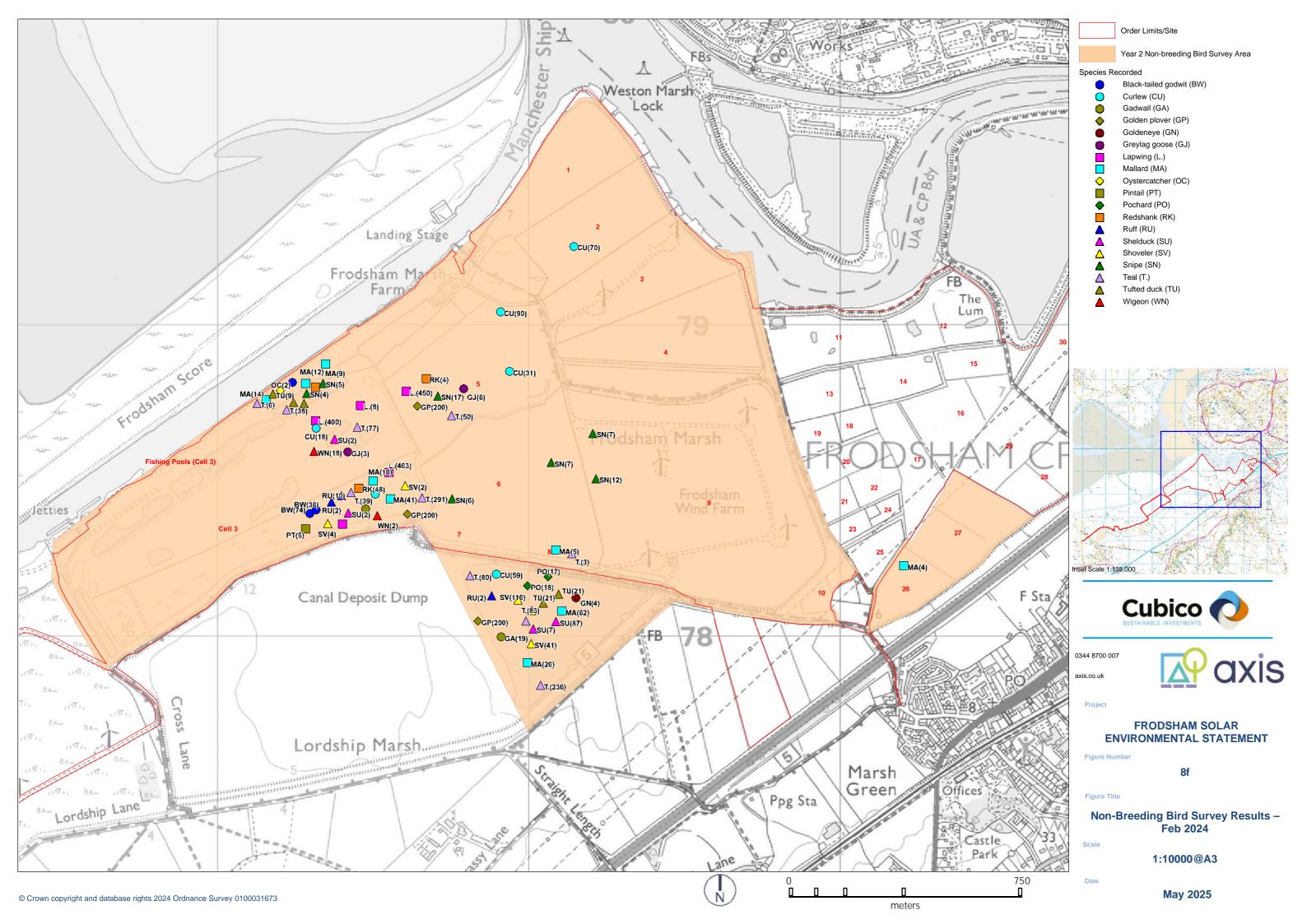


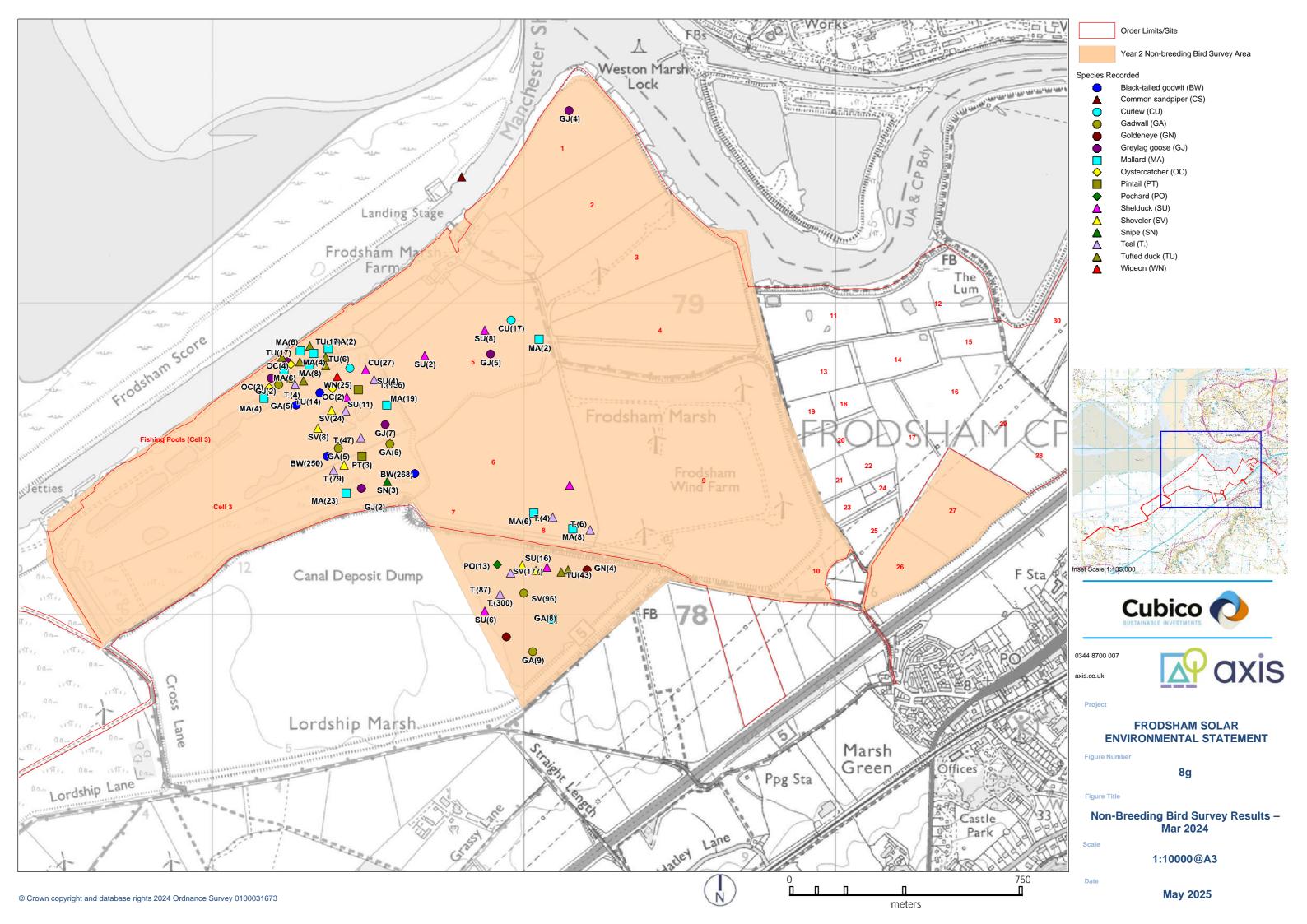


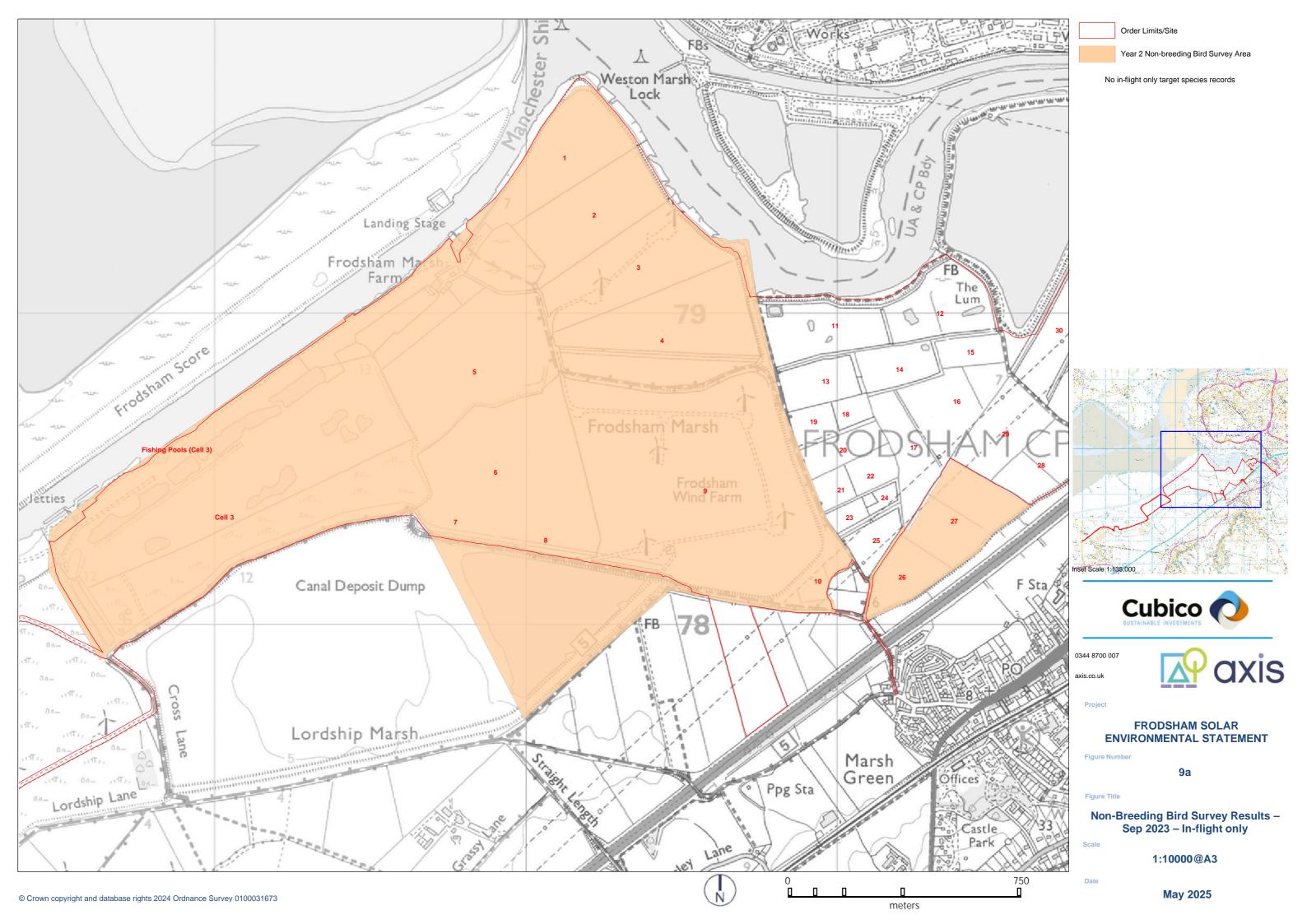


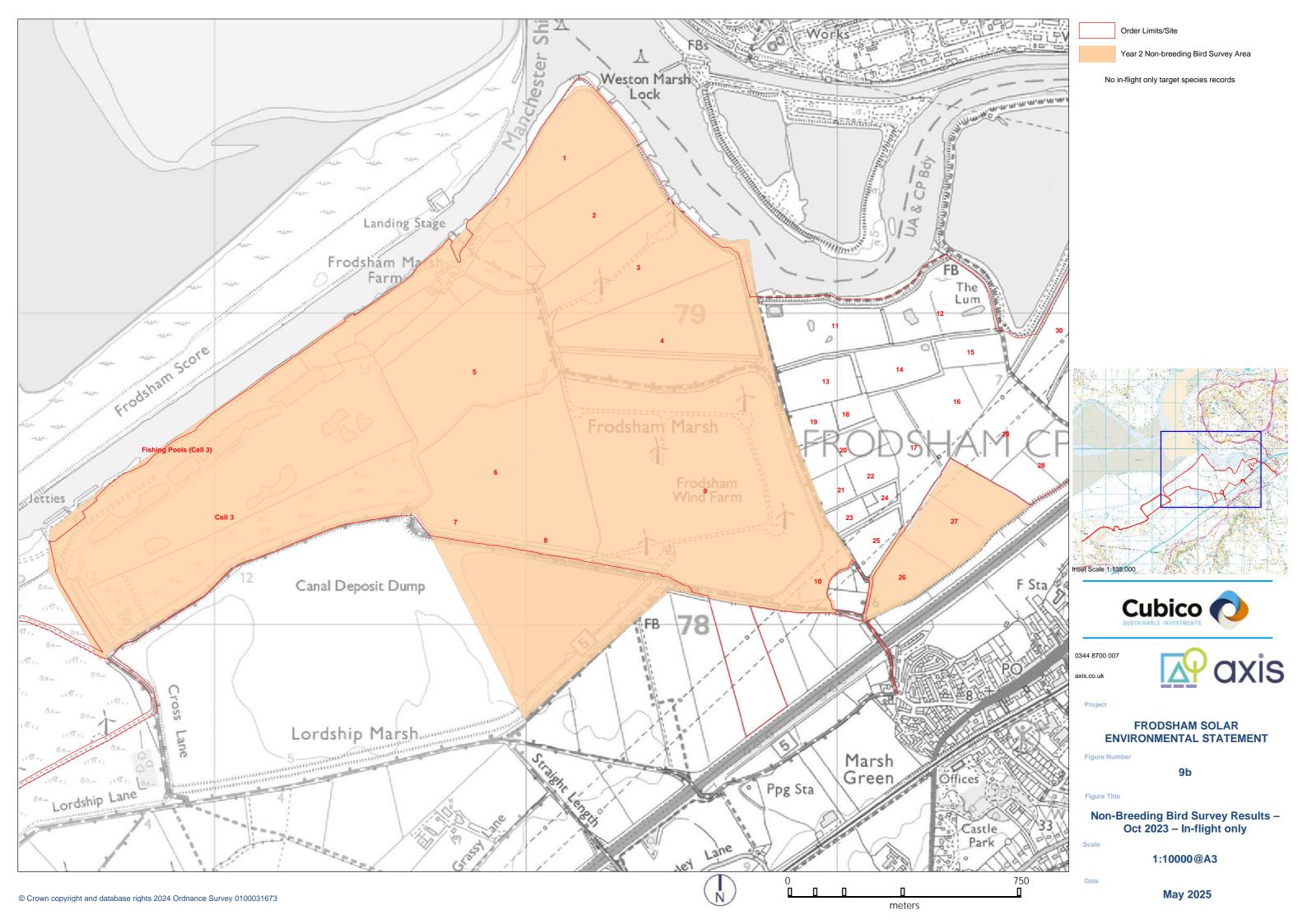


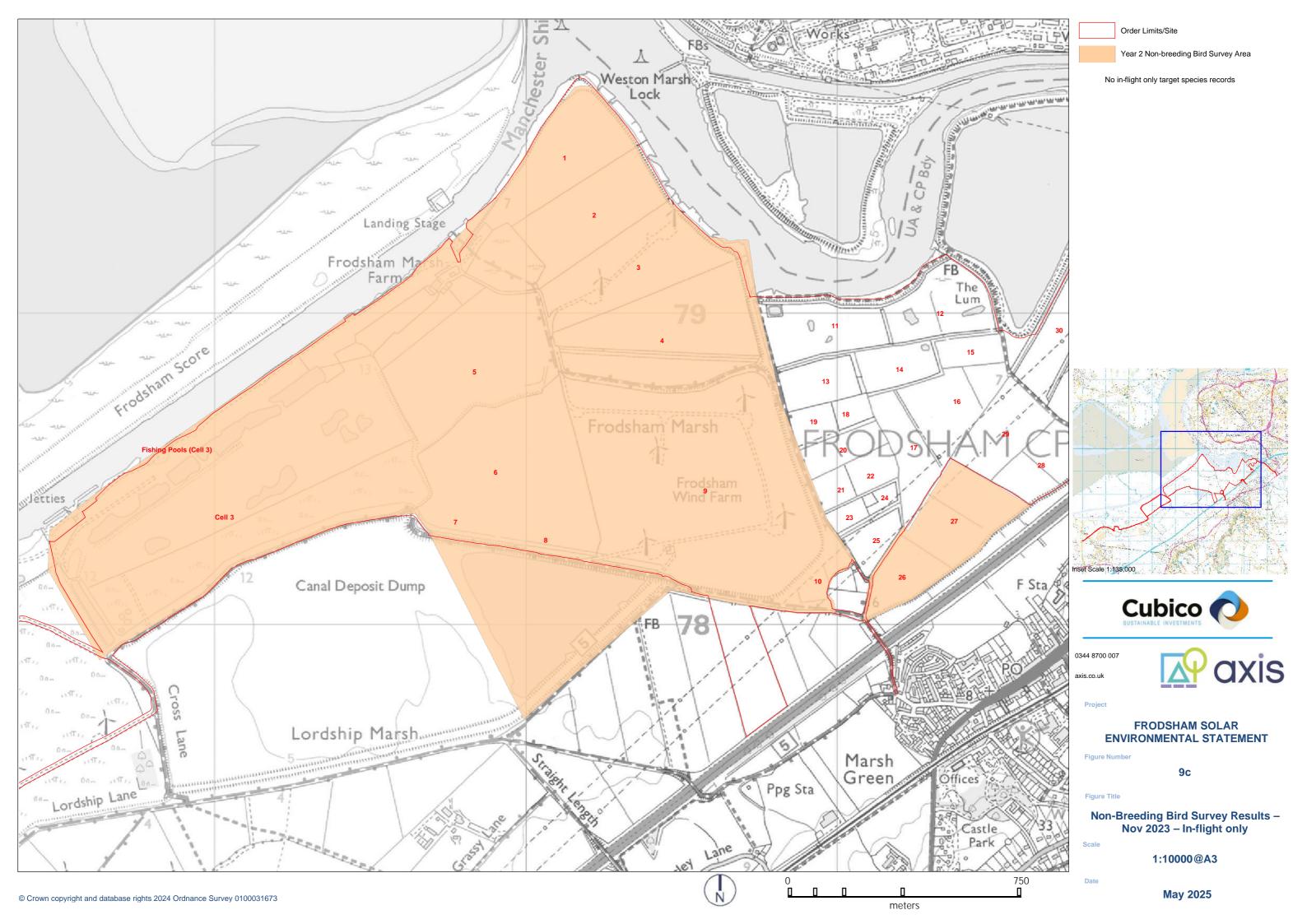


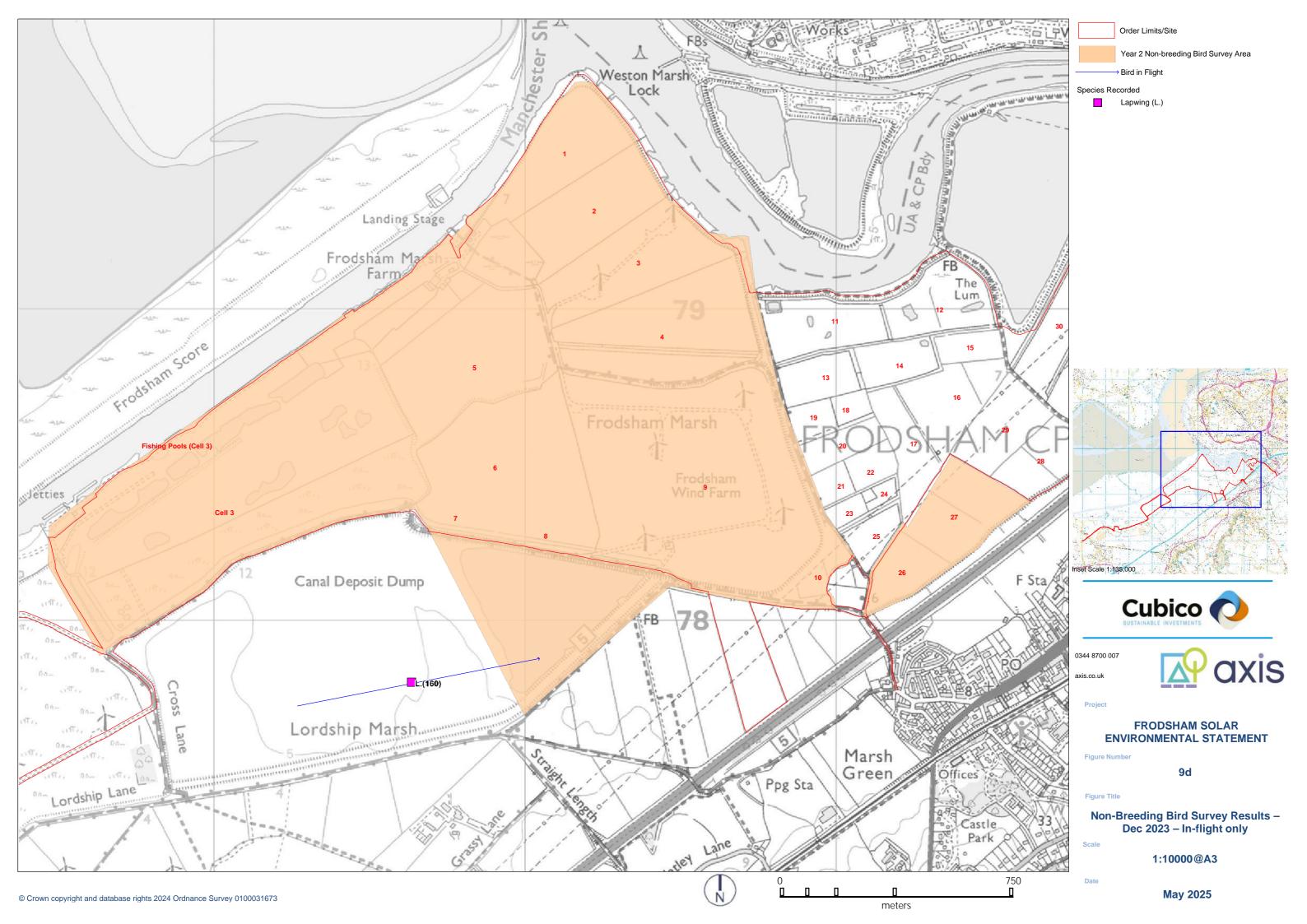


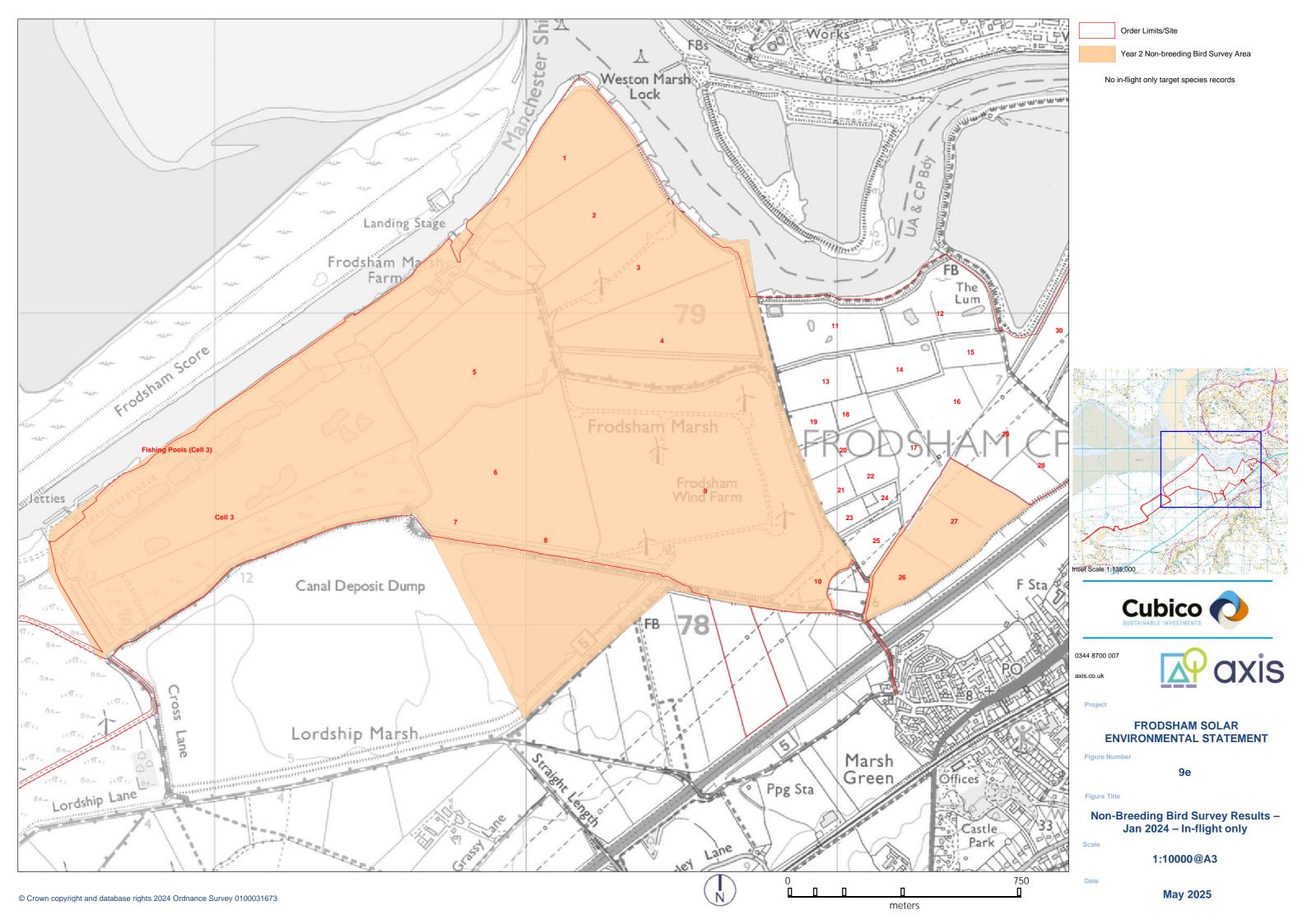


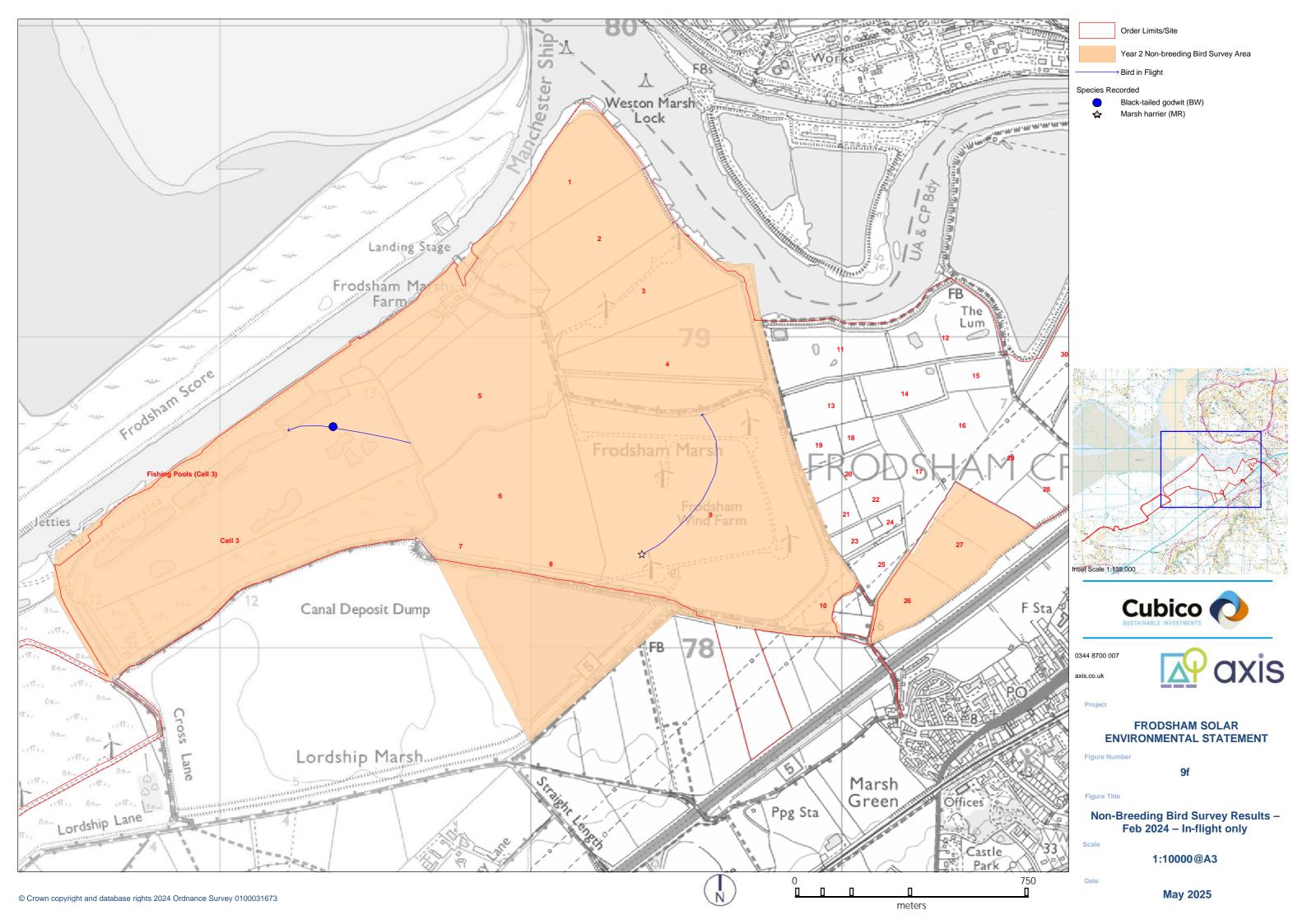


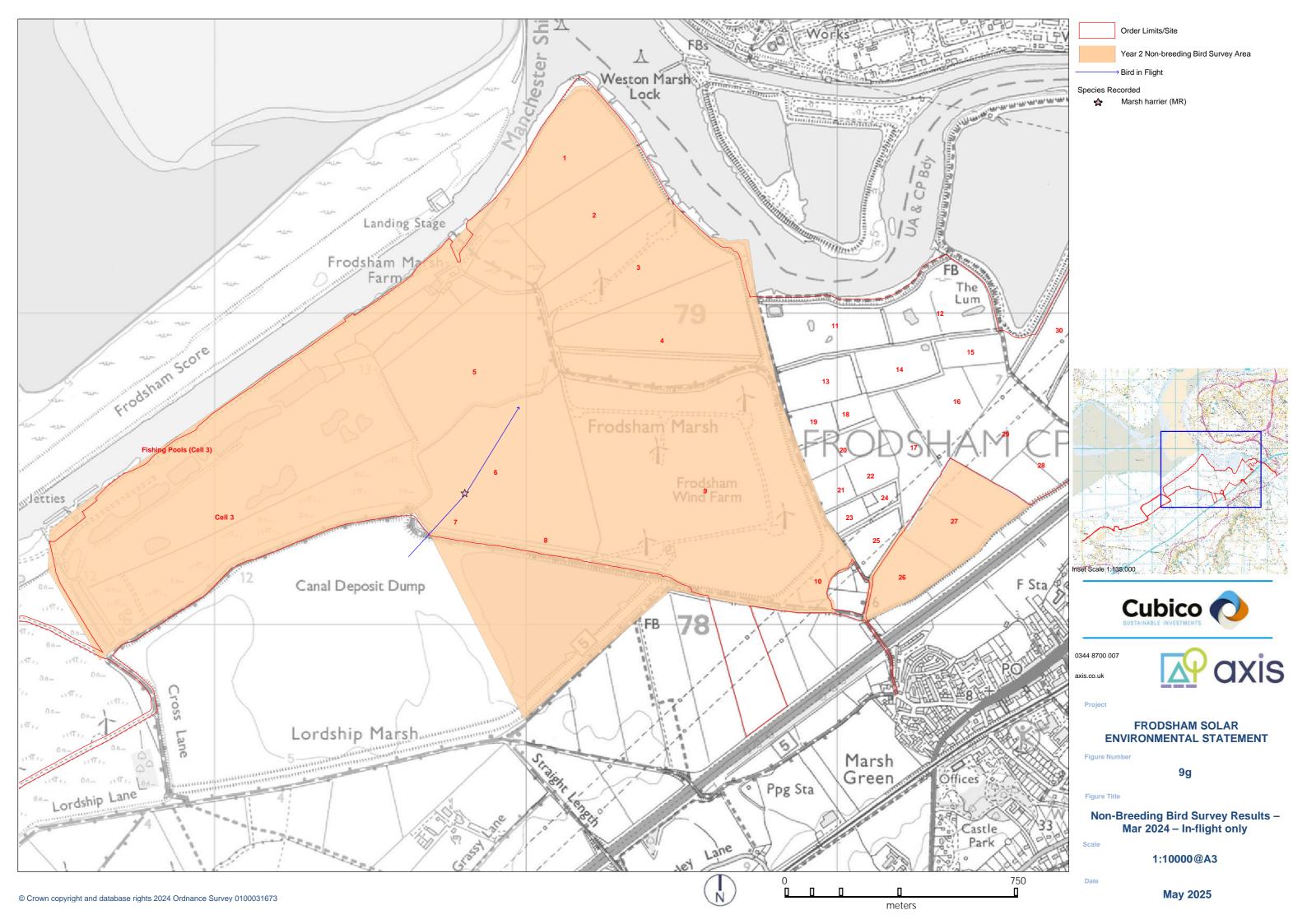


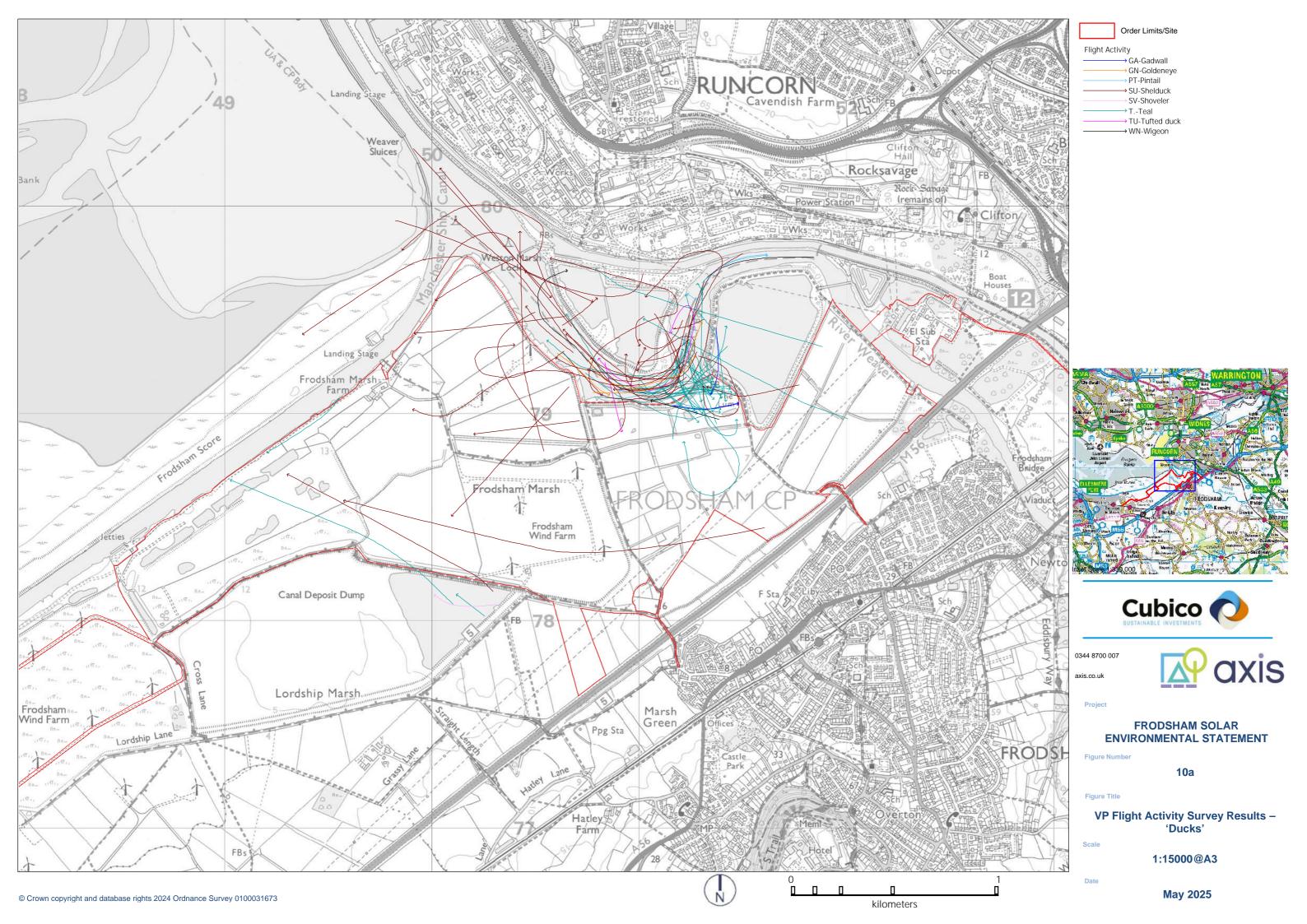


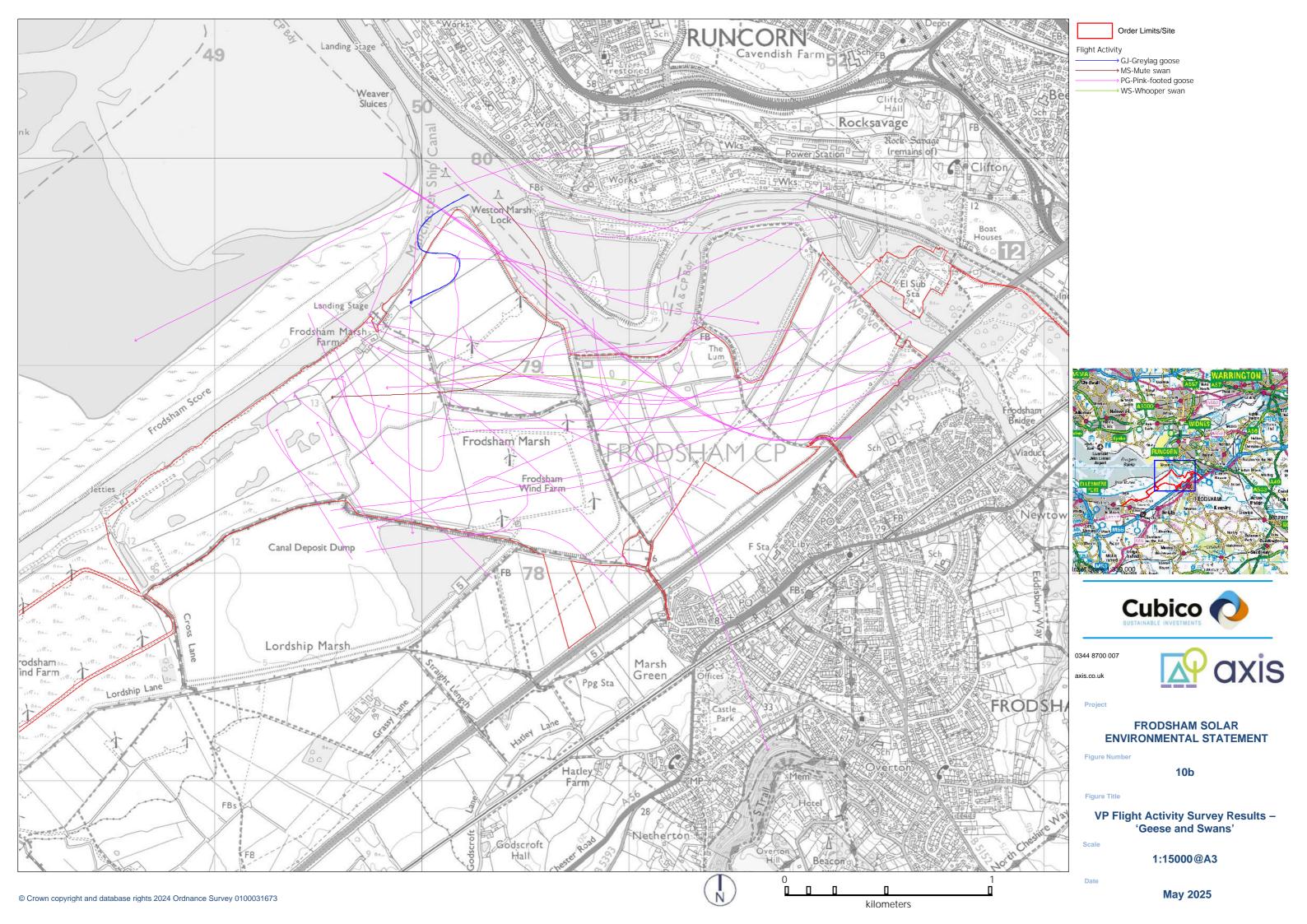


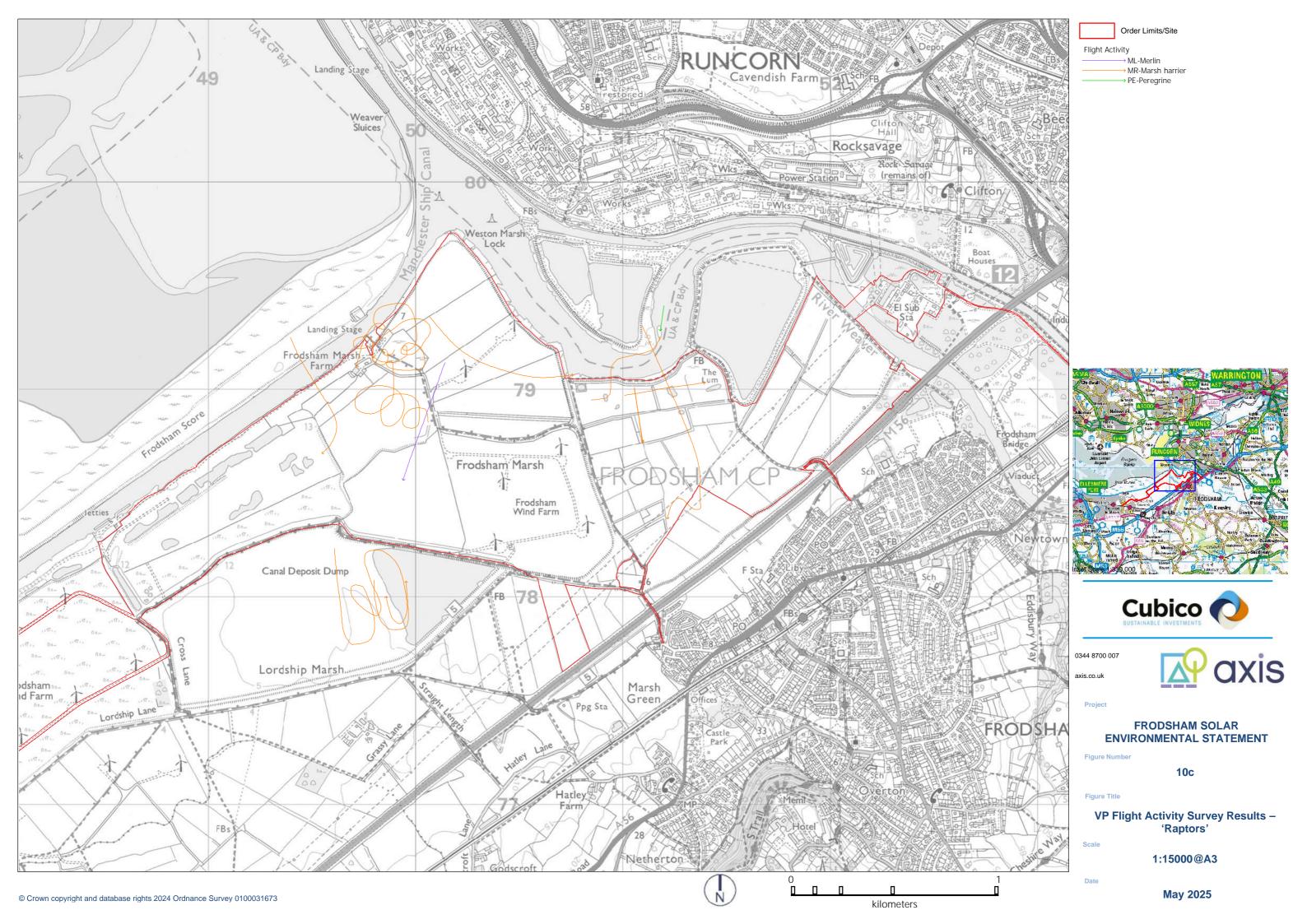


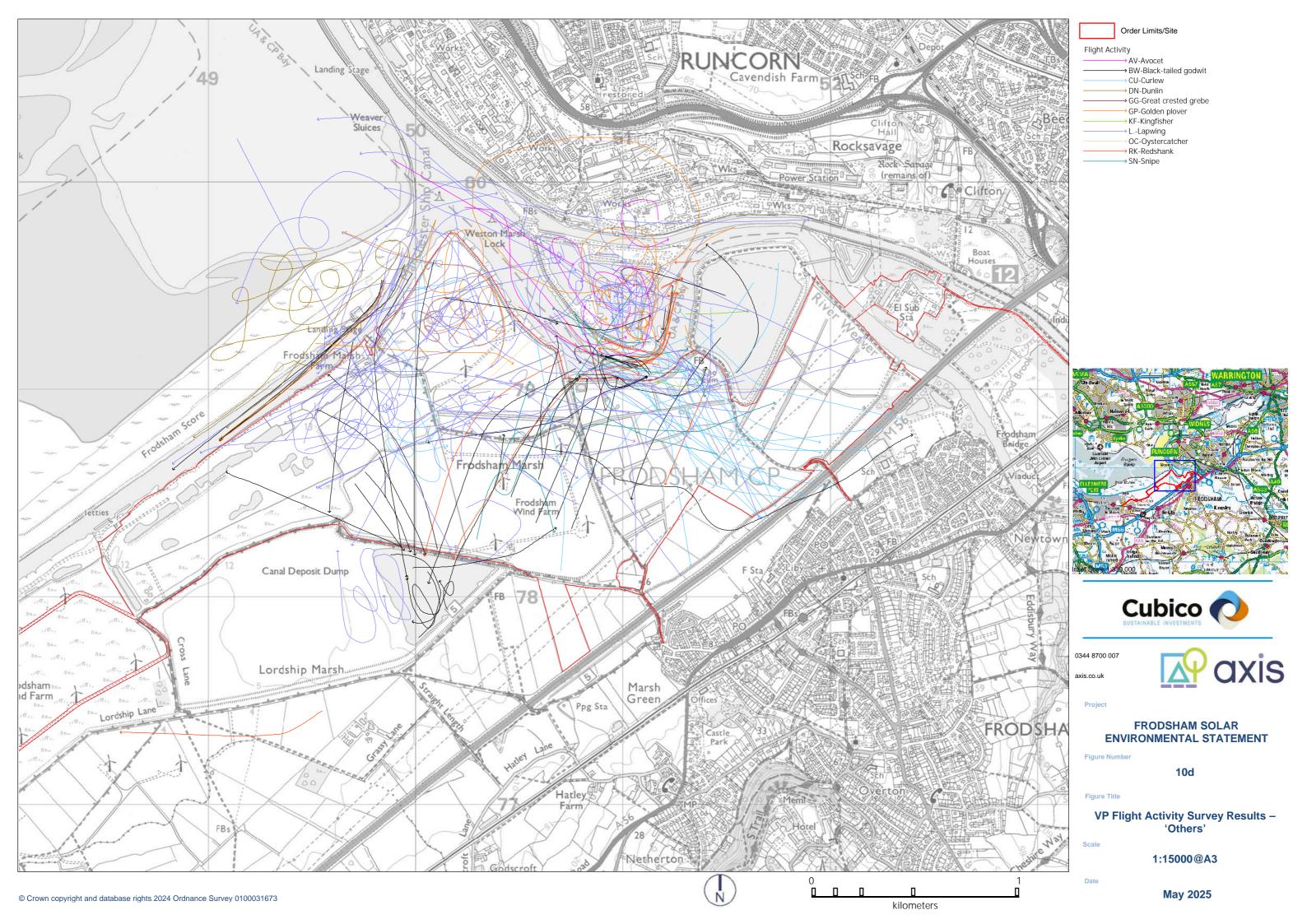


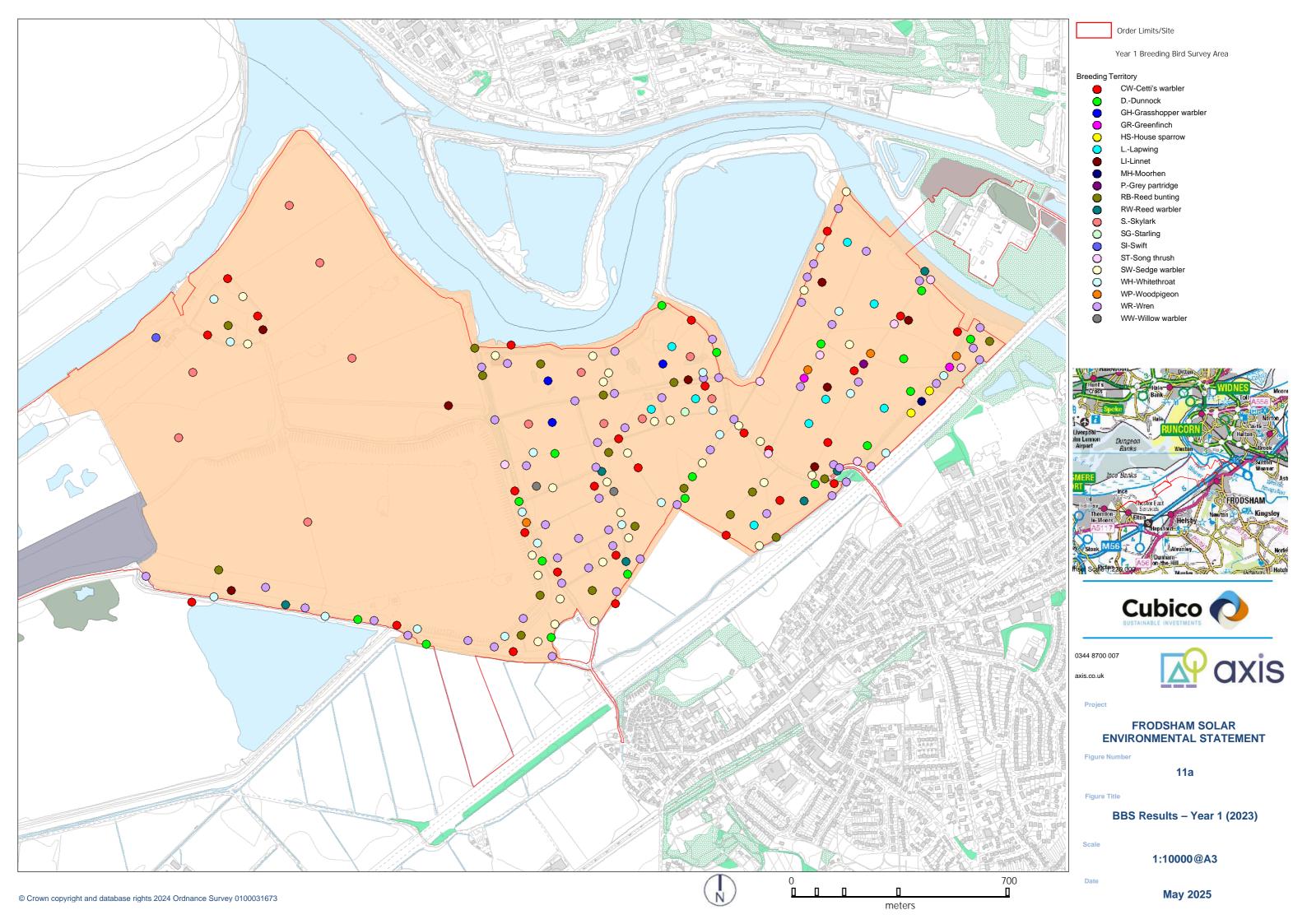


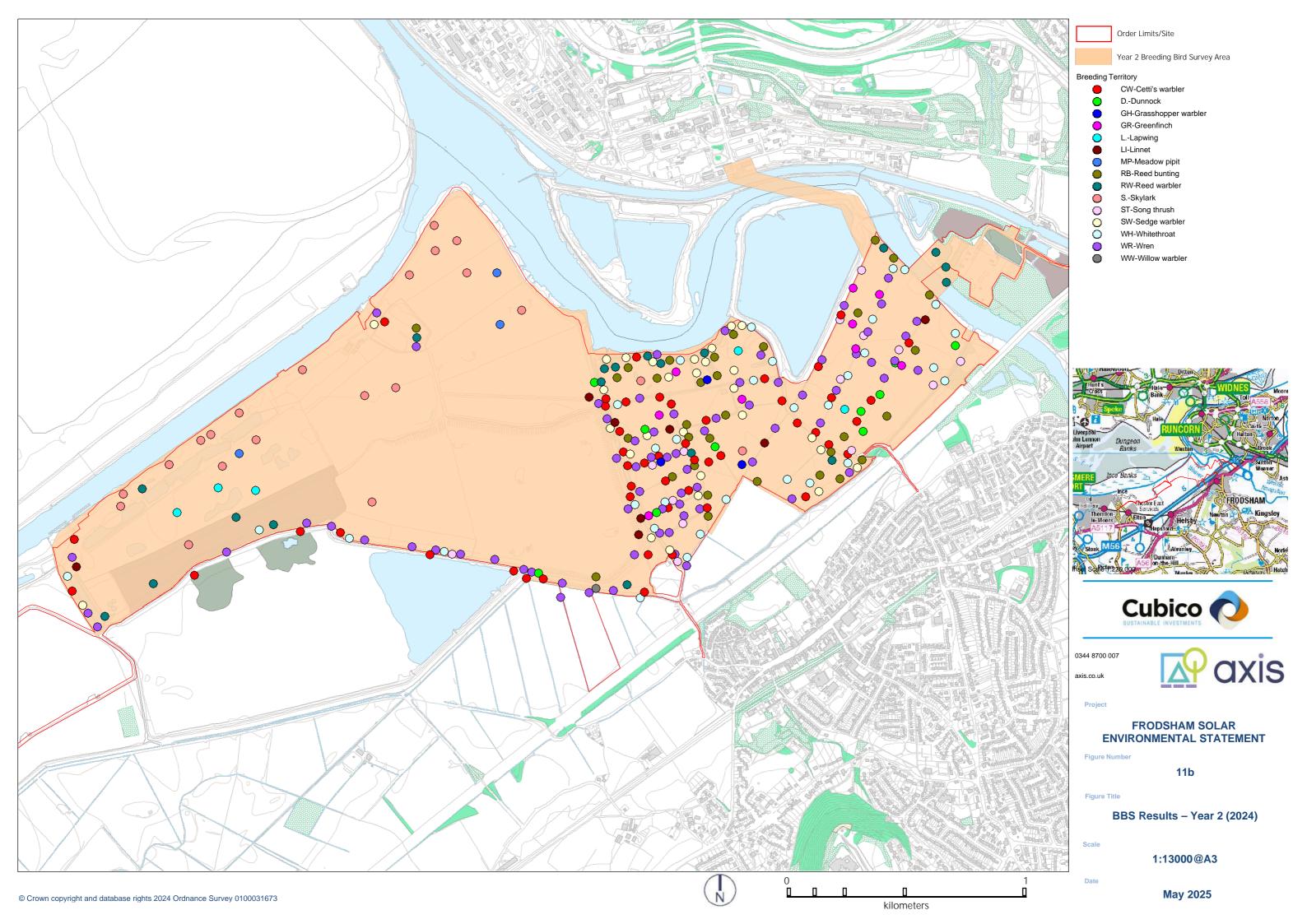


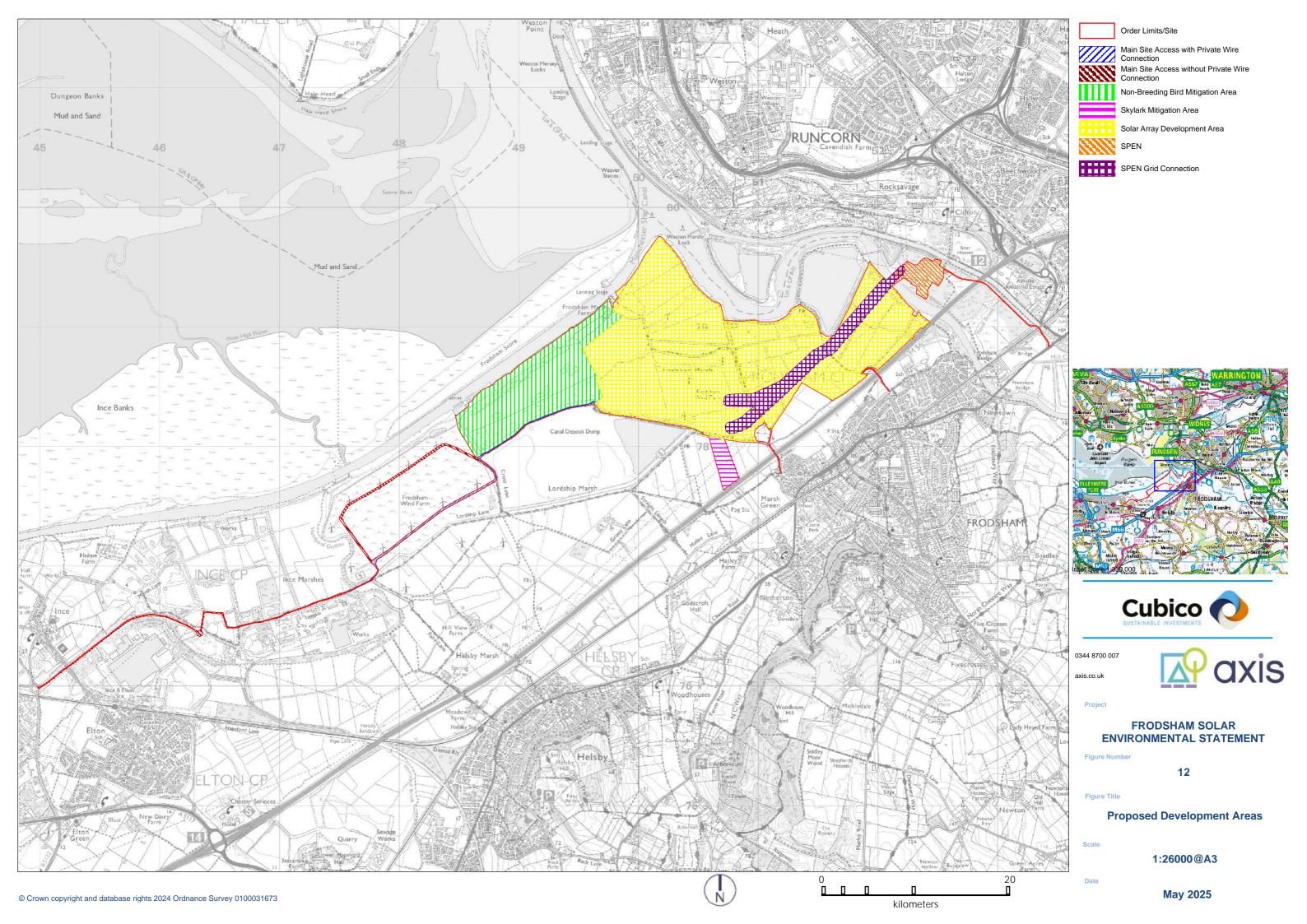


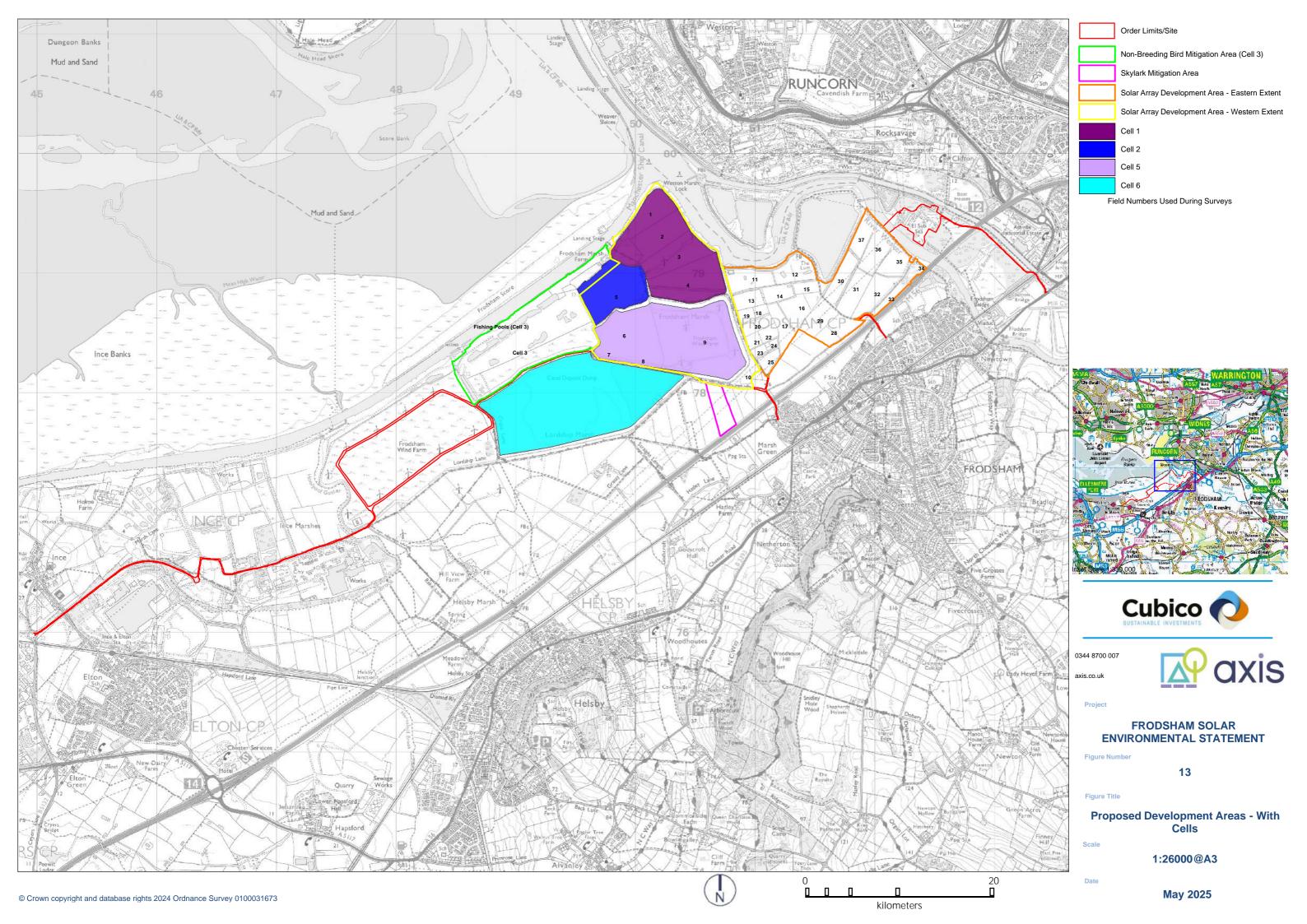


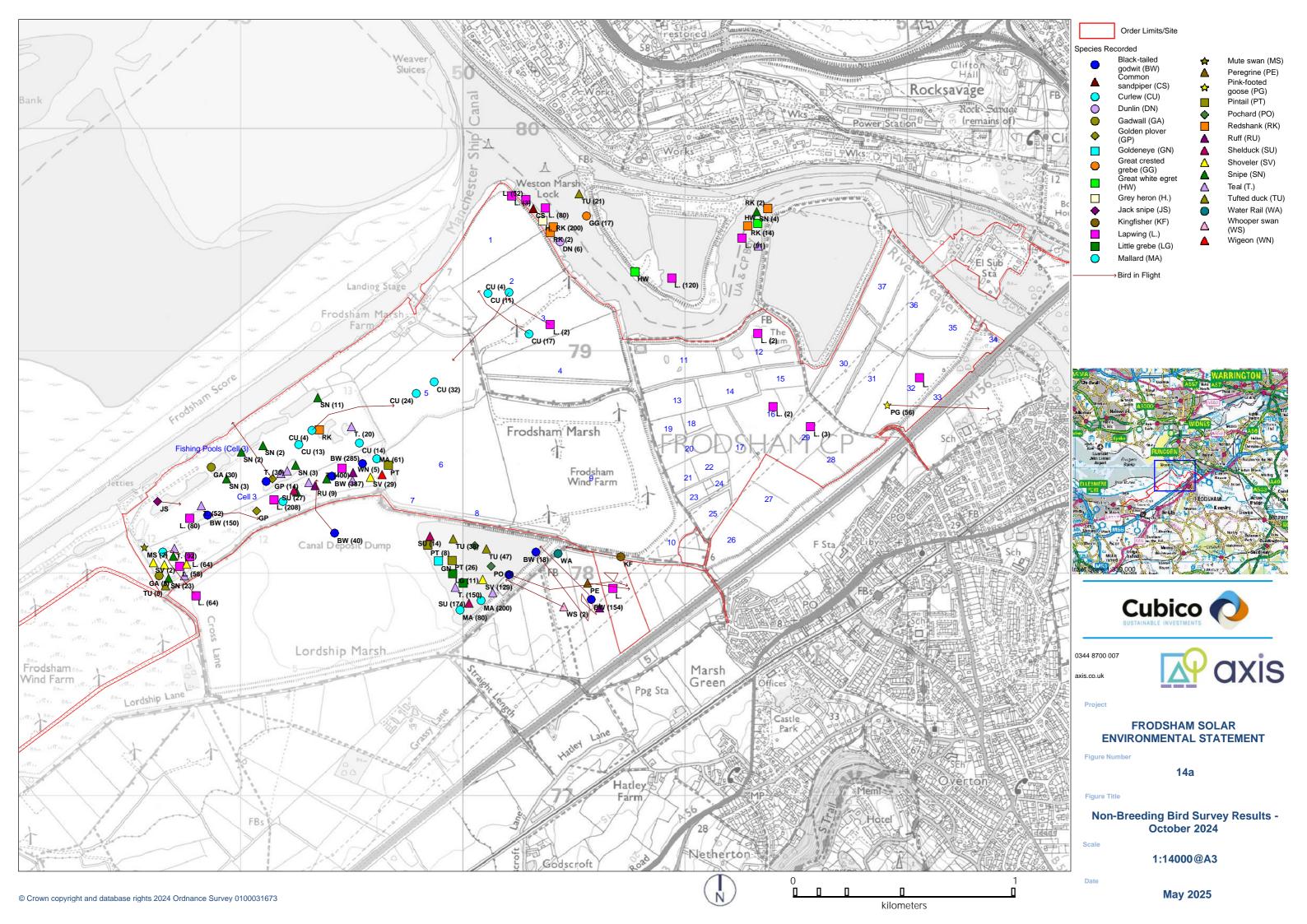


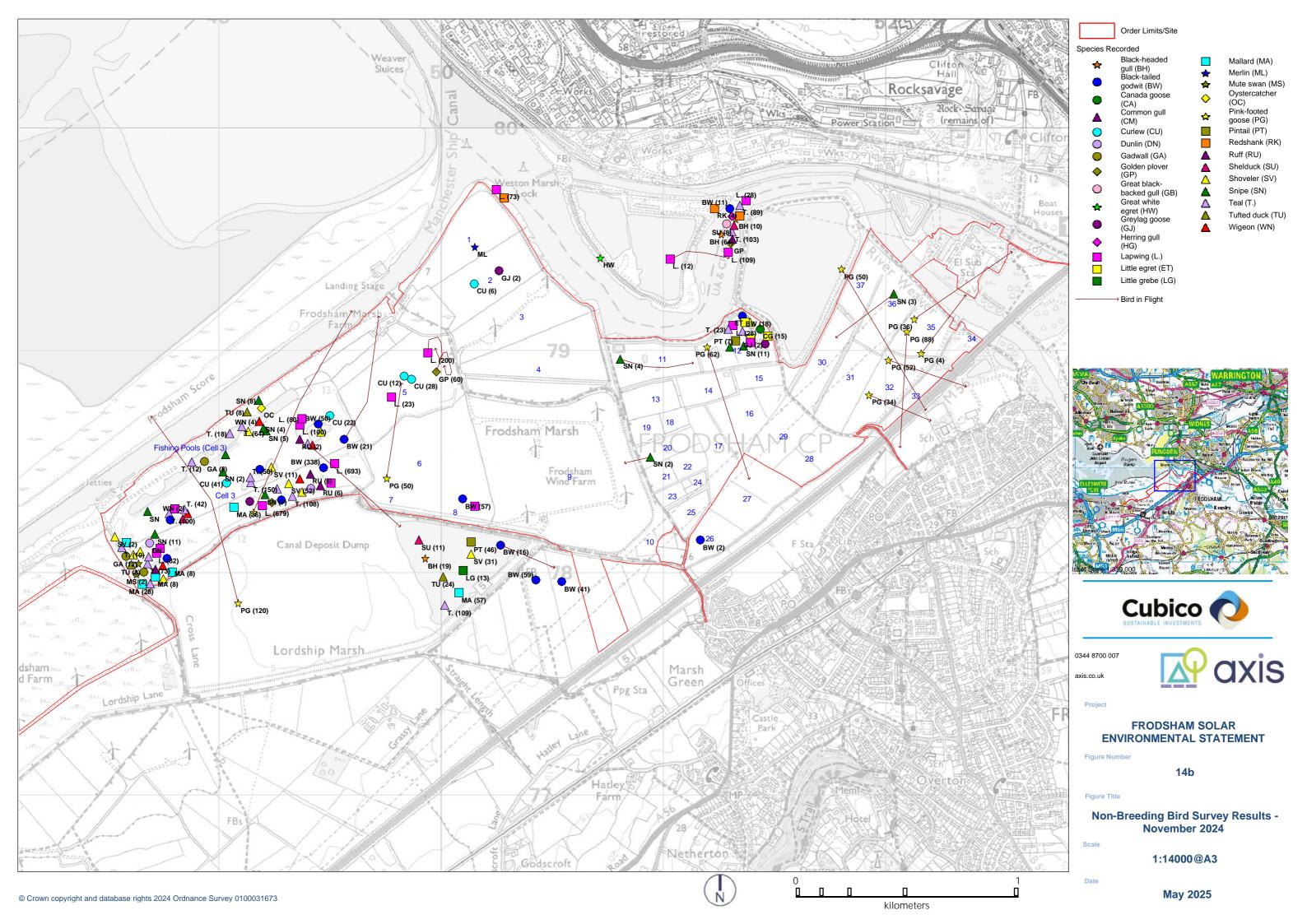


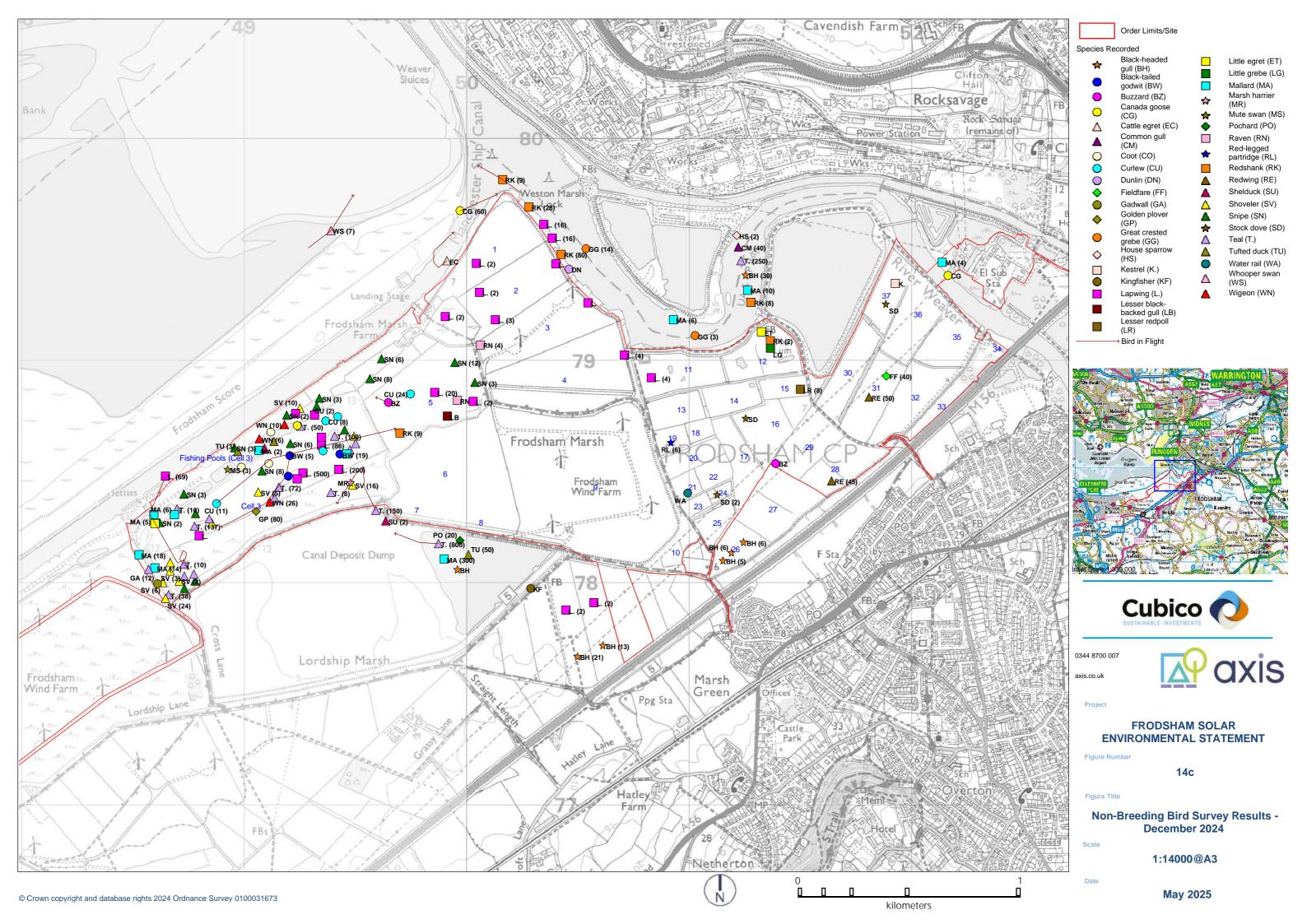


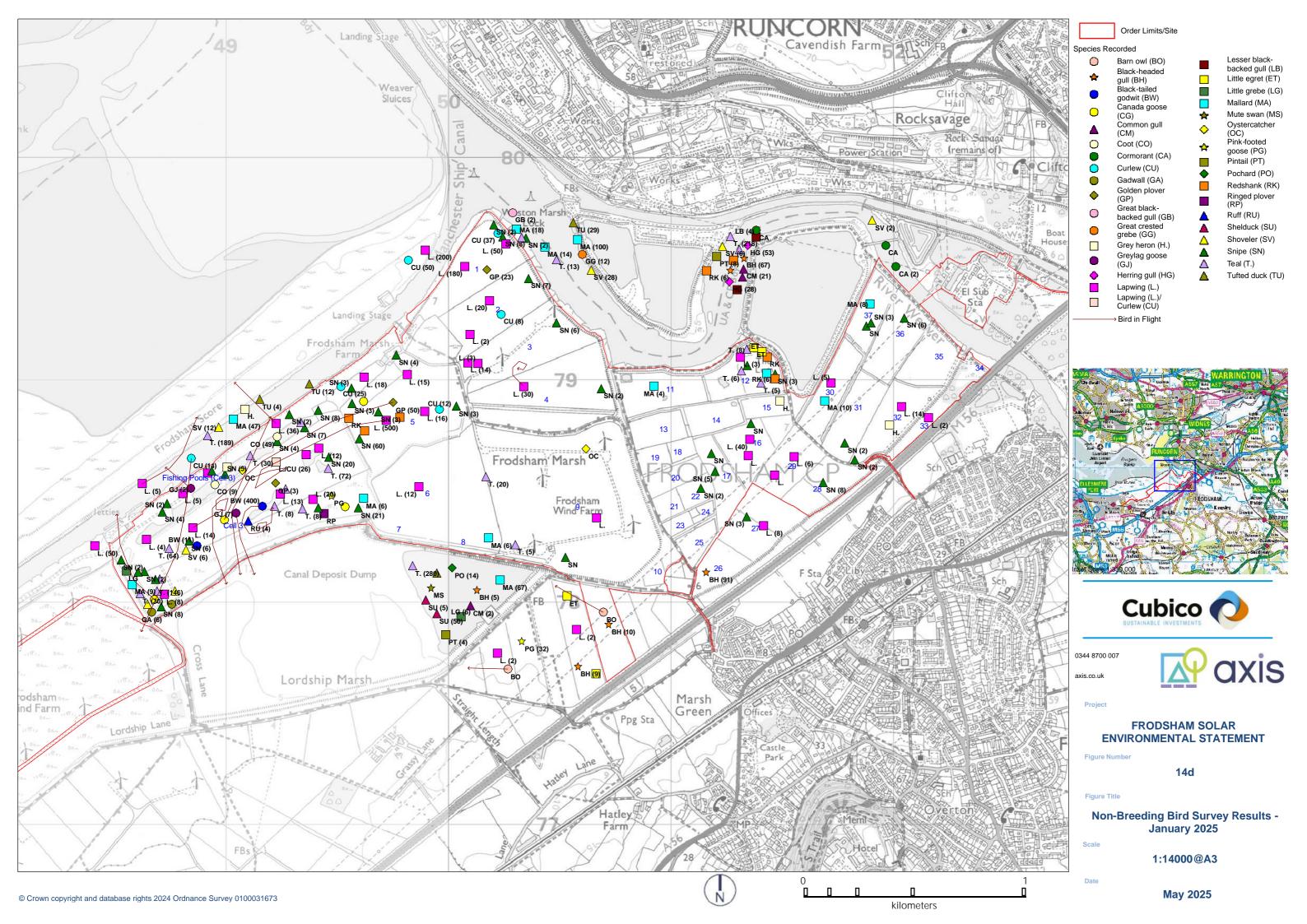


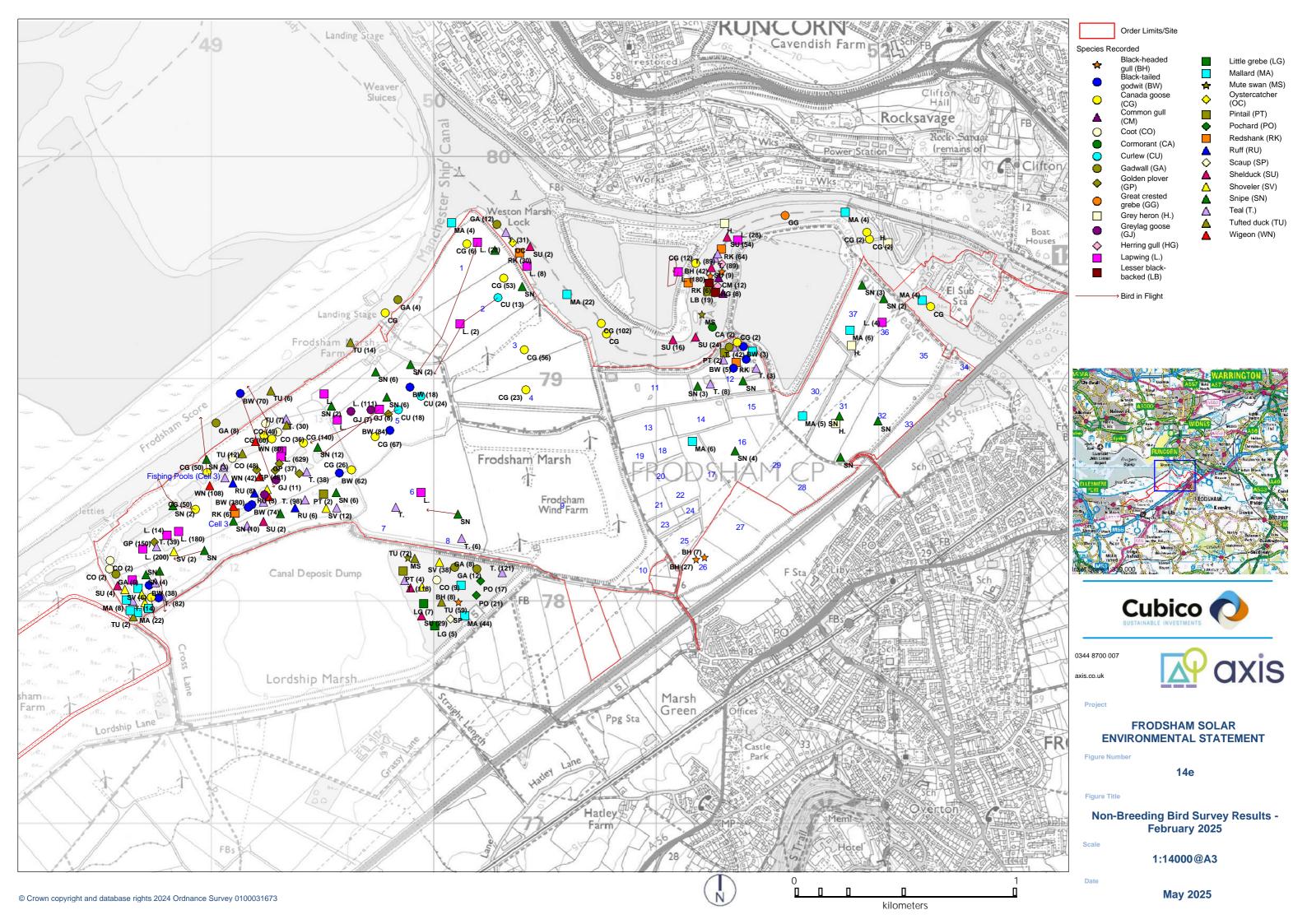


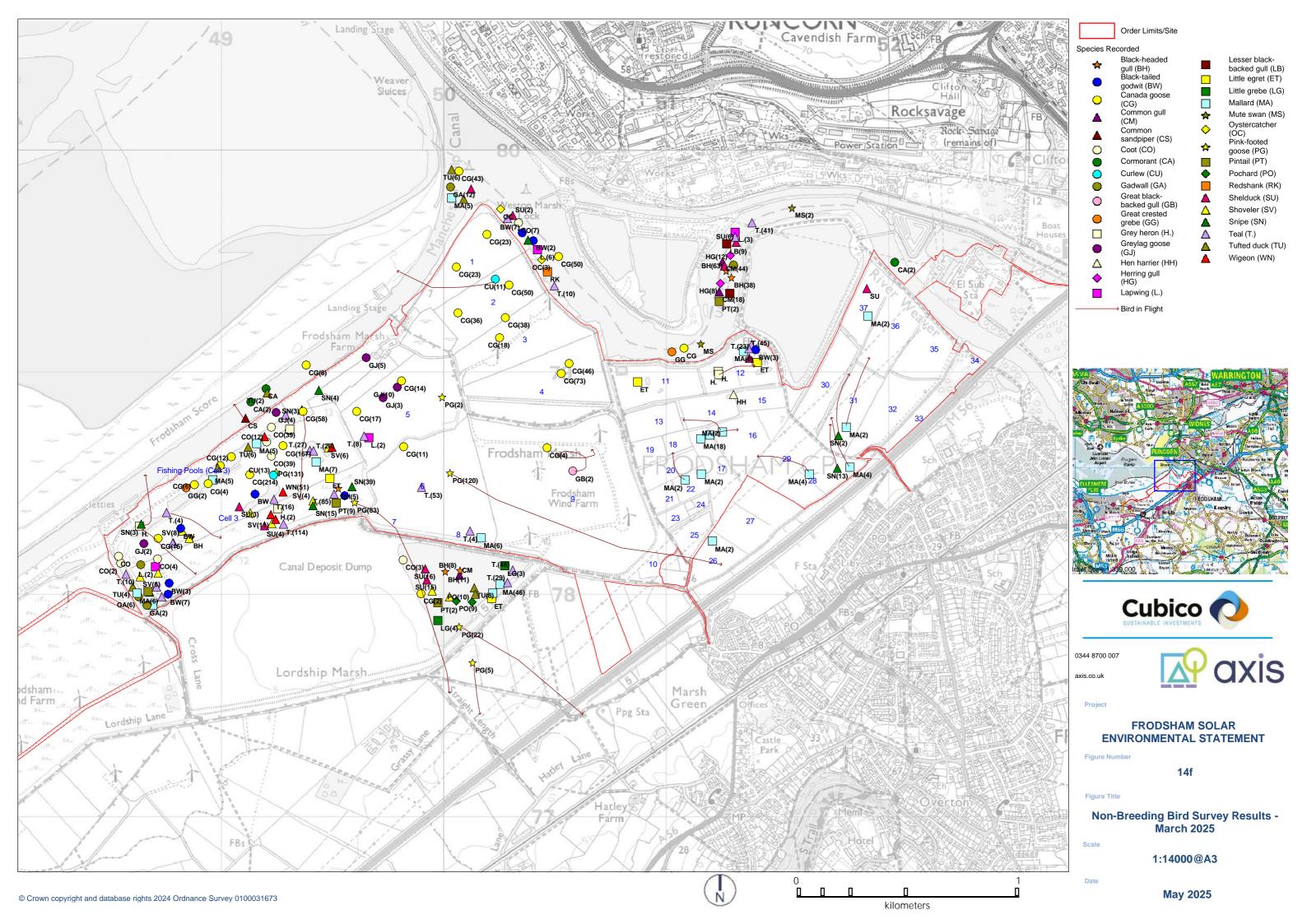












ANNEX 8-1. BIRD SPECIES SUMMARY

Table A1 provides a list of bird species recorded during the bird surveys. Both common and species names are presented along with a summary of each species conservation status using the following abbreviations:

- Ann1 European Birds Directive Annex I species;
- Sch1.1/1A/1.2 Schedule 1 part 1 (and 1A), or Schedule 1 part 2, of the Wildlife & Countryside Act 1981 (as amended);
- RBBP Birds listed on the Rare Breeding Bird Panel within the United Kingdom¹⁶;
- BoCC Birds of Conservation Concern as listed by leading bird conservation organisations in the
 UK, including the Royal Society for the Protection of Birds (RSPB) and British Trust for Ornithology
 (BTO). Red and Amber categories are given (Stanbury et al., 2021); and,
- Sec41 species listed under Section 41 of the 2006 NERC Act.

Table A1: Summary of bird species.

Common Name Scientific Name Conservation Status Anser anser Amber **Greylag Goose** Anser brachyrhynchus Amber; RBBP Pink-footed Goose Anser albifrons Red; Sch41 White-fronted Goose Branta leucopsis Amber, Ann1 Barnacle Goose Branta bernicla Amber **Brent Goose** Cygnus olor Green Mute Swan Cygnus cygnus Amber; Sch1.1; Ann1; RBBP Whooper Swan Cygnus columbianus bewickii Bewick's Swan Tadorna tadorna Amber Shelduck Dendrocygna bicolor **Fulvous Whistling Duck** Spatula clypeata Amber; RBBP Shoveler Mareca strepera Amber Gadwall Mareca penelope Amber; RBBP Wigeon Anas platyrhynchos Amber Mallard Anas acuta Amber; Sch1.2; RBBP Pintail Spatula querquedula Amber; Sch1.1; RBBP Garganey Anas crecca Amber Teal Clangula hyemalis Red; Sch1.1; RBBP Long-tailed duck Melanitta nigra Red; Sch1.1; Sec41; RBBP **Common Scoter** Aythya fuligula Green **Tufted Duck** Aythya marila Red; Sch1.1; Sec41; RBBP Scaup Aythya ferina Red:RBBP **Pochard** Bucephala clangula Red; Sch1.2; RBBP Goldeneye Perdix perdix Red; Sec41 **Grey Partridge** Apus apus Red Swift Columba palumbus Amber Woodpigeon Gallinula chloropus Amber Moorhen Fulica atra Green Coot

¹⁶ https://rbbp.org.uk/species-overview/ (Accessed 10th March 2023)

Common Name	Scientific Name	Conservation Status
Great Crested Grebe	Podiceps cristatus	Green
Oystercatcher	Haematopus ostralegus	Amber
Avocet	Recurvirostra avosetta	Amber; Sch1.1; Ann1; RBBP
Lapwing	Vanellus vanellus	Red; Sec41
Golden Plover	Pluvialis apricaria	Green; Ann1
American Golden Plover	Pluvialis dominica	-
Grey Plover	Pluvialis squatarola	Amber
Ringed Plover	Charadrius hiaticula	Red
Little ringed Plover	Charadrius dubius	Green;S1;RBBP
Curlew	Numenius arquata	Red; Sec41
Whimbrel	Numenius phaeopus	Red; Sch1.1; RBBP
Black-tailed Godwit	Limosa limosa	Red; Sch1.1; Sec41; RBBP
Bar-tailed Godwit	Limosa lapponica	Amber; Ann1; RBBP
Long-billed Dowitcher	Limnodromus scolopaceus	-
Ruff	Calidris pugnax	Red; Sch1.1; Ann1; RBBP
Knot	Calidris canutus	Amber
Sanderling	Calidris alba	Amber
Curlew Sandpiper	Calidris ferruginea	Amber
Dunlin	Calidris alpina	Red
Little Stint	Calidris minutus	Green
Pectoral Sandpiper	Calidris melanotos	RBBP
Red-necked Phalarope	Ogalaropus lobatus	Red; Sch1.1; Ann1; RBBP
Turnstone	Arenaria interpres	Amber; RBBP
Woodcock	Scolopax rusticola	Red
Snipe	Gallinago gallinago	Amber
Jack snipe	Lymnocryptes minimus	Amber; Sch1.1;RBBP
Spotted Redshank	Tringa erythropus	Amber
Redshank	Tringa tetanus	Amber
Greenshank	Tringa nebularia	Amber; Sch1.1
Wood Sandpiper	Tringa glaerola	Amber; Sch1.1; Ann1; RBBP
Green Sandpiper	Tringa ochropus	Amber, S1;RBBP
Common Sandpiper	Actitis hypoleucos	Amber
Black-headed Gull	Chroicocephalus ridibundus	Amber
Great Black-backed Gull	Larus marinus	Red
Herring Gull	Larus argentatus	Red; Sec41
Lesser Black-backed Gull	Larus fuscus	Amber
Cormorant	Phalacrocorax carbo	Green
Grey Heron	Ardea cinerea	Green
Great White Egret	Ardea alba	Amber; Ann1; RBBP
Little Egret	Egretta garzetta	Green; Ann1; RBBP
Osprey	Pandion haliaetus	Amber; Sch1.1; Ann1; RBBP
Sparrowhawk	Accipiter nisus	Amber

Common Name	Scientific Name	Conservation Status
Goshawk	Accipter gentilis	Sch1.1; RBBP
Red Kite	Milvus milvus	Green; Sch1.1; Ann1
Marsh Harrier	Circus aeruginosus	Amber; Sch1.1 & 1A; Ann1; RBBP
Hen Harrier	Circus cyaneus	Red, Sch1.1 & 1A; Sec41; Ann1; RBBP
Kingfisher	Alcedo atthis	Green; Sch1.1; Ann1
Kestrel	Falco tinnunculus	Amber
Merlin	Falco columbarius	Red; Sch1.1; Ann1; RBBP
Hobby	Falco Subbuteo	Green; Sch1.1; RBBP
Peregrine	Falco peregrinus	Green; Sch1.1; Ann1; RBBP
Barn Owl	Tyto alba	Green; Sch1.1
Short-eared Owl	Asio flammeus	Amber; Ann1; RBBP
Stock Dove	Columba oenas	Amber
Skylark	Alauda arvensis	Red; Sec41
Cetti's Warbler	Cettia cetti	Green; Sch1.1
Willow Warbler	Phylloscopus trochilus	Amber
Sedge Warbler	Acrocephalus schoenobaenus	Amber
Reed Warbler	Acrocephalus scirpaceus	Green
Grasshopper Warbler	Locustella naevia	Red; Sec41
Whitethroat	Curruca communis	Amber
Wren	Troglodytes troglodytes	Amber
Starling	Sturnus vulgaris	Red; Sec41
Song Thrush	Turdus philomelos	Amber; Sec41
Redwing	Turdus iliacus	Amber; Sch1.1; RBBP
Fieldfare	Turdus pilaris	Red; Sch1.1; RBBP
Whinchat	Saxicola rubetra	Red
Wheatear	Oenanthe oenanthe	Amber
House Sparrow	Passer domesticus	Red; Sec41
Dunnock	Prunella modularis	Amber; Sec41
Yellow wagtail	Motacilla flava flavissima	Red; Sec41
Meadow Pipit	Anthus pratensis	Amber
Greenfinch	Chloris chloris	Red
Bullfinch	Pyrrhula pyrrhula	Red; Sec41
Linnet	Linaria cannabina	Red; Sec41
Yellowhammer	Emberiza citrinella	Red; Sec41
Reed Bunting	Emberiza schoeniclus	Amber; Sec41

ANNEX 8-2: BIRD SURVEY EFFORT

Table A2: Survey Condition Categorisation

Wind Speed		W-Direction	Rain		Cloud Cover		Cloud Height	
Calm	0	Use 16 point Compass	None	0	In oighths	3/8	<150m	0
Light air	1	Use 16-point Compass	Light Showers	1	In eighths	3/8	150-500m	1
Light breeze	2	N	Heavy Showers	2			>500m	2
Mod. breeze	4	NE	Light rain	3				
Fresh breeze	5	ENE	Heavy rain	4				
Strong breeze	6	E						
Mod. gale	7	Etc	Visibility		Snow		Frost	
Fresh gale	8		Poor	0	None	0	None	0
Strong gale	9]	< 1km	1	On site	1	Ground	1
Whole gale	10		>1km	2	High ground	2	All day	2
Storm	11							

ANNEX 8-3: NON-BREEDING BIRD SURVEY METADATA FOR WALKOVER AND VP SURVEYS

A3: Survey metadata

Survey Visit	Date	Start Time (24hrs)	End Time (24hrs)	Nearest High Tide ¹⁷ (24hrs)	Survey Conditions
Year 1 – Septemb	ber 2022 to April 2023				
1	09/09/2022	09:45	17:00	11:46	Dry, 37.5-50% cloud cover, north-north-westerly breeze (2 on Beaufort scale), excellent visibility.
2	15/09/2022	12:30	17:30	15:30	Dry, 50% cloud cover, southerly breeze (2 on Beaufort scale), excellent visibility.
3	23/09/2022	07:00	11:00	11:14	Dry, 25% cloud cover, north-westerly light air (1 on Beaufort scale), excellent visibility.
4	26/09/2022	07:05	10:20	12:49	Mainly dry, irregular heavy showers, 75% cloud cover, south-easterly breeze (3-5 on Beaufort scale), excellent visibility.
5	13/10/2022	12:20	15:35	14:24	Dry, 75% cloud cover, south-easterly breeze (2 on Beaufort scale), excellent visibility.
6	21/10/2022	07:40	10:20	09:53	Dry, 62.5-87.5% cloud cover, south-south-easterly breeze (2 on Beaufort scale), excellent visibility.
7	27/10/2022	12:15	15:30	13:28	Dry, 87.5% cloud cover, northerly breeze (2 on Beaufort scale), excellent visibility.
8	30/10/2022	07:40	10:20	14:34	Dry, 62.5-87.5% cloud cover, south-south-easterly breeze (2 on Beaufort scale), excellent visibility.
9	09/11/2022	10:30	14:25	11:54	Dry, 25% cloud cover, northerly breeze (2 on Beaufort scale), excellent visibility.
10	25/11/2022	11:57	16:30	12:08	Dry, no cloud cover, north-easterly breeze (2 on Beaufort scale), excellent visibility.
11	02/12/2022	12:00	15:05	18:59	Dry, 100% cloud cover, north-easterly breeze (2 on Beaufort scale), excellent visibility.

¹⁷ Based on high tide times and heights from Ince Banks, on the River Mersey, taken from https://tides.willyweather.co.uk/nw/cheshire/river-mersey----ince-banks.html (Accessed 19/07/2024).

Survey Visit	Date	Start Time (24hrs)	End Time (24hrs)	Nearest High Tide ¹⁷ (24hrs)	Survey Conditions	
12	15/12/2022	13:00	16:10	15:53	Dry, no cloud cover, northerly breeze (1 on Beaufort scale), excellent visibility.	
13	12/01/2023	13:00	16:05	14:40	Mainly dry, irregular heavy showers, 25-100% cloud, northerly breeze (3-6 on Beaufort scale), excellent visibility.	
14	31/01/2023	11:55	14:45	07:18	Dry, 87.5% cloud cover, northerly breeze (4 on Beaufort scale), excellent visibility.	
15	16/02/2023	12:30	15:30	20:10	Dry, 75% cloud cover, northerly breeze (2 on Beaufort scale), excellent visibility.	
16	22/02/2023	10:30	13:15	13:06	Dry, 75% cloud cover, northerly breeze (3 on Beaufort scale), excellent visibility.	
17	14/03/2023	13:07	16:20	15:40	Light showers, 100% cloud cover, north- westerly breeze (4 on Beaufort scale), excellent visibility.	
18	28/03/2023	12:30	16:35	16:59	Heavy showers, 100% cloud cover, westerly breeze (2 on Beaufort scale), excellent visibility.	
19	17/04/2023	06:30	11:45	10:20	Some scattered drizzle, 100% cloud cover, southerly light air (1 on Beaufort scale), excellent visibility.	
Year 2 – Septembe	r 2023 to March 2024					
1	25/09/2023	12:00	17:00	08:29	Light showers, 87.5% cloud cover, north-easterly breeze (2 on Beaufort scale), excellent visibility.	
2	30/10/2023	11:40	15:45	12:13	Some scattered drizzle, 75% cloud cover, east-south- easterly breeze (2 on Beaufort scale), excellent visibility.	
3	23/11/2023	11:00	15:30	08:01	Dry, 100% cloud cover, calm (0 on Beaufort scale), excellent visibility.	
4	30/11/2023	12:45	16:00	13:07	Dry, 12.5% cloud cover, north-easterly breeze (2 on Beaufort scale), excellent visibility.	
5	08/12/2023	07:55	12:30	07:57	Dry, 75% cloud cover, southerly breeze (4 on Beaufort scale), excellent visibility.	

Survey Visit	Date	Start Time (24hrs)	End Time (24hrs)	Nearest High Tide ¹⁷ (24hrs)	Survey Conditions	
6	21/12/2023	11:00	14:30	18:37	Light showers, 75% cloud cover, south-easterly breeze (3 on Beaufort scale), excellent visibility.	
7	19/01/2024	09:00	13:55	05:28	Dry, 12.5% cloud cover, west-south-westerly light air (1 on Beaufort scale), some frost, excellent visibility.	
8	26/01/2024	10:00	14:50	12:10	Dry, 12.5% cloud cover, westerly breeze (2 on Beaufort scale), some frost, excellent visibility.	
9	09/02/2024	08:50	14:55	11:05	Some scattered drizzle and light showers, 100% cloud cover, east-south-easterly light air (1 on Beaufort scale), some frost, excellent visibility.	
10	28/02/2024	07:30	13:10	13:45	Some scattered drizzle and light showers, 100% cloud cover, south-south-easterly breeze (2 on Beaufort scale), some frost, excellent visibility.	
11	15/03/2024	07:45	13:20	15:00	Some scattered drizzle, 87.5% cloud cover, southwesterly breeze (2 on Beaufort scale), some frost, excellent visibility.	
12	28/03/2024	08:45	13:30	13:16	Dry, 50% cloud cover, southerly breeze (2 on Beaufort scale), excellent visibility.	
Year 3 – October 2	024 to March 2025					
1	25/10/2024	08:15	12:30	05:44	Some scattered drizzle, 90% cloud cover, northwesterly breeze.	
2	28/10/2024	07:15	13:10	14:39	Some scattered drizzle, 90% cloud cover, southwesterly breeze	
3	29/10/2024	08:15	14:10	15:20	Heavy showers, 100% cloud cover, north-westerly breeze	
4	30/10/2024	08:15	15:20	15:55	Heavy showers, 100% cloud cover, north-westerly breeze	
5	08/11/2024	09:10	14:10	14:59	Dry, 100% cloud cover, south-easterly breeze	

Survey Visit	Date	Start Time (24hrs)	End Time (24hrs)	Nearest High Tide ¹⁷ (24hrs)	Survey Conditions	
6	15/11/2024	07:00	11:55	09:54	Some scattered drizzle, 100% cloud cover, southwesterly breeze	
7	18/11/2024	07:05	13:00	12:03	Dry, 90% cloud cover, northernly breeze	
8	28/11/2024	12:30	15:05	15:19	Dry, 10% cloud cover, south-easterly breeze	
9	02/12/2024	11:05	15:30	17:52	Heavy rain, 100% cloud cover, northerly breeze.	
10	10/12/2024	10:05	12:45	15:09	Dry, 70% cloud cover, north-easterly breeze	
11	12/12/2024	14:52	18:00	20:13	Dry, 100% cloud cover, north easterly breeze	
12	17/12/2024	10:10	13:05	11:06	Dry, 100% cloud cover, southerly breeze	
13	19/12/2024	10:50	12:40	08:00	Some scattered drizzle, 100% cloud cover, southerly breeze	
14	09/01/2025	18:45	21:00	16:54	Dry, 10% cloud cover.	
15	10/01/2025	10:00	15:30	07:24	Dry, 40% cloud cover, south easterly breeze	
16	17/01/2025	09:00	13:00	18:39	Dry, 70% cloud cover, southerly breeze	
17	27/01/2025	11:30	15:30	09:21	Some scattered drizzle, 60% cloud cover, southwesterly	
18	28/01/2025	09:00	23:30	20:50	Some scattered drizzle, 90% cloud cover, northwesterly	
19	28/01/2025	21:30	23:30	20:50	Some scattered drizzle, 90% cloud cover, northwesterly	
20	29/01/2025	10:30	15:25	17:26	Dry, 50% cloud cover, north-westerly	

Survey Visit	Date	Start Time (24hrs)	End Time (24hrs)	Nearest High Tide ¹⁷ (24hrs)	Survey Conditions
21	07/02/2025	09:15	14:15	05:41	Dry, 90% cloud cover, easterly
22	13/02/2025	09:00	14:30	05:40	Dry, 100% cloud cover, easterly
23	21/02/2025	10:30	16:20	16:28	Some scattered drizzle, 100% cloud cover, southerly
24	24/02/2025	11:15	16:00	08:01	Heavy showers, 100% cloud cover, westerly
25	26/02/2025	00:00	02:45	03:54	Dry, south westerly
26	26/02/2025	00:00	02:00	03:54	Dry, 10% cloud cover, south westerly
27	05/03/2025	08:30	13:15		Dry, 50% cloud cover, southerly
28	06/03/2025	08:00	13:20		Dry, 0% cloud cover, south-easterly
29	07/03/2025	07:10	12:10		Some scattered drizzle, 100% cloud cover, southeasterly
30	10/03/2025	10:35	14:20		Dry, 50% cloud cover, easterly

Table A3.1: VP Flight Activity Survey Effort in hours (Non-breeding, Year 1).

VP		2	022			Total Hrs			
•••	September	October	November	December	January	February	March	Totalins	
1/1a	3	6	6	6	6	6	6	39	
2	6	6	6	6	6	6	6	42	

ANNEX 8-4: BREEDING BIRD SURVEY METADATA

Survey Visit	Date	Start time (24hrs)	End time (24hrs)	Sunrise time (24hrs)	Survey conditions
Year 1 – April to	June 2023				
1	11/04/2023 (Eastern side) 17/04/2023 (Western half)	06:50 06:30	10:10 09:45	06:21	Dry, 50% cloud cover, southerly breeze (2-3 on Beaufort scale), excellent visibility. Some scattered drizzle, 100% cloud cover, southerly light air (1 on Beaufort scale), excellent visibility.
2	19/05/2023 (Eastern side) 22/05/2023 (Western side)	07:00	12:32	05:06 05:01	Mostly dry and brief light rain shower, 80% cloud cover, westerly light air (1 on Beaufort scale), excellent visibility. Dry, 12.5-62.5% cloud cover, north-north-westerly light air (1 on Beaufort scale), excellent visibility.
3	13/06/2023 (Eastern Side) 14/06/2023 (Western side)	07:15	10:00 09:55	04:43	Dry, 0% cloud cover, north-westerly light air (1 on Beaufort scale), excellent visibility. Dry, 0% cloud cover, westerly breeze (2 on Beaufort scale), excellent visibility.
Year 2 – April to	July 2024				
1	23/04/2024	05:49	09:59 (Western side) 11:30 (Eastern Side)	05:52	Dry, 87.5% cloud cover, easterly light air/breeze (1-2 on Beaufort scale), excellent visibility.
2	03/05/2024	05:22	10:24 (Western Side) 13:00 (Eastern Side)	05:32 05:24	Dry, 25% cloud cover, southerly light air (1 on Beaufort scale), excellent visibility. Dry, 75-100% cloud cover, north-easterly breeze (2 on Beaufort scale), excellent visibility.

Survey Visit	Date	Start time (24hrs)	End time (24hrs)	Sunrise time (24hrs)	Survey conditions
3 22/05/2024 24/05/2024				05:00	Light showers, 100% cloud cover, north-westerly breeze (3 on Beaufort scale), excellent visibility. Some scattered drizzle/rain, 75%-100% cloud cover, south-westerly light air/breeze (0-3 on Beaufort scale), excellent visibility.
4	07/06/2024	05:40	11:30 (Western Side) 12:45 (Eastern Side)	04:45	Dry, 75-87.5% cloud cover, west-south-westerly breeze (3-4 on Beaufort scale), excellent visibility.
	17/06/2024	04:40		04:42	Dry, 87.5-100% cloud cover, westerly breeze (2-4 on Beaufort scale), excellent visibility.
5 ('dusk' surveys)	26/06/2024	19:30	22:45 (Eastern Side) 22:30 (Western side)	21:42 (sunset) 21:40 (sunset)	Dry, 55.5-75% cloud cover, westerly breeze (2 on Beaufort scale), excellent visibility. Dry, 80% cloud cover, south westerly breeze (3 on the Beaufort scale), excellent visibility.
6	01/07/2024	04:45	07:30 (Eastern Side)	04:48	Dry, 50-100% cloud cover, west-north-westerly light air (1 on Beaufort scale), excellent visibility.
	31/07/2024	05:05	08:35 (Western side)	05:30	Dry, 25% cloud cover, northerly light air (1 on Beaufort scale), excellent visibility.

ANNEX 8-5: THE DESK STUDY DATA – BTO DATA AND CAWOS RECORDS

Table A3: BTO WeBS Data 2017-21 for Frodsham Sludge Lagoons, Weston Marshes Sectors and CAWOS records from 2015-2022.

Species	Average Count (Frodsham)	Peak Count (Frodsham)	Average Count (Weston)	Peak Count (Weston)	Peak Count (CAWOS)	No. of Records (CAWOS)
Black-tailed godwit	583.4	3885	0.3	7	4800	1651
Lapwing	267.2	2000	3.62	130	7000	1387
Teal	253.1	1300	2.75	48	3000	1552
Golden plover	87.28	1200	-	-	1730	449
Dunlin	58.16	1000	-	-	68000	769
Redshank	35.47	600	0.09	2	1000	1025
Wigeon	15.98	485	-	-	1000	433
Shoveler	89.19	413	0.06	2	426	1150
Pink-footed goose	18.6	400	-	-	10000	306
Curlew	41.04	340	-	-	1500	634
Shelduck	28	161	0.49	6	7568	1334
Tufted duck	26.91	161	0.06	2	426	1515
Ringed plover	5.58	147	0.02	1	395	513
Ruff	5.23	130	0.06	2	134	939
Mallard	37.11	113	1.25	12	620	1437
Greylag goose	2.04	81	-	-	101	474
Snipe	7.67	77	0.04	2	250	468
Pintail	8.3	67	-	-	280	621
Gadwall	9.51	53	0.17	7	126	1017
Avocet	1.86	51	-	-	196	606
Grey plover	1.63	41	-	-	340	80
Pochard	5.58	39	-	-	74	640
Mute swan	3.81	31	-	-	40	901
Whooper swan	1.72	25	-	-	37	413

Knot	0.49	8	-	-	100	165
Goldeneye	0.42	7	-	-	200	277
Oystercatcher	0.56	6	0.04	2	230	468
Little ringed plover	0.49	6	-	-	11	265
Bar-tailed godwit	0.44	4	-	-	400	229
Greenshank	0.18	4	-	-	12	114
Garganey	0.14	3	-	-	5	187
Curlew sandpiper	0.09	3	-	-	26	230
Common sandpiper	0.21	3	0.02	1	14	333
Barnacle goose	0.11	2	-	-	36	78
Bewicks swan	0.07	2	-	-	9	115
Scaup	0.07	2	-	-	7	95
Whimbrel	0.05	2	-	-	100	140
Green sandpiper	0.14	2	-	-	200	277
Fulvous whistling duck	0.07	2	-	-	2	19
Long-tailed duck	0.02	1	-	-	1	96
Great crested grebe	0.07	1	-	-	35	618
Sanderling	0.02	1	-	-	2	21
Little stint	0.02	1	-	-	7	219
Long-billed dowitcher	0.02	1	-	-	1	65
Jack snipe	0.02	1	-	-	5	10
Wood sandpiper	0.04	1	-	-	2	39
Spotted redshank	0.05	1	-	-	6	152
Kingfisher	0.07	1	-	-	2	92
American golden plover	-	-	-	-	1	4
Barn owl	-	-	-	-	4	44
Brent goose	-	-	-	-	5	8
Common scoter	-	-	-	-	2	20
Goshawk	-	-	-	-	1	1
Hen harrier	-	-	-	-	1	104
Hobby	-	-	-	-	3	106

Marsh harrier	-	-	-	-	10	1043
Merlin	-	-	-	-	2	182
Osprey	-	-	-	-	2	85
Pectoral sandpiper	-	-	-	-	1	19
Peregrine	-	-	-	-	3	402
Red kite	-	-	-	-	1	5
Red-necked phalarope	-	-	-	-	2	37
Short-eared owl	-	-	-	-	3	137
Turnstone	-	-	-	-	1	12
White-fronted goose	-	-	-	-	4	14
Woodcock	-	-	-	-	2	14

ANNEX 8-6: THE DESK STUDY DATA — BREEDING BIRD SURVEY RESULTS FROM THE WINDFARM MONITORING REPORT(S)

Table A5: BBS Results from the Frodsham Wind Farm Monitoring (2018-2021).

Species	Breeding Territory Estimate
Avocet	0 - 3
Bullfinch	0 - 1
Cetti's warbler	4 - 10
Curlew	0-1
Dunnock	3 – 41
Gadwall	1-12
Grasshopper warbler	1-3
House sparrow	0-1
Kestrel	0 – 2
Kingfisher	0-1
Lapwing	1-32
Linnet	3 – 24
Little ringed plover	0 – 2
Mallard	2 – 16
Meadow pipit	2 – 15
Reed bunting	11 – 47
Ringed plover	0 - 4
Shelduck	0 – 16
Shoveler	0-1
Skylark	26 – 58
Song thrush	3 – 13
Starling	0 - 1

Species	Breeding Territory Estimate
Stock dove	0 – 4
Yellow wagtail	0 - 4
Yellowhammer	0 - 7

ANNEX 8-7: VP FLIGHT ACTIVITY SURVEY RESULTS (YEAR 1, 2022-23).

Table A6: VP Flight Activity Survey Results (Year 1, 2022-23).

Target Species	No. of Records	No. of Birds	Peak count	Further Comments
Greylag goose	2	32	16	-
Pink-footed goose	37	2,976	500	-
Mute swan	3	5	2	Included two birds using the River Weaver & 2 birds in field 12.
Whooper swan	1	2	1	-
Shelduck	44	434	64	Included a peak of 64 birds using the River Weaver.
Shoveler	1	4	4	-
Gadwall	5	15	4	Included a peak of nine birds using the River Weaver & four birds in field 4.
Wigeon	2	51	50	Included one bird using field 12.
Pintail	5	30	8	Included a peak of seven birds using the River Weaver.
Teal	52	669	100	Included a peak of 54 birds using field 12, 21 birds using the River Weaver & 42 birds using field 30.
Tufted duck	5	100	7	Included a peak of 85 birds using the River Weaver.
Goldeneye	4	5	2	Included one bird using the River Weaver.
Great crested grebe	5	19	12	Included a peak of 12 birds using the River Weaver.
Oystercatcher	3	10	4	Included two birds using the River Weaver & four birds in field 3.
Avocet	9	887	500	-
Lapwing	107	11,537	500	-

Target Species	No. of Records	No. of Birds	Peak count	Further Comments
Golden plover	19	5,140	1,000	-
Curlew	31	339	62	-
Black-tailed godwit	47	4,893	2,000	Included a grounded peak of five birds in field 12 & three birds in field 3.
Dunlin	4	2,512	1,000	-
Snipe	9	32	8	-
Redshank	20	687	400	-
Marsh harrier	11	11	1	Included one bird in field 14.
Kingfisher	2	2	1	Included a bird in field 14.
Merlin	1	1	1	-
Peregrine	1	1	1	-

ANNEX 8-8: BBS SURVEY RESULTS FOR YEAR 1 AND YEAR 2

Table A7: BBS Results (Year 1, 2023 and Year 2, 2024).

Target Species	Indicative No. Breeding Pairs (Year 1, 2023)	Indicative No. Breeding Pairs (Year 2, 2024)	Further Comments
Grey partridge	1	0	Associated with field margin vegetation in the east of the Order Limits.
Swift	1	0	Associated with farm buildings near the northern Site boundary.
Woodpigeon	4	0	Associated with field boundary vegetation mainly in the east of the Order Limits.
Moorhen	1	0	In a waterbody in the east of the Order Limits.
Lapwing	9	5	Associated with open fields in the east of the Order Limits, and within Cell 3 within the NBBMA.
Skylark	12	21	Associated with open fields mainly in the centre of the Order Limits and Cell 3 within the NBBMA.
Cetti's warbler	27	48	Typically associated with field margin vegetation.
Willow warbler	2	1	Associated with field boundary vegetation in the centre of the Order Limits.
Sedge warbler	29	28	Associated with field boundary vegetation in the centre and east of the Order Limits.
Reed warbler	6	19	Associated with tall rank vegetation mainly along field boundaries in the east of the Order Limits and Cell 3 located within the NBBMA
Grasshopper warbler	3	3	Associated with rank vegetation within fields in the centre of the Order Limits.

Target Species	Indicative No. Breeding Pairs (Year 1, 2023)	Indicative No. Breeding Pairs (Year 2, 2024)	Further Comments
Whitethroat	19	32	Associated with rank vegetation mainly along field boundaries throughout the Order Limits.
Wren	55	71	Associated with field boundary vegetation throughout the Order Limits.
Starling	1	0	Associated with trees along field margin in centre of the Order Limits.
Song thrush	8	14	Associated with field margin vegetation in the east of the Order Limits.
House sparrow	2 (colonies)	0	Associated with field boundary vegetation in the east of the Order Limits.
Dunnock	18	10	Associated with field boundaries, especially in the eastern part of the Order Limits.
Meadow pipit	0	3	In open fields in north of the Order Limits and in Cell 3 (the NBBMA).
Greenfinch	2	9	Associated with field boundaries (and trees) principally in the east of the Order Limits.
Linnet	8	8	Associated with field boundary vegetation mainly in the east of the Order Limits.
Reed bunting	18	32	Associated with the fields and especially the field margins and rank (typically wet) vegetation in the east of the Order Limits.

ANNEX 8-9: WALK OVER RESULTS (NON-BREEDING BIRD SURVEYS) YEAR 1

Table A8: Target and Secondary Species recorded during Walkover Surveys (Year 1, 2022-23). Field Survey Result Summary from the field surveys completed within the SADA boundary (western and eastern extent).

											Surve	y Visits								
Field No.	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Target Spe	cies																			
1	Lapwing	-	-	-	-	-	-	-	-	-	-	-	50	-	-	-	-	-	-	-
	Pintail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
2	Curlew	9	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Greylag goose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
3	Snipe	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
<u> </u>	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	-
	Black-tailed godwit	-	-	17	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Curlew	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Lapwing	-	-	-	-	-	159	-	-	-	-	-	-	-	-	-	-	2	-	-
	Merlin	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
	Curlew	12	-	3	-	-	27	-	-	-	-	-	-	-	-	-	-	8	-	-
5	Snipe	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
5	Oystercatcher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
	Golden plover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-
6	Greylag goose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
· · · · · · · · · · · · · · · · · · ·	Curlew	-	-	-	-	-	22	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Curlew	6	-	-	-	-	4	-	3	-	-	-	-	-	-	-	-	-	-	-
<i>3</i>	Teal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-
11	Snipe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-

											Surve	y Visits								
Field No.	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Black-tailed godwit	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Redshank	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Snipe	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
	Teal	-	-	-	-	-	-	-	4	-	-	-	17	-	-	52	42	6	35	24
12	Lapwing	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2
12	Woodcock	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-
	Mute swan	-	-	-	-	-		-	-	-	-	-	-	2	-	-	-	-	-	-
	Shoveler	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1
	Gadwall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2
	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	2	-
4.5	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
15	Lapwing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Black-tailed godwit	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
47	Lapwing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
17	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
	Teal	-	-	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	-
20	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
25	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
31	Lapwing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	4
32	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
35	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
26	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
36	Lapwing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
27	Mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-
37	Gadwall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2

											Surve	y Visits	;							
Field No.	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Shelduck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Lapwing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Secondary	Species				·							·			·					
2	Grey partridge	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-
2	Skylark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
3	Starling	-	-	-	-	-	-	-	-	-	120	-	-	-	-	-	-	-	-	-
	Black-headed gull	-	-	-	-	-	-	-	-	-	-	-	-	100	-	-	3	-	-	26
4	Lesser black-backed gull	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Wheatear	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Whinchat	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kestrel	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Whinchat	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Starling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400	200	-
8	Cetti's warbler	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-
0	Cetti's warbler	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Starling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300	-	-	-	-
11	Cetti's warbler	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Coot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	1	-	-
12	Cetti's warbler	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Black-headed gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-
17	Woodpigeon	-	-	-	-	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-
25	Redwing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-	-	-
32	Cetti's warbler	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
22	Coot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
33	Cetti's warbler	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-

Field No.	Species										Surve	y Visits								
Field No.	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
34	Cetti's warbler	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	Cetti's warbler	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
36	Grey heron	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
37	Grey heron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-

ANNEX 8-10: WALK OVER RESULTS (NON-BREEDING BIRD SURVEYS) YEAR 2

Table A9: Target and Secondary Species recorded during Walkover Surveys (Year 2, 2023-24). Results are from the field surveys completed within the SADA boundary, the western extent only. The summary results also include the NBBMA (Cell 3) field results.

Field No.	Species		Survey Visits											
		1	2	3	4	5	6	7	8	9	10	11	12	
Target Species														
1	Curlew	-	6	-	-	4	-	-	-	-	-	-	-	
	Greylag goose	-	-	-	-	-	-	-	-	-	-	-	4	
	Lapwing	-	-	-	-	-	-	50	-	-	-	-	-	
2	Curlew	-	-	-	-	-	-	-	-	70	-	-	-	
	Lapwing	-	-	-	-	-	-	-	18	-	-	-	-	
	Shelduck	-	-	-	-	-	10	-	-	-	-	-	-	
	Snipe	-	-	-	-	-	-	6	-	-	-	-	-	
3	Lapwing	-	-	-	-	-	20	-	-	-	-	-	-	
4	Snipe	-	-	-	7	-	-	4	13	-	-	-	-	
	Lapwing	-	-	-	280	-	-	118	-	-	-	-	-	
	Golden plover	-	-	-	34	-	-	37	-	-	-	-	-	
5	Curlew	-	-	-	31	-	2	56	26	90	31	17	-	
	Snipe	-	-	-	25	-	-	6	-	17	-	-	-	
	Lapwing	-	-	-	144	-	40	245	-	450	-	-	-	
	Redshank	-	-	-	-	-	-	-	-	4	-	-	-	
	Teal	-	-	-	-	-	-	-	-	50	-	-	-	
	Greylag goose	-	-	-	-	-	-	-	-	6	-	5	-	
	Black-tailed godwit	-	-	-	-	-	-	8	-	-	-	-	-	
	Shelduck	-	-	-	-	-	-	-	-	-	-	8	2	
	Mallard	-	-	-	-	-	-	-	-	-	-	2	-	

Field No.	Species						Sui	rvey Vis	its				
		1	2	3	4	5	6	7	8	9	10	11	12
	Golden plover	-	-	-	-	-	17	100	-	200	-	-	-
	Snipe	-	-	-	-	-	-	-	-	7	6	-	-
6	Teal	-	-	-	-	-	-	-	-	-	-	-	4
	Mallard	-	-	-	-	-	-	-	-	-	-	-	6
	Mallard	-	-	-	-	-	-	-	-	5	-	8	
8	Teal	-	-	-	-	-	-	-	-	3	-	6	
	Shelduck	-	-	-	-	-	-	-	-	1	-	-	
0	Snipe	-	-	-	-	-	-	36	-	12	7	-	-
9	Lapwing	-	-	-	-	-	-	5	-	-	-	-	-
	Black-tailed godwit	2	-	-	-	-	-	-	-	36	74	1,411	800
	Ruff	-	-	-	-	-	-	-	-	10	2	-	-
	Redshank	-	-	-	-	-	-	-	-	48	-	-	-
	Curlew	46	36	4	-	4	-	-	-	59	18	27	-
	Snipe	1	28	3	24	-	-	-	-	-	-	3	-
	Teal	-	177	-	-	-	-	-	114	291	116	235	49
	Golden plover	-	-	-	275	-	-	53	433	200	-	-	-
'Cell 3'	Lapwing	-	-	-	150	400	-	124	800	463	9	-	-
Cell 3	Pintail	-	-	-	-	-	-	-	-	5	-	4	-
	Greylag goose	-	-	-	8	-	-	-	-	-	3	2	7
	Gadwall	-	-	-	-	-	-	-	-	-	2	6	5
	Shoveler	-	-	-	-	-	-	-	-	4	2	38	8
	Oystercatcher	-	-	-	-	-	-	-	-	-	-	-	2
	Wigeon	-	-	-	-	-	-	-	19	2	18	25	-
	Mallard	-	-	-	-	-	-	-	-	41	10	42	-
	Shelduck	-	-	-	-	-	-	-	1	2	2	11	4

Field No.	Species						Sui	rvey Vis	its				
		1	2	3	4	5	6	7	8	9	10	11	12
	Gadwall	12	6	-	-	-	-	-	-	-	-	5	-
	Mallard	5	43	9	8	13	-	-	-	-	35	12	18
	Teal	-	27	-	56	-	-	-	-	38	6	4	-
	Redshank	-	-	-	-	-	-	1	-	1	-	-	-
	Tufted duck	-	-	-	-	3	-	-	8	19	12	30	50
Fishing	Great crested grebe	-	-	1	-	-	-	-	-	-	-	-	-
Pools (N. Cell 3)	Oystercatcher	-	-	-	-	-	-	-	-	-	2	2	4
-	Snipe	-	13	2	3	-	-	34	6	9	-	-	-
	Greylag goose	-	-	-	-	-	-	-	-	-	-	-	4
	Black-tailed godwit	-	-	-	-	-	-	-	-	-	1	-	-
	Whooper swan	-	-	1	-	1	-	-	-	-	-	-	-
	Mute swan	-	-	-	8	-	-	-	-	-	-	-	-
Secondary	Species												
	Skylark	-	-	-	-	-	-	-	-	-	3	2	3
1	Reed bunting	-	-	-	-	-	-	-	-	-	-	-	2
	Cetti's warbler	-	-	-	-	-	-	-	-	-	-	-	1
	Skylark	-	-	-	-	-	-	-	-	-	2	3	-
	Starling	-	-	-	-	-	-	-	-	-	2	-	-
2	Black-headed gull	-	-	-	-	-	15	-	-	-	-	-	-
	Cetti's warbler	-	-	-	-	-	-	-	-	-	-	2	-
	Reed bunting	-	-	-	-	-	-	-	-	-	4	3	-
4	Starling	-	-	-	-	-	-	200	-	-	-	-	-
	Starling	-	-	-	-	-	-	-	-	200	180	-	-
5	Skylark	-	-	-	-	-	-	-	-	-	5	3	3
	Wheatear	-	-	-	-	-	-	-	-	-	-	1	

Field No.	Species						Sur	vey Vis	its				
		1	2	3	4	5	6	7	8	9	10	11	12
	Black-headed gull	-	-	-	-	-	-	-	-	-	24	-	-
	Skylark	-	-	-	-	-	-	-	-	-	-	3	2
6	Wheatear	-	-	-	-	-	-	-	-	-	-	-	1
	Great black-backed gull	-	-	-	-	-	-	-	1	2	-	1	-
Cell 3	Grey heron	-	-	-	-	-	-	-	-	-	-	-	1
Cell 3	Skylark	-	-	-	-	-	-	-	-	-	-	-	8
	Little egret	-	-	-	-	-	-	-	-	-	-	4	-
	Coot	18	-	-	45	-	-	-	65	120	79	55	35
Fishing	Black-headed gull	-	-	-	-	-	-	-	-	-	26	7	-
Pools (N. Cell 3)	Grey heron	-	-	-	-	-	-	-	-	-	-	-	1
· 	Great white egret	1	-	-	-	-	-	-	-	-	-	-	-

ANNEX 8-11: WALK OVER RESULTS (NON-BREEDING BIRD SURVEYS) YEAR 3

Table A10: Target and Secondary Species recorded during Walkover Surveys (Year 3, 2024-25). Field survey results are from the SADA boundary.

Cell No.	Field No.	Species		ey Vis	it												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Target Spe	cies		'		'				'								
1	1	Lapwing			3								2				180
1	1	Merlin							1								
1	1	Golden plover															23
1	1	Snipe															8
1	2	Curlew			11 + 17		6										
1	2	Lapwing			2								1+2+3				20
1	2	Greylag goose					2										
1	2	Snipe															7
1	3	Snipe															6
1	3	Lapwing											1				14 + 30
1	4	Lapwing											4				
1	4	Snipe															2
2	5	Curlew			24	4 ¹⁸ + 32	28		12		24						25 + 12
2	5	Lapwing					73		200				2 + 20 + 2				18+ 16

¹⁸ Flock also was in Cell 3 first and flew into Cell 2.

Cell No.	Field No.	Species	Surv	ey Visi	it												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	5	Golden plover							60								
2	5	Redshank												9			
2	5	Snipe											8 + 6 + 12 + 3				3 + 60
5	6	Black-tailed godwit							57								
5	6	Lapwing							4								
5	10	Kingfisher				1 ¹⁹											
N/A	11	Snipe						4								1	
N/A	12	Lapwing		2				28		18							
N/A	12	Black-tailed godwit						18									
N/A	12	Pintail						7									
N/A	12	Teal						92		23							
N/A	12	Shoveler						2									
N/A	12	Snipe						11		3						1	
N/A	12	Redshank													2		
N/A	12	Greylag goose						2									
N/A	12	Woodcock														2	
N/A	16	Lapwing	2														
N/A	21	Water rail										1					
N/A	29	Lapwing	3														
N/A	32	Lapwing		1													
N/A	33	Teal														2+3	
N/A	36	Snipe						3									

¹⁹ Perched along side of field along wet ditch.

Cell No.	Field No.	Species	Surv	ey Vis	it												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
N/A	37	Snipe														1	
3	N/A	Black-tailed godwit			387 + 150	285 + 40 + 138	338		211 + 14 + 16 + 24 + 50		35 0 + 19			5			
3	N/A	Ruff			9	8	6+2		6+1								
3	N/A	Snipe			5+23+3 +2	7 + 17 + 2 + 3 + 11	7+1+ 2+5		11+2+4+8		5 + 2 + 3 + 3 + 2		4 + 2 + 8 + 6 + 4				21 +8 +2 +2 +4 +6 +5 +4 +2 +7 +8 +
3	N/A	Lapwing			208 + 80 + 58 + 64	338 + 64	693 + 82 + 100		679 + 100 + 232 + 60 + 80		50 0 + 86		69 + 1 + 27 + 21	200			5 + 9 + 36
3	N/A	Golden plover			1 + 14				526		80						3
3	N/A	Teal			400 + 32 + 52 + 30 + 20	266 + 92 + 100	229 + 73 + 10 + 100 + 150		108 + 49 + 20 + 42 + 50 + 20		8 + 72 + 10 + 38 +		72 + 49 + 23 + 30 + 18	250 + 300			

Cell No.	Field No.	Species	Surv	ey Visi	it												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
											7						
											+ 10						
											0						
3	N/A	Shoveler			29 + 8	27 +13	52 + 6 +		8+3+6		16		3 +	2			
						+ 2	2 + 11 +				+ 5		24				
							0				+						
											2						
											+						
											6 +						
											4						
											+						
_											2						
3	N/A	Shelduck							1								<u> </u>
3	N/A	Wigeon			5		38 + 4 + 2 + 9				26						
3	N/A	Pintail			1												
3	N/A	Mallard			61 + 12	52	36 + 8 + 28		8 + 13		14		18	50			
3	N/A	Curlew			13	4 ¹ + 14	22		41		11		2	8			
											+						
_											8						
3	N/A	Redshank			1												-
3	N/A	Dunlin							8 +1								
3	N/A	Oystercatcher					1										
3	N/A	Water rail			1												
3	N/A	Tufted duck				8	8										
3	N/A	Gadwall				8	12		16				12				

Cell No.	Field No.	Species	Surv	ey Vis	it												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3	N/A	Mute swan				2	2		2								
3	N/A	Greylag goose					4										
3	N/A	Jack snipe				1											
3	N/A	Marsh harrier												1 (hunting)			
Canal pools (N. of Cell 3)	N/A	Gadwall				30	8										
Canal pools (N. of Cell 3)	N/A	Teal					64		12+ 18				10 + 50				
Canal pools (N. of Cell 3)	N/A	Wigeon					4						10	6			
Canal pools (N. of Cell 3)	N/A	Tufted duck					8							3+5			
Canal pools (N. of Cell 3)	N/A	Mallard											5	6+2			
Canal pools (N. of Cell 3)	N/A	Shoveler							2				10				
Canal pools (N. of Cell 3)	N/A	Lapwing											5	3			
Canal pools (N. of Cell 3)	N/A	Snipe											3	10			

Cell No.	Field No.	Species	Surv	ey Visi	it												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Canal pools (N. of Cell 3)	N/A	Mute swan									3						
Canal pools (N. of Cell 3)	N/A	Shelduck												2			
Secondary .	Species																
2	5	Lesser black-backed gull												1			
N/A	10	Stock dove										1					
N/A	12	Little grebe										1					
N/A	12	Little egret										1					
N/A	12	Stock dove													2		
N/A	15	Lesser redpoll										8					
N/A	28	Redwing										45					
N/A	31	Redwing										50					
N/A	31	Fieldfare										40					
N/A	37	Stock dove										1					
Canal Pools (N/ of Cell 3)	N/A	Little egret												1			
Canal Pools (N/ of Cell 3)	N/A	Coot												33 + 18 + 54			

Cell No.	Field No.	Species	Surv	ey Vis	it												
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Target Species	'					-		-	•	_					<u>'</u>		
1	1	Curlew					37										
1	1	Lapwing					50	20									
1	1	Snipe					2	1									
1	2	Curlew					8			13 ⁵						11	
1	2	Lapwing										2					
1	2	Snipe						1									
2	5	Black-tailed godwit								84 + 18							
2	5	Snipe			3+4+3		3			6		2 + 6 + 2					
2	5	Lapwing			15 + 2 + 3 + 12 + 13 ²⁰			111 ²¹				1+1		2			
2	5	Golden plover										38					
2	5	Curlew			13 ³			18 ²²		24 + 13 ²³							
2	5	Redshank			1+1		1										
2	5	Greylag goose						7		8				10		5+3	
2	5	Teal														8	
2	5	Pink-footed goose														2	

²⁰ Mixed flock with curlew (total of 26), and 13 of each species is used as an estimate.

<sup>Then flew to Cell 3.
Then flew to Cell 3.
Flew from Cell 1.</sup>

Cell No.	Field No.	Species	Surv	ey Visi	t												
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
5	6	Teal			20							Not kno wn ²⁴				53	
5	6	Snipe										1					
5	6	Lapwing			12			1									
5	8	Mallard					6									6	
5	8	Teal						6								4	
5	9	Oystercatch er					1										
5	9	Lapwing			1												
5	9	Snipe			1												
5	9	Teal			5												
N/A	11	Mallard		4													
N/A	12	Snipe	3	3									3+1				
N/A	12	Redshank	1						1								
N/A	12	Lapwing	3														
N/A	12	Teal	6	8					42		52 + 8		3		23		45
N/A	12	Black-tailed godwit							3		3		5				3
N/A	12	Gadwall									4						
N/A	12	Mallard									4						6
N/A	12	Shelduck															1
N/A	12	Pintail							2								
N/A	14	Hen harrier													1		

_

²⁴ Heard only, no estimate possible.

Cell No.	Field No.	Species	Surv	ey Visi	it												
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
N/A	16	Lapwing	1														
N/A	16	Snipe	1										4				
N/A	16	Mallard													2		
N/A	17	Snipe	5														
N/A	17	Mallard									6				18		2
N/A	22	Snipe	2														
N/A	22	Mallard													2		2
N/A	28	Snipe	8														13
N/A	28	Mallard													4		4
N/A	29	Lapwing		1													
N/A	30	Mallard											5				
N/A	31	Snipe	2	2							1		1				2
N/A	31	Mallard															2
N/A	32	Snipe											1				
N/A	36	Snipe		6									2				
N/A	36	Lapwing											4				
N/A	37	Snipe	1	3									3				
N/A	37	Mallard									6						2
N/A	37	Shelduck													1		
3	N/A	Gadwall					2+6	6						6		4 + 2	
3	N/A	Black-tailed godwit					400 + 11	74 + 38 + 70		62 + 380 + 3				7		3+1 +3+ 1	
3	N/A	Ruff					4	8		6+3							

Cell No.	Field No.	Species	Surv	ey Visi	t												
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
3	N/A	Pink-footed goose			Not known ²⁵									131			
3	N/A	Curlew						18 ⁴								13	
3	N/A	Lapwing			20 + 13 + 8 +		500 + 14 + 53	200 +629 + 111 ³		650 + 180 + 14		1		2			
3	N/A	Teal			8+8+10		122 + 146 + 30 + 64 + 72	38 + 82 + 14		98 + 36 + 108 + 39 + 62		10+20		85 + 93 + 10 + 27 + 57		114 + 16 + 20 + 35 + 48	
3	N/A	Ringed plover			1												
3	N/A	Golden plover					50	481 + 150		300		32 + 37					
3	N/A	Greylag goose			7		2	11				2		4		2	
3	N/A	Shelduck								2						4+3	
3	N/A	Redshank						6									
3	N/A	Snipe			6+2+3		8+8	6 + 4		7		1 + 1 + 10 + 12		39 + 2 + 4		15	
3	N/A	Mallard					6+9	5 + 22		5 + 8		6		4 + 7		6	
3	N/A	Wigeon						108 + 50		42 + 50						44 + 12 +	

 $^{^{\}rm 25}$ Birds heard during nocturnal survey but no estimate was possible.

Cell No.	Field No.	Species	Survey Visit														
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
																51 + 62	
3	N/A	Shoveler					12 + 5 + 6	6+6		12 + 6 + 4 + 2 + 6				4+6 +8+ 6		11 + 4 + 9 + 6	
3	N/A	Pintail								2						9 + 4	
3	N/A	Tufted duck								2				4			
Canal Pools (N/ of Cell 3)	N/A	Oystercatch er					1										
Canal Pools (N/ of Cell 3)	N/A	Great crested grebe														2	
Canal Pools (N/ of Cell 3)	N/A	Teal					30 + 13	18 + 30						4 + 57		21	
Canal Pools (N/ of Cell 3)	N/A	Snipe						3		2				3		3	
Canal Pools (N/ of Cell 3)	N/A	Wigeon						80								1	
Canal Pools (N/ of Cell 3)	N/A	Mallard												5		5	
Canal Pools (N/ of Cell 3)	N/A	Tufted duck								12 + 7				6		9	
Secondary Species																	
5	9	Great black- backed gull														2	
N/A	11	Little egret													1		
N/A	12	Little egret	1	1													1
N/A	12	Grey heron													1		1
N/A	15	Grey heron		1													

Cell No.	Field No.	Species	Surv	ey Vis	it												
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
N/A	26	Black- headed gull		9													
N/A	31	Grey heron							1								
N/A	37	Grey heron									1						
3	N/A	Little grebe					1										
3	N/A	Coot												42 + 2		39 + 4 + 1	
3	N/A	Grey heron														2	
3	N/A	Little egret												1			
3	N/A	Black- headed gull												1		5	
Canal Pools (N/ of Cell 3)	N/A	Coot					9 + 49	40		48 + 36 + 2		2		12		39	
Canal Pools (N/ of Cell 3)	N/A	Grey heron					1							1		1	
N/A	12	Redshank				6											
N/A	12	Mallard				3											
N/A	12	Teal				5											
N/A	16	Lapwing				40											
N/A	17	Snipe				1											
N/A	27	Lapwing				8											
N/A	29	Lapwing				6											
N/A	30	Lapwing				5											
N/A	30	Mallard				10											
N/A	32	Lapwing				14											
N/A	32	Grey heron				1											

Cell No.	Field No.	Species	Surv	ey Visi	t												
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
N/A	33	Lapwing				2											
N/A	37	Mallard				8											

ANNEX 8-12: MERSEY ESTUARY SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI) CITATION

File ref: C/S/13

County: Cheshire/Merseyside Site Name: Mersey Estuary

District: Ellesmere Port/Vale Royal/Halton/Wirral/

Liverpool

Status: Site of Special Scientific Interest (SSSI) notified under Section

28 of the Wildlife and Countryside Act, 1981.

Local Planning Authority: Cheshire County Council

Merseyside Metropolitan County

Ellesmere Port and Neston Borough Council

Vale Royal District Council Halton Borough Council

Wirral Metropolitan District Council Liverpool Metropolitan District Council

National Grid Reference: SJ 440800 Area: 6,702.14 (ha) 16,561 (ac)

Ordnance Survey Sheet 1:50 000 108, 117 1:10 000 SJ 37 NE

SJ 38 NE, SE SJ 47 NE, NW SJ 48 SE, SW SJ 57 NW SJ 58 SW

Date Notified (Under 1949 Act): 1951 Date of Last Revision: 1979

Date Notified (Under 1981 Act): 1984 Date of Last Revision: 1985

Other Information:

- Hale Duck Decoy is a scheduled Ancient Monument and is managed as a reserve by Cheshire Conservation Trust.
- Boundary modified at renotification by extensions and deletions.

Reasons for Notification:

The Mersey Estuary is an internationally important site for wildfowl and consists of large areas of intertidal sand and mudflats. The site also includes an area of reclaimed marshland, salt-marshes, brackish marshes and boulder clay cliffs with freshwater seepages. The Manchester Ship Canal forms part of the southern boundary of the site and separates a series of pools from the main estuary. These pools together with Hale Marsh are important roosting sites for wildfowl and waders at high tide. Throughout the winter the estuary supports large numbers of wildfowl and waders. The birds feed on the rich invertebrate fauna of the intertidal sediments as well as plants and seeds from the salt-marsh

and adjacent agricultural land. The estuary is also a valuable staging post for migrating birds in spring and autumn.

In 1980–81 the estuary had the highest monthly count of wildfowl of any British site; 57,700 birds. The most important species over the period 1978–83 were pintail *Anas acuta* (17% of the total western European population), teal *Anas crecca* (12%), shelduck *Tadorna tadorna* (7%) and wigeon *Anas penelope* (2%). In 1982–83 the estuary had the 16th highest monthly count of waders of any British site: 26,593 birds. The most important species over the period 1978–83 was dunlin *Calidris alpina* (1%). However, nationally important numbers of curlew *Numenius arquata*, redshank *Tringa totanus* and golden plover *Pluvialis apricaria* were also recorded.

Several area of salt-marsh are present. These form important feeding and roosting sites for birds. Glasswort *Salicornia* spp. is widespread on the outer margins whilst sea Poa *Puccinellia maritima* is dominant over the rest. Unlike the other salt-marshes in the estuary, Stanlow Banks has not been grazed by sheep or cattle, and consequently has a more diverse flora. Sea aster *Aster tripolium* and hastate orache *Atriplex prostrata* are widespread throughout this area. Sea plantain *Plantago maritima*, annual seablite *Suaeda maritima* and scurvy-grass *Cochlearia* spp. also occur.

In a number of areas the salt-marsh grades into brackish marsh dominated by common reed *Phragmites australis* with sea arrow-grass *Triglochin maritima* and great reedmace *Typha latifolia* also present in some areas. On the sandy foreshore sea sandwort *Honkenya peploides* occurs with sea milkwort *Glaux maritima*. At the inner edge of the salt-marsh and along the strand line, mud rush *Juncus gerardi*, sand sedge *Carex arenaria* and curled dock *Rumex crispus* occur.

On the north side of the estuary, part of the coastline is formed by boulder clay cliffs. Portions of the cliff have become exposed by slumping, and in these areas a number of unusual species occur including yellow-wort *Blackstonia perfoliata* and bristly oxtongue *Picris echioides*, both of which are at the northern limits of their distribution.

ANNEX 8-13: MERSEY ESTUARY SPA CONSERVATION OBJECTIVES AND CITATION

European Site Conservation Objectives for Mersey Estuary Special Protection Area Site Code: UK9005131



With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- > The extent and distribution of the habitats of the qualifying features
- > The structure and function of the habitats of the qualifying features
- > The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

ADAO	Todorno	tadarna:	Common	shelduck	Mon hr	(padipac
AU40	radoma	ladoma.	Common	SHEIDUCK	(INOH-DI	eeama

A052 Anas crecca; Eurasian teal (Non-breeding)

A054 Anas acuta; Northern pintail (Non-breeding)

A140 Pluvialis apricaria; European golden plover (Non-breeding)

A149 Calidris alpina alpina; Dunlin (Non-breeding)

A156 Limosa limosa islandica; Black-tailed godwit (Non-breeding)

A162 Tringa totanus; Common redshank (Non-breeding)

Waterbird assemblage

This is a European Marine Site

This SPA is a part of the Mersey Estuary European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 5). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

EC Directive 79/409 on the Conservation of Wild Birds Special Protection Area (SPA)

Name: Mersey Estuary

Unitary Authority/County: Cheshire; Halton; Liverpool; and Wirral.

Site description: The Mersey Estuary is on the Irish Sea coast of north-west England. The SPA encompasses all or parts of Mersey Estuary SSSI and New Ferry SSSI. It is a large, sheltered estuary which comprises large areas of saltmarsh and extensive intertidal sand and mudflats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment. The intertidal flats and saltmarshes provide feeding and roosting sites for large and internationally important populations of waterfowl. During the winter, the site is of major importance for duck and waders. The site is also important during spring and autumn migration periods, particularly for wader populations moving along the west coast of Britain.

Size of SPA: The SPA covers an area of 5,023.35 ha.

Qualifying species:

The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Annex 1 species	Count and season	Period	% of GB population
Golden plover Pluvialis apricaria	3,040 individuals - wintering	5 year peak mean 1993/94 - 1997/98	1.2%

The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

Migratory species	Count and season	Period	% of subspecies/population
Redshank	4,513 individuals -	5 year peak mean	3.5% brittanica
Tringa totanus	passage	1993 - 1997	
Shelduck	6,476 individuals -	5 year peak mean	2.2% Northwestern
Tadorna tadorna	wintering	1993/94 - 1997/98	Europe (breeding)
Teal Anas crecca	11,723 individuals -	5 year peak mean	2.9% Northwestern
	wintering	1993/94 - 1997/98	Europe (non-breeding)
Pintail Anas acuta	1,169 individuals -	5 year peak mean	1.9% Northwestern
	wintering	1993/94 - 1997/98	Europe (non-breeding)
Dunlin	48,789 individuals -	5 year peak mean	3.7% alpina, Western
Calidris alpina alpina	wintering	1993/94 - 1997/98	Europe (non-breeding)
Black-tailed godwit	976 individuals -	5 year peak mean	2.8% islandica
Limosa limosa islandica	wintering	1993/94 - 1997/98	
Redshank	4,993 individuals -	5 year peak mean	3.8% brittanica
Tringa totanus	wintering	1993/94 - 1997/98	

Bird counts from: Wetland Bird Survey (WeBS) database.



Assemblage qualification:

The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season:

In the non-breeding season, the area regularly supports 104,599 individual waterbirds (5 year peak mean 1993/94 - 1997/98), including great crested grebe *Podiceps cristatus*, shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, pintail *Anas acuta*, ringed plover *Charadrius hiaticula*, golden plover *Pluvialis apricaria*, grey plover *Pluvialis squatarola*, lapwing *Vanellus vanellus*, dunlin *Calidris alpina alpina*, black-tailed godwit *Limosa limosa islandica*, curlew *Numenius arquata* and redshank *Tringa totanus*.

Non-qualifying species of interest: Bewick's swan *Cygnus columbianus bewickii*, whooper swan *Cygnus cygnus*, merlin *Falco columbarius*, peregrine *Falco peregrinus*, ruff *Philomachus pugnax*, bar-tailed godwit *Limosa lapponica* and short-eared owl *Asio flammeus* (all Annex I species) occur in non-breeding numbers of less than European importance (less than 1% of the GB population).

Status of SPA:

- 1) The Mersey Estuary was classified as a Special Protection Area on 20 December 1995.
- An extension to the Mersey Estuary SPA, to include New Ferry SSSI, was classified on 23 June 2004.



ANNEX 8-14: INFORMATION SHEET ON RAMSAR WETLANDS (RIS): **MERSEY ESTUARY**

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

The RIS should be completed in accordance with the attached Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands. Compilers are strongly advised to read this guidance before filling in the

	RIS.				
2.					he Strategic Framework for
		nt of the List of Wetlands			
		y COP9 Resolution IX.1		ition of the Handbook,	incorporating these
	amendments, is in pre	paration and will be ava	nable in 2006.		
3.	Once completed, the l	RIS (and accompanying	map(s)) should be su	bmitted to the Ramsar	Secretariat, Compilers
32		ctronic (MS Word) copy			
1.	Name and addres	s of the compiler of	this form:	FOR OFFICE USE ONLY	•
				DD MM YY	
	Joint Nature Co.	nservation Commit	tee		
	Monkstone House				
	City Road	50			Site D. Course Name to
	Peterborough			Designation date	Site Reference Number
		DEL LIV			
	Cambridgeshire	PE1 1JY			
	UK	144 (0) 1533 - 553	(606 / 144 /0):2	22 555 040	
	Telephone/Fax:	+44 (0)1733 - 562		55 – 555 948	
	Email:	RIS@JNCC.gov.u	<u>k</u>		
2.	Date this sheet we	s completed/updat	od.		
4.			cu.		
100	Designated: 20 D	ecember 1995			
3.	Country:				
	UK (England)				
4.	Name of the Ram	sar site:	_		
477	Mersey Estuary	f			
1978	CASA PROPERTY OF THE PROPERTY OF		ndate of existing	site:	
12791	Designation of ne	w Ramsar site or u	Duale of Calsting		
100	Designation of ne	w Ramsar site or u	poace of carson;		
5.			•	•	
5.		w Ramsar site or u ed information on a	•	•	
5. This	s RIS is for: Updat	ed information on a	n existing Ramsa	r site	v: wodata:
5. This	For RIS updates	ed information on a	n existing Ramsa	r site	er update:
5. This	s RIS is for: Updat	ed information on a	n existing Ramsa	r site	er update:
5. This	For RIS updates	ed information on a	n existing Ramsa	r site	er update:
5. This 6. a) S: ** Im	For RIS updates of the boundary and a	ed information on an only, changes to the rea:	n existing Ramsa e site since its de	r site signation or carlie	ne Contracting Party should
5. This 6. a) S ** In have	For RIS updates of the boundary and a portant note: If the bounfollowed the procedures	ed information on ar only, changes to the rea: dary and/or area of the destablished by the Confe	n existing Ramsa e site since its de designated site is being	r site signation or earlie ng restricted/reduced, the in the Annex to COP9	ne Contracting Party should Resolution IX.6 and
5. This 6. a) Si ** Im have	For RIS updates of the boundary and a portant note: If the bounfollowed the procedures	ed information on an only, changes to the rea:	n existing Ramsa e site since its de designated site is being	r site signation or earlie ng restricted/reduced, the in the Annex to COP9	ne Contracting Party should Resolution IX.6 and
5. This 6. a) Si ** Improvi	For RIS updates of ite boundary and a portant note: If the boundary ded a report in line with	only, changes to the rea: dary and/or area of the c established by the Confe paragraph 28 of that Am	e site since its de designated site is beit erence of the Parties nex, prior to the subr	r site signation or earlie ng restricted/reduced, the in the Annex to COP9 in mission of an updated R	ne Contracting Party should Resolution IX.6 and US.
5. This 6. a) Si ** Im have provi	For RIS updates of ite boundary and a suportant note: If the boundary ded a report in line with Describe briefly any	ed information on an only, changes to the rea: adary and/or area of the cestablished by the Confeparagraph 28 of that Any major changes to	e site since its de designated site is beit erence of the Parties nex, prior to the subs	r site signation or earlie og restricted/reduced, the in the Annex to COP9 mission of an updated R character of the R	ne Contracting Party should Resolution IX.6 and
5. This 6. a) Si ** Im have provi	For RIS updates of ite boundary and a suportant note: If the boundary ded a report in line with Describe briefly any	only, changes to the rea: dary and/or area of the c established by the Confe paragraph 28 of that Am	e site since its de designated site is beit erence of the Parties nex, prior to the subs	r site signation or earlie og restricted/reduced, the in the Annex to COP9 mission of an updated R character of the R	ne Contracting Party should Resolution IX.6 and US.
5. This 6. a) Si *** Imhave provi	For RIS updates of ite boundary and a suportant note: If the boundary ded a report in line with Describe briefly any	ed information on an only, changes to the rea: adary and/or area of the cestablished by the Confeparagraph 28 of that Any major changes to	e site since its de designated site is beit erence of the Parties nex, prior to the subs	r site signation or earlie og restricted/reduced, the in the Annex to COP9 mission of an updated R character of the R	ne Contracting Party should Resolution IX.6 and US.
5. This 6. (a) Si *** Imhave provi b) D in th	For RIS updates of ite boundary and a suportant note: If the boundary ded a report in line with Describe briefly any	ed information on an only, changes to the rea: adary and/or area of the cestablished by the Confeparagraph 28 of that Amy major changes to e Criteria, since the	e site since its de designated site is beit erence of the Parties nex, prior to the subs	r site signation or earlie og restricted/reduced, the in the Annex to COP9 mission of an updated R character of the R	ne Contracting Party should Resolution IX.6 and US.

7. Map of site included:

Refer to Annex III of the Explanatory Notes and Guidelines, for detailed guidance on provision of suitable maps, including digital maps.

- a) A map of the site, with clearly delineated boundaries, is included as:
 - i) hard copy (required for inclusion of site in the Ramsar List): yes ✓ -or- no □;
 - ii) an electronic format (e.g. a JPEG or ArcView image) Yes
 - iii) a GIS file providing geo-referenced site boundary vectors and attribute tables yes ✓ -or-no □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

053 18 51 N

002 49 25 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Liverpool

Mersey Estuary is located in north-west England between the counties of Cheshire and Merseyside.

Administrative region: Cheshire; Halton; Merseyside; Liverpool; Wirral

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 5023.35

Min. -3 Max. 32 Mean 1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the

The Mersey is a large, sheltered estuary which comprises large areas of saltmarsh and extensive intertidal sand and mudflats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment. The intertidal flats and saltmarshes provide feeding and roosting sites for large and internationally important populations of waterfowl. During the winter, the site is of major importance for duck and waders. The site is also important during spring and autumn migration periods, particularly for wader populations moving along the west coast of Britain.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Amex II of the Explanatory Notes and Guidelines for the Criteria and guidelines for their application (adopted by Resolution VII.11).

5. 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 5

Assemblages of international importance:

Ramsar Information Sheet: UK11041 Page 2 of 10 Mersey Estuary

Produced by JNCC: Version 3.0, 13/06/2008

Species with peak counts in winter:

89576 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Common shelduck, Tadorna tadorna, NW 12676 individuals, representing an average of Europe 4.2% of the population (5 year peak mean

1998/9-2002/3)

Black-tailed godwit, Limosa limosa islandica,

Iceland/W Europe

2011 individuals, representing an average of 5.7% of the population (5 year peak mean

1998/9-2002/3)

Common redshank, Tringa totanus totanus, 6651 individuals, representing an average of

2.6% of the population (5 year peak mean

1998/9-2002/3)

Species with peak counts in winter:

Eurasian teal, Anas crecca, NW Europe 10613 individuals, representing an average of

2.6% of the population (5 year peak mean

1998/9-2002/3)

Northern pintail, Anas acuta, NW Europe 565 individuals, representing an average of 2%

of the GB population (5 year peak mean 1998/9-

2002/3

Dunlin, Calidris alpina alpina, W Siberia/W

Europe

48364 individuals, representing an average of 3.6% of the population (5 year peak mean

1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.

Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	clay, mud, sand, sandstone/mudstone
Geomorphology and landscape	cliffs, coastal, estuary, intertidal sediments (including sandflat/mudflat), lowland, subtidal sediments (including sandbank/mudbank)

Nutrient status	eutrophic, mesotrophic
рН	no information
Salinity	brackish / mixosaline, saline / euhaline
Soil	no information
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Blackpool, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/blackpool.html) Max. daily temperature: 12.9° C Min. daily temperature: 6.4° C Days of air frost: 40.3 Rainfall: 871.3 mm Hrs. of sunshine: 1540.3

General description of the Physical Features:

The Mersey Estuary is located on the Irish Sea coast of north-west England. It is a large, sheltered estuary which comprises large areas of saltmarsh and extensive intertidal sand- and mud-flats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Mersey catchment covers an area of approximately 535 km2 and includes the River Mersey and the River Bollin and their tributaries. Several canals and a large number of water bodies, including the Cheshire Meres, large reservoirs and ponds lie within the catchment. The area is heavily urbanised around Greater Manchester, contrasting with the more rural areas of Cheshire to the south and east. Water is abstracted throughout the catchments from both surface waters and groundwater for a number of uses including agricultural, industrial and public water supply. A number of public water supply reservoirs are present within the upper reaches of the catchments including Lamaload, Trentabank and Ridgegate reservoirs.

The Mersey Estuary is located on the Irish Sea coast of north-west England. It is a large, sheltered estuary which comprises large areas of saltmarsh and extensive intertidal sand- and mud-flats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping, Water supply

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	89
Н	Salt marshes	11

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Within this site the main habitat types are: Mudflats, Sandflats, Saltmarsh, Soft cliffs and Brackish marsh

The main plant communities consists of: Spartina anglica saltmarsh (SM6), Puccinellia maritima saltmarsh (SM13), Transitional low-marsh vegetation with Puccinellia maritima, Salicornia species and Suaeda maritima (SM10), Honkenya peploides-Cakile maritima strandline community (SD2), Typha latifolia swamp (S12), Phragmites australis-Urtica dioica tall-herb fen (S26).

The estuary consists of large areas of intertidal sand and mudflats and saltmarsh. These provide feeding and roosting sites for large populations of waterfowl. Grazing of the saltmarsh by sheep and cattle adds diversity. Some parts of the northern shoreline are formed of boulder clay cliffs below which there are, in some parts, transitional areas with *Phragmites australis*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. Do not include here taxonomic lists of species present - these may be supplied as supplementary information to the RIS.

None reported

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. Do not include here taxonomic lists of species present - these may be supplied as supplementary information to the RIS.

Birds

Species currently occurring at levels of national importance:

Species with	peak	counts	in	spring/autumn:
--------------	------	--------	----	----------------

Ringed plover, Charadrius hiaticula, 429 individuals, representing an average of 1.3% Europe/Northwest Africa of the GB population (5 year peak mean 1998/9-

Eurasian curlew, Numenius arquata arquata, N. 2010 individuals, representing an average of 1.3%

of the GB population (5 year peak mean 1998/9-

2002/3)

Spotted redshank, Tringa erythropus, Europe/W

(breeding)

3 individuals, representing an average of 2.2% of

the GB population (5 year peak mean 1998/9-

2002/3)

Common greenshank, Tringa nebularia,

Europe/W Africa

a. arquata Europe

6 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-

2002/3)

Species with peak counts in winter:

Eurasian wigeon, Anas penelope, NW Europe

8268 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-

2002/3)

Species Information

None reported

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic

Environmental education/interpretation

Livestock grazing

Non-consumptive recreation

Scientific research

Sport hunting

Tourism

Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

- sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
National/Crown Estate	+	+
Private	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Current scientific research	+	+
Fishing: (unspecified)		+
Fishing: commercial		+
Fishing: recreational/sport		+
Fishing: subsistence		+
Bait collection	+	
Grazing (unspecified)	+	+
Hunting: recreational/sport	+	+

Ramsar Information Sheet: UK11041 Page 6 of 10 Mersey Estuary

Produced by JNCC: Version 3.0, 13/06/2008

Industrial water supply	+	+
Industry	+	+
Sewage treatment/disposal	+	+
Harbour/port	+	+
Mineral exploration (excl.	+	+
hydrocarbons)		
Oil/gas exploration		+
Oil/gas production		+
Transport route	+	+
Urban development		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

- Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.
- Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
No factors reported	NA				

1981/01				
For category	2 fo	ectors	on	lv.

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?

Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	+
Special Protection Area (SPA)	+	
Management agreement	+	+
Site management statement/plan implemented	+	
Other	+	+

b) Describe any other current management practices:

Ramsar Information Sheet: UK11041 Page 7 of 10 Mersey Estuary

Produced by JNCC: Version 3.0, 13/06/2008

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Environment

The Environment Agency has ongoing research/monitoring of water quality, management required under the Water Framework Directive. Research/monitoring is undertaken by departments within the University of Liverpool. The Liverpool Bay Shoreline Management Plan (Liverpool Bay Coastal Group, 1999a; 1999b; 1999c) expands knowledge of natural resources and physical processes within and affecting the estuary. In future, this will be enhanced by development of the Mersey Estuary Shoreline Management Plan which has not yet been prepared.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Both public sector and non-governmental organisations are involved in interpretation and education at the site.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities

As the waters become cleaner, more people are likely to be attracted to water-based recreational activities including sailing, canoeing, windsurfing and angling.

There is a network of footpaths in the upper estuary, with the potential to extend public access. There is also the potential for greater integration of the footpath network, and improved accessibility design.

Facilities provided

Partial footpath network. New access points, routes and country parks have been opened recently.

Seasonality

BS1 6EB

All year with main concentrations during the summer from a catchment of 2 million people.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs,

European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol,

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

Ramsar Information Sheet: UK11041 Page 8 of 10 Mersey Estuary

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Site-relevant references

- Anon. (1995) Biodiversity: The UK Steering Group Report. Volume 2: Action plans. HMSO, London
- Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP & Davidson, NC (eds.) (1996) Coasts and seas of the United Kingdom. Region 13. Northern Irish Sea: Colwyn Bay to Stranvaer, including the Isle of Man. Joint Nature Conservation Committee, Peterborough. (Coastal Directories Series.)
- Buck, AL (ed.) (1993) An inventory of UK estuaries. Volume 3. North-west Britain. Joint Nature Conservation Committee, Peterborough
- Burd, F (1989) The saltmarsh survey of Great Britain. An inventory of British saltmarshes. Nature Conservancy Council, Peterborough (Research & Survey in Nature Conservation, No. 17)
- Buxton, NE (1978) Stanlow and Ince Banks the wildlife importance of the Banks. Cheshire County Council Planning Department, Chester (Mersey Marshes Local Plan Technical Report No. 3).
- Carter, I (1993) Departmental Brief: Mersey Estuary proposed Special Protection Area and Ramsar site (513A). English Nature. Peterborough
- Cheshire County Council (1989) The ecology of the Mersey estuary. Cheshire County Council, Environmental Planning, Chester
- Clark, NA et al. (1990) Waterfowl migration and distribution in north west estuaries. (Contractor: British Trust for Ornithology) Department of Energy, London (BTO Research Report, No. 54)
- Covey, R (1998) Marine Nature Conservation Review Sector 11. Liverpool Bay and the Solway Firth: area summaries. Joint Nature Conservation Committee, Peterborough (Coasts and seas of the United Kingdom. MNCR series)
- Cranswick, PA, Waters, RJ, Musgrove, AJ & Pollitt, MS (1997) The Wetland Bird Survey 1995–96: wildfowl and wader counts. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge
- Curtis, MS, Norman, D & Wallace, I (1990) The Mersey estuary naturally ours. Liverpool Museum, Liverpool
- English Nature (2001) Mersey Estuary European Marine Site. English Nature's advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994, as amended. English Nature, Peterborough. www.englishnature.org.uk/about/teams/team_photo/Mersey%20Estuary%20Reg%2033%20-%20Final%20Version%20Low%20Res%2015May03%20LTF.pdf
- George, N (1999) Liverpool Bay coastal natural area. A nature conservation profile. English Nature, Peterborough
- Gray, LC (1980) Environmental bibliography of north-west England (vice-counties 59, 60, 69 and 70) 1850–1979.
 University of Lancaster Library, Lancaster (Library Occasional Paper, No. 10)
- Liverpool Bay Coastal Group (1999a) Liverpool Bay Shoveline Management Plan Sub-Cell 11a: Great Ormes Head to Formby Point. Data Collation Report.
- Liverpool Bay Coastal Group (1999b) Liverpool Bay Shoreline Management Plan Sub-Cell 11a: Great Ormes Head to Formby Point. Plan Document.
- Liverpool Bay Coastal Group (1999c) Liverpool Bay Shoveline Management Plan Sub-Cell 11a: Great Ormes Head to Formby Point. Context Report.
- Mersey Basin Campaign (1996) Mersey strategy: Mersey estuary management plan summary. Mersey Basin Campaign, Estuary Projects Group, Manchester
- Mersey Estuary Project Group (1995) Mersey estuary management plan a strategic policy framework. Liverpool University Press, Liverpool
- Mills, DJL (1998) Chapter 11. Liverpool Bay to the Solway (Rhôs-on-Sea to the Mull of Galloway) (MNCR Sector 11). In: Benthic marine ecosystems of Great Britain and the north-east Atlantic, ed. by K. Hiscock, 315-338. Joint Nature Conservation Committee, Peterborough. (Coasts and Seas of the United Kingdom. MNCR series)
- Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99. WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)
- Musgrove, AJ, Pollitt, MS, Hall, C, Heam, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) The Wetland Bird Survey 1999–2000: wildfowl and wader counts. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14
- Pugh-Thomas, M (ed.) (1980) The ecology of the Mersey estuary. University of Salford, Manchester, for North West Water Authority

Ramsar Information Sheet: UK11041 Page 9 of 10 Mersey Estuary

Information Sheet on Ramsar Wetlands (RIS), page 10

- Ratcliffe, DA (ed.) (1977) A Nature Conservation Review. The selection of biological sites of national importance to nature conservation in Britain. Cambridge University Press (for the Natural Environment Research Council and the Nature Conservancy Council), Cambridge (2 vols.)
- Rehfisch, MM et al. (1994) Waterfowl distribution and diet on the Mersey estuary and adjacent areas. (Contractor: British Trust for Ornithology) Mersey Barrage Company, Liverpool (BTO Research Report, No. 77)
- Rice, KA & Putwain, PD (1987) The Dee and Mersey estuaries. Environmental background. (Contractor: University of Liverpool, Environmental Advisory Unit.) Shell UK Ltd.
- Rodwell, JS (ed.) (1995) British plant communities. Volume 4. Aquatic communities, swamps and tall-herb fens. Cambridge University Press, Cambridge
- Rose, PM & Scott, DA (1997) Waterfowl population estimates. 2nd edn. Wetlands International, Wageningen (Wetlands International Publication, No. 44) www.wetlands.org/IWC/wpe2/WPE2-toc.htm
- Stammers, MK (1994) The archaeology of the Mersey estuary: past work and future potential. International Journal of Nautical Archaeology, 23, 27-33
- Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) The UK SPA network: its scope and content. Joint Nature Conservation Committee, Peterborough (3 vols.) www.jncc.gov.uk/UKSPA/default.htm
- Taylor, PM & Parker, JG (eds.) (1993) The coast of north Wales & north west England. An environmental appraisal. Hamilton Oil Company Ltd., London
- Tucker, GM & Heath, MF (1994) Birds in Europe: their conservation status. BirdLife International, Cambridge (BirdLife Conservation Series, No. 3)
- Weighell, AJ, Donnelly, AP & Calder, K (eds.) (2000) Directory of the Celtic coasts and seas. Joint Nature Conservation Committee, Peterborough

Please return to: Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland
Telephone: +41 22 999 0170 • Fax: +41 22 999 0169 • email: ramsar@ramsar.org

Ramsar Information Sheet: UK11041 Page 10 of 10 Mersey Estuary

ANNEX 8-15: WEBS COUNT SECTORS

