

Welsh Government

M4 Corridor around Newport

Environmental Statement

Supplement

Volume 3: Appendix S10.5

2016 Breeding Season
Ornithological Surveys

M4CaN-DJV-EBD-ZG_GEN-AX-EN-0043

At Issue | September 2016

Contents

		Page
1	Introduction	1
2	Methodologies	3
3	Survey Results	6
4	Discussion	13
5	References	15

Figure 1	Location and extent of 2016 ornithological survey areas
Figure 2	Breeding Bird Survey 2016 Records (Visit 1, Area BBS1)
Figure 3	Breeding Bird Survey 2016 Records (Visit 1, Area BBS2)
Figure 4	Breeding Bird Survey 2016 Records (Visit 1, Area BBS3)
Figure 5	Breeding Bird Survey 2016 Records (Visit 2, Area BBS1)
Figure 6	Breeding Bird Survey 2016 Records (Visit 2, Area BBS2)
Figure 7	Breeding Bird Survey 2016 Records (Visit 2, Area BBS3)
Figure 8	Breeding Bird Survey 2016 Records (Visit 3, Area BBS1)
Figure 9	Breeding Bird Survey 2016 Records (Visit 3, Area BBS2)
Figure 10	Breeding Bird Survey 2016 Records (Visit 3, Area BBS3)
Figure 11	Cetti's Warbler Survey 2016 (All Records)

Summary

- S.1** RPS was contracted by Welsh Government to provide ornithological surveys in support of the proposed new section of motorway as part of the M4 Corridor around Newport project (M4CaN) to the south of Newport, Gwent (referred to hereafter as 'the Scheme').
- S.2** Two types of survey were carried out according to established methodologies by experienced ornithological surveyors; breeding bird surveys and species-specific surveys for Cetti's warbler. These surveys were both carried out between April and June 2016.
- S.3** The species recorded and the numbers they were recorded in during the breeding bird surveys are considered fairly typical for such habitats. No species named on Annex I of the Birds Directive 2009/147/EC were recorded within the study area. Two species named in Schedule 1 of the Wildlife and Countryside Act (1981) were recorded; black-tailed godwit and Cetti's warbler, with no breeding evidence of the former species recorded. In total, up to 49 Cetti's warbler territories were recorded within the species-specific study area.
- S.4** Five qualifying species of the Severn Estuary Special Protection Area (SPA) or Ramsar site (dunlin, shelduck, shoveler, herring gull and lesser black-backed gull) were recorded during breeding bird surveys, though none of these species were recorded showing behaviour associated with breeding.

1 Introduction

1.1 Development Background

1.1.1 Welsh Government proposes to build a new section of motorway as part of the M4 Corridor around Newport project (M4CaN) to the south of Newport, Gwent (referred to hereafter as ‘the Scheme’).

1.1.2 The new section of motorway would be approximately 23 kilometres (km) in length and would provide three lanes in both directions between Junction 29 of the existing M4 at Castleton and Junction 23 at Magor. After leaving the existing M4 motorway at Junction 29, the new section of motorway would pass to the south of Duffryn before crossing the Rivers Ebbw and Usk to the south of the A48 at Newport Docks. The new section of motorway would then continue to the south of the Solutia chemical works and the Tata Steel site at Llanwern before passing to the west of Magor and re-joining the existing M4.

1.2 Survey Context and Overview

1.2.1 The breeding bird surveys carried out in 2016 provide further data following previously reported surveys by Arup in 2014 (March 2016 ES Appendix 10.13) and by Thomson Ecology in 2015 (March 2016 ES Appendix 10.28).

1.2.2 The surveys commenced in April 2016 and concluded in June 2016. Two types of survey were carried out:

- breeding bird surveys; and
- species-specific surveys to quantify breeding Cetti’s warbler (*Cettia cetti*).

1.3 Survey Team

1.3.1 Only highly competent and experienced surveyors were used for these surveys. They were Martin Scott (MSS), Stuart Thomas (ST), Micky Maher (MM) and Chas Holt (CH).

1.3.2 Martin Scott is a Principal Ornithologist with 35 years of experience in ornithology. He has worked for three private consultancies in Scotland, undertaking large amounts of fieldwork, monitoring, modelling, planning application assessment, environmental statement/technical data authoring, and habitat regulation assessments. He has undertaken a large number of ornithological studies to assess potential environmental impacts of a range of developments. Prior to working in private consultancy he was employed for over nine years by the RSPB, assessing planning applications for ornithological impacts.

1.3.3 Micky Maher is a specialist ornithologist who has conducted field assessments relating to ornithology on numerous developments throughout the UK. He is familiar with all of the currently recognised and used census techniques and has an excellent working knowledge of how these are applied in an EIA context. Over the last twenty years Micky has been employed by some of the leading conservation organisations in Britain including JNCC, SNH, RSPB, BTO, The

National Trust and The Wildlife Trusts. Micky is an acknowledged expert on bird identification and is a current member of the British Birds Rarities Committee.

1.3.4 Stuart Thomas is a highly experienced ornithologist who has spent over ten years as a consultant ornithologist, conducting fieldwork for a huge range of developments across the UK. Stuart has undertaken ecological surveys on over sixty terrestrial windfarm projects, twenty offshore projects, and numerous other developments. He regularly undertakes Ecological Impact Assessments (EclAs) and Preliminary Ecological Assessments (PEA) for developers and consultancies. Stuart has full membership of the Chartered Institute of Ecology and Environmental Management (CIEEM).

1.3.5 Chas Holt is a Principal Ornithologist who has worked for 18 years in the ecology/conservation sector, including 13 years at the British Trust for Ornithology where responsibilities included project management of the BTO/RSPB/JNCC/WWT Wetland Bird Survey (WeBS), developing associated research and undertaking data analysis. He is highly experienced in undertaking ornithological fieldwork both across the UK and overseas.

2 Methodologies

2.1 Desk Study

- 2.1.1** The 2014 (March 2016 ES Appendix 10.13) and 2015 (March 2016 ES Appendix 10.28) breeding bird survey reports for the Scheme were consulted to identify constraints, including any particular species where additional focus and survey effort was required.

2.2 Study Area

- 2.2.1** The study area for the breeding bird survey comprises the areas covered by the 2015 breeding bird surveys undertaken by Thomson Ecology (March 2016 ES Appendix 10.28). The three survey areas are labelled from west to east as BBS1, BBS2 and BBS3 (Figure 1). The approximate area covered by the Cetti's warbler surveys is also shown on Figure 1.

2.3 Breeding Bird Survey

- 2.3.1** Three breeding bird survey visits were undertaken during April, May and June 2016.
- 2.3.2** The methodology employed was a modified version of the Breeding Bird Survey (BBS) methodology as set out in the standard guidance Gilbert *et al.* (1998). Bird surveys were carried out from a combination of publicly accessible roads and paths in each survey area, and also transect routes in any fields for which access had been obtained, where required. All locations within each survey area were approached to within approximately 100 metres (m). Access was granted so that all survey areas were covered in their entirety during all visits.
- 2.3.3** All surveys began an hour after dawn and finished at or before midday. The surveyor(s) walked at a slow pace recording all bird activity. They also stopped approximately every 100-200 m to scan for and count the birds present, following the guidelines in Bibby *et al.* (2000).
- 2.3.4** The location and species of all birds encountered (seen and/or heard) were recorded on field sheets using standard British Trust for Ornithology (BTO) recording nomenclature. Additional information was recorded to further inform their breeding status, such as singing males, adults carrying food, or nests with eggs.
- 2.3.5** The dates and the weather conditions during the breeding bird surveys are shown in Table 1.

Table 1: BBS Survey Effort and General Weather Conditions 2016

Date	Survey Area	Visit Number	Time of Survey	Surveyor	General Conditions	Weather
27/04/2016	BBS3	1	0720 - 0910	MSS	Dry, <50% cloud cover, wind speed 2 N, cold at dawn.	
27/04/2016	BBS1	1	0940 - 1115	MSS	Some rain towards end of survey, 40-60% cloud cover, wind speed 2 NW, cold at dawn.	
28/04/2016	BBS2	1	0715 – 1040	MSS	Dry, 50% cloud cover, wind speed 3 NW, cold at dawn.	
10/05/2016	BBS3	2	0630 – 0810	ST/MM	Raining, 100% cloud cover, wind speed 1 E, mild.	
10/05/2016	BBS1	2	0845 - 1030	ST/MM	Raining, 100% cloud cover, wind speed 1 E, mild.	
20/05/2016	BBS2	2	0830 – 1045	ST/MM	Dry, 75-90% cloud cover, wind speed 3-4 S, mild.	
10/06/2016	BBS2	3	0530 – 0915	ST/MM	Dry, 75% cloud cover, wind speed 1-2, SE, mild.	
11/06/2016	BBS1	3	0630 – 0830	ST/MM	Dry, 100% cloud cover, wind speed 1, S/E, mild.	
11/06/2016	BBS3	3	0900 – 1100	ST/MM	Dry, 100% cloud cover, wind speed 2, SE, mild.	

2.4 Cetti's Warbler Survey

2.4.1 A programme of species-specific surveys to map and quantify the number of singing male Cetti's warblers was undertaken. The methodology used a three visit walkover methodology from Gilbert *et al.* (1998). The approximate area covered by these surveys is illustrated in Figure 1. During Visit 1, the eastern and western extents were not covered. The surveyors used their judgement during surveys to identify duplicate records.

2.4.2 The dates and the weather conditions during these surveys are shown in Table 2.

Table 2: Cetti's Warbler Survey Effort and General Weather Conditions 2016

Date	Survey Area	Visit Number	Time of Survey	Surveyor	General Conditions	Weather
22/04/2016	Cetti	1	0615 - 1200	CH	Dry with light rain at end of survey, 100% cloud cover, wind speed 3 NE, 4 E at end of survey, cool.	
06/05/2016	Cetti	2	0520 – 1155	CH	Dry, 0-35% cloud cover, wind speed 2 SE, mild.	
27/05/2016	Cetti	3	0700 – 1145	ST/MM	Light rain early, 50-100% cloud cover, wind speed 0-2 E, warm.	
28/05/2016			0700 - 1130	ST/MM	Dry, 50-65% cloud cover, wind speed 2 E, warm.	

3 Survey Results

3.1 Breeding Bird Surveys

3.1.1 The distribution of bird species recorded, split by survey area and visit, is presented in Figure 2, Figure 3 and Figure 4 (Visit 1), Figure 5, Figure 6 and Figure 7 (Visit 2) and Figure 8, Figure 9 and Figure 10 (Visit 3).

3.1.2 A summary of the bird species recorded in each survey area during each of the three survey visits is provided in Table 3, Table 4 and Table 5.

3.1.3 In addition, the UK conservation status according to British Birds of Conservation Concern (BoCC) 2015 is provided (Eaton *et al.*, 2015). The conservation status of regularly occurring birds in the UK has been reviewed, resulting in each species being placed on one of three lists: Red, Amber or Green.

3.1.4 Red List species are those which are globally threatened, whose population or range has declined rapidly in recent years, or that have declined historically and not shown a substantial recent recovery.

3.1.5 Amber List species are those which have an unfavourable conservation status in Europe, whose population or range has declined moderately in recent years or those whose population has declined historically but made a substantial recent recovery. It also includes rare breeders and those for which the UK holds internationally important or localised populations.

3.1.6 Species on the Green List fulfil none of the above criteria and are of least conservation concern.

3.1.7 It should be noted that the 2015 update of the BoCC list may mean that classification of species is slightly different to previous breeding bird reports, which used the 2009 version of the report.

Table 3: Species Recorded in BBS1 Survey Area During Breeding Bird Surveys

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Blackbird	Green	4 singing	3 singing	3 flying and singing
Blackcap	Green	-	1 singing	2 flying and singing, 1 observed
Black-tailed godwit	Red	-	-	1 flying and singing
Blue tit	Green	3 singing	1 singing	1 calling
Buzzard	Green	1 flying and calling	-	-
Carrion crow*	Green	-	-	1 calling
Cetti's warbler	Green	1 singing	2 singing	4 flying and singing

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Chaffinch	Green	1 singing	-	2 flying and singing
Chiffchaff	Green	4 singing	2 singing	-
Cuckoo*	Red	-	-	1 in flight
Dunnock	Amber	2 singing	-	-
Goldcrest	Green	2 singing	-	-
Great tit	Green	1 singing	1 singing	3 observed
Herring gull*	Red	-	50 observed	6 observed, 1 in flight
Heron*	Green	-	-	1 in flight
House sparrow*	Red	-	5 calling	-
Jackdaw	Green	1 singing	-	-
Jay	Green	3 singing	-	-
Lapwing*	Red	2 observed	-	-
Lesser black-backed gull*	Amber	-	30 observed, 1 in flight	10 observed
Magpie	Green	2 singing	-	2 calling
Mallard*	Amber	4 observed	-	-
Reed warbler	Green	2 singing	-	1 singing
Robin	Green	1 singing	5 singing	1 singing, 1 flying and singing
Sedge warbler	Green	1 singing	3 singing, 2 calling	2 flying and singing
Shoveler*	Amber	2 calling	-	-
Song thrush	Red	-	-	2 flying and singing
Stock dove*	Amber	-	-	2 in flight
Swallow*	Green	-	1 in flight	2 in flight
Whitethroat	Green	-	2 singing	-
Wood pigeon	Green	4 singing	-	1 in flight
Wren	Green	4 singing	2 singing	8 flying and singing
Notes				
*Breeding behaviour not recorded for this species.				

Table 4: Species Recorded in BBS2 Survey Area During Breeding Bird Surveys

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Blackbird	Green	2 singing	5 singing, 4 flying and singing, 1 alarm/territorial call, 1 calling, 1 in flight	2 flying and singing, 2 observed, 1 singing, 1 flying, 1 calling, 1 alarm/territorial call
Blackcap	Green	4 singing	9 singing, 1 flying and singing, 1 observed	7 flying and singing, 2 calling
Blue tit	Green	4 singing	1 family observed, 3 calling	1 calling, 1 flying and singing
Bullfinch	Amber	1 singing	1 observed	3 observed, 1 in flight
Buzzard*	Green	-	1 in flight	1 in flight
Canada goose*	Not assessed	-	1 calling	-
Carrion crow*	Green	-	1 in flight	-
Cetti's warbler	Green	9 singing	8 singing, 5 flying and singing, 1 in flight	16 flying and singing
Chaffinch	Green	1 singing	3 singing, 1 flying and singing	-
Chiffchaff	Green	2 singing	4 flying and singing, 2 singing	14 flying and singing, 3 singing
Dunlin	Amber	-	-	1 flying and singing
Dunnock	Amber	-	2 flying and singing, 1 singing	1 flying and singing, 1 singing
Garden warbler*	Green	-	1 calling	-
Goldcrest	Green	-	-	4 flying and singing
Goldfinch	Green	-	1 calling	3 in flight, 2 flying singing, 1 calling
Great tit	Green	3 singing	1 singing	1 in flight
Greenfinch	Green	-	-	1 calling, 1 flying and singing

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Herring gull*	Red	-	2 in flight, 1 aggressive encounter (with heron)	-
Heron*	Green	-	1 aggressive encounter (with herring gull)	-
House martin*	Amber	-	2 observed	-
House sparrow	Red	1 singing	-	-
Jackdaw*	Green	-	1 in flight	-
Jay	Green	1 singing	-	-
Long-tailed tit	Green	1 singing	2 in flight	-
Magpie	Green	1 singing	4 calling	1 flying and singing
Mallard*	Amber	-	2 observed	-
Mistle thrush*	Red	-	-	7 in flight, 1 calling
Moorhen*	Green	-	-	1 in flight
Pied wagtail	Green	1 singing	-	1 in flight
Reed bunting	Amber	-	1 flying and singing	1 calling
Reed warbler	Green	3 singing	5 singing, 1 calling	6 flying and singing
Robin	Green	-	3 calling, 2 singing, 2 flying and singing	7 flying and singing, 1 calling, 1 singing
Sedge warbler	Green	1 singing	4 flying and singing, 3 singing	5 flying and singing
Shelduck*	Amber	1 calling	-	-
Song thrush	Red	1 singing	1 flying and calling	-
Swallow*	Green	-	2 in flight	-
Swift*	Amber	-	1 observed	-
Treecreeper	Green	1 singing	-	-
Whitethroat	Green	-	4 singing, 2 calling, 1 in flight	2 flying and singing, 1 in flight, 1 calling
Willow tit	Red	-	2 flying and singing, 1 calling	3 flying and singing
Wood pigeon*	Green	-	3 in flight	1 in flight

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Wren	Green	-	10 singing and/or flying, 1 observed, 1 calling	4 flying and singing, 1 calling, 1 flying and calling, 1 singing
Yellowhammer	Red	-	2 singing, 1 calling	-
Notes *Breeding behaviour not recorded for this species.				

Table 5: Species Recorded in BBS3 Survey Area During Breeding Bird Surveys

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Blackbird	Green	5 singing	4 in flight, 3 singing, 1 alarm calling, 1 observed	5 observed, 3 calling, 3 flying and singing, 2 aggressive encounter, 2 alarm calling, 1 flying
Blackcap	Green	1 singing	1 singing	4 flying and singing
Blue tit	Green	6 singing	2 singing, 2 calling	11 calling, 3 observed, 1 flying and singing
Buzzard*	Green	1 observed, 1 calling	2 in flight	1 in flight
Carrion crow*	Green	3 observed	1 observed	-
Chaffinch	Green	5 singing	3 singing	4 flying and singing, 1 observed
Chiffchaff	Green	3 singing	5 singing	5 flying and singing, 1 singing
Dunlin*	Amber	-	-	1 observed, 1 calling
Dunnock	Amber	6 singing	7 singing, 2 in flight, 1 observed	5 flying and singing
Garden warbler*	Green	-	1 calling	-
Goldcrest	Green	-	1 singing	-
Goldfinch	Green	10 singing	2 singing, 2 observed	2 calling, 2 in flight
Grasshopper warbler	Red	1 singing	-	-

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Great spotted woodpecker	Green	1 singing	-	-
Great tit	Green	4 singing	5 singing	3 observed, 2 calling
Green woodpecker	Green	1 singing	-	-
Herring gull*	Red	-	-	1 in flight
House sparrow	Red	2 singing	1 in flight, 6 observed	15 calling, 3 observed
Jackdaw*	Green	-	1 in flight	-
Jay*	Green	1 calling	-	-
Lesser black-backed gull*	Amber	-	1 in flight	-
Linnet	Red	-	-	1 flying and singing
Long-tailed tit	Green	2 singing	5 calling (family), 3 observed	3 observed (family)
Magpie*	Green	2 observed, 2 calling	-	-
Marsh tit	Red	-	-	1 flying and singing
Mistle thrush*	Red	1 observed	1 in flight	-
Nuthatch	Green	1 observed	1 calling	-
Pheasant*	Not assessed	-	1 calling	-
Pied wagtail*	Green	1 observed	-	1 in flight
Robin	Green	4 singing	6 singing, 2 aggressive encounter, 2 calling, 1 in flight, 1 observed	1 flying and singing
Skylark	Red	-	1 singing	3 flying and singing
Song thrush	Red	2 singing	1 in flight, 1 singing	5 flying and singing
Starling	Red	1 singing	1 in flight	-
Swallow	Green	1 singing	7 in flight, 1 observed	1 in flight,, 1 flying and calling
Swift*	Amber	-	-	1 in flight
Whitethroat	Green	-	-	1 flying and singing
Willow tit*	Red	-	-	1 calling
Wood pigeon	Green	3 singing	20 observed, 1 in flight	2 in flight

Species	UK BoCC Conservation Status	Visit 1	Visit 2	Visit 3
Wren	Green	4 singing	7 singing	7 flying and singing, 3 calling, 1 alarm calling
Notes *Breeding behaviour not recorded for this species.				

3.2 Cetti's Warbler Surveys

3.2.1 The distribution of singing male Cetti's warblers during the three survey visits is presented in Figure 11. During Visit 1 and Visit 2, 49 records were made, with 48 records made during Visit 3. It is therefore estimated that there were 49 Cetti's warbler territories present in the Cetti's warbler survey area during the 2016 breeding season.

4 Discussion

4.1 Breeding Bird Surveys

4.1.1 A range of birds exhibiting behaviour that suggests breeding was located within the three BBS survey areas. The bird assemblages encountered are considered to be fairly typical for the areas in question. Bird abundance in these areas was not considered to be anything above what would be expected for such habitats.

4.1.2 Of the 58 bird species encountered, none are listed on Annex I of the Birds Directive 2009/147/EC. Two species named on Schedule 1 of the Wildlife and Countryside Act (1981) were recorded; black-tailed godwit and Cetti's warbler. A single black-tailed godwit was recorded during the BBS on 11/06/2016 in BBS1. However, because of the isolated nature of this record, it is not thought that this species was breeding within the study area. Cetti's warbler was breeding within the study area, and is discussed in greater detail in Section 4.2.

4.1.3 Three species named in the Severn Estuary SPA citation were recorded. Two species, shelduck and shoveler, were recorded calling within BBS2 and BBS1 on 28/04/2016 and 27/04/2016 respectively, whilst two records of dunlin were made on 11/06/2016 in BBS3. The low number of birds and isolated nature of the records suggest that the habitats within the study area are not important to these birds during the breeding season, and that these species were not breeding within the study area.

4.1.4 Both herring gull and lesser black-backed gull, named species of the Severn Estuary Ramsar citation, were recorded during breeding bird surveys. Herring gulls were recorded in all three BBS survey areas. A group of two birds and one record of a single bird were recorded in BBS2 (all on the same day; 20/05/2016), all in flight, and a single observation of a bird in flight was made in BBS3. A group of 50 birds were observed in BBS1 on 10/05/2016, with a further two observations consisting of seven birds made during the final visit. Lesser black-backed gulls were recorded on three occasions, two instances of individual birds in flight, and a group of 30 birds in BBS1 on the same date as the herring gull group. There is no evidence that any birds of these species were breeding in the area.

4.2 Cetti's Warbler Surveys

4.2.1 The last national population estimate of Cetti's warbler (which is listed on Schedule 1 of the Wildlife and Countryside Act (1981)) was 2,000 singing males based on data from 2006-2010 (Musgrove *et al.*, 2013). Based on the fact that multiple females can occur in a single male's territory, this represents a minimum of 4,000 birds.

4.2.2 It was noted by Musgrove *et al.* (2013) that for this species, "*No new census but numbers known to have increased*". This is reflected in previous population estimates being 574 singing males in 1996 (Wotton *et al.*, 1998) and a doubling to 1,137 singing males by 2004 (Holling & RBBP, 2007). The population in the UK doubles every four to seven years and is potentially under-recorded (Holling & RBBP, 2010). On this basis, it is possible that there are around 4,000 singing males currently in the UK, with a total population of at least double this number.

- 4.2.3** As well as a very large increase in the British breeding population, the range of the British population has increased by 6,783% between 1970 and 2009 (Balmer *et al.*, 2013). It is known that populations of this species can be severely impacted by cold winters (for example, 2009/10 may have produced a particularly large effect, noted by Holling & RBBP, 2010). There is currently no indication that the UK population is decreasing, though its increase may slow (Robinson, 2007).
- 4.2.4** The 49 singing male Cetti's warblers centred on the reens of the Tata Steelworks represent a substantial population of birds. It is fairly likely that these birds are resident and will occur over the winter as well as the summer. The minimum total population is 98 individuals (2.45% of the UK total) based on the 2006-2010 estimate, or approximately half that figure assuming that a further doubling of the population has occurred since that estimate.



5 References

- Balmer D., Gillings S., Caffrey B., Swann B. Downie I. & Fuller R. (2013) Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland. BTO Books, Thetford.
- Bibby C.J., Burgess N.D., Hill D.A. & Mustoe S.H. (2000) Bird Census Techniques, 2nd Edition. Academic Press, London.
- Eaton M., Aebischer N., Brown A., Hearn R., Lock L., Musgrove A., Noble D., Stroud D. & Gregory R. (2015) Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. *British Birds* 108: 708-746.
- Gilbert G., Gibbons D.W. & Evans, J. (1998) Bird Monitoring Methods: A Manual of Techniques for Key UK Species. RSPB, Sandy.
- Holling M. & Rare Breeding Birds Panel (2007) Rare breeding birds in the United Kingdom in 2003 and 2004. *British Birds* 100: 321-367.
- Holling M. & Rare Breeding Birds Panel (2010) Rare breeding birds in the United Kingdom in 2007. *British Birds* 103: 2-52.
- Musgrove A., Aebischer N., Eaton M., Hearn R., Newson S., Noble D., Parsons M., Risely K. & Stroud D. (2013) Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 106: 64.100.
- Robinson R.A., Freeman S.N., Balmer D.E. & Grantham M.J. (2007) Cetti's Warbler *Cettia cetti*. Analysis of an expanding population. *Bird Study* 54: 230-235.
- Wotton S., Gibbons D.W., Dilger M. & Grice P.V. (1998) Cetti's Warbler in the United Kingdom and the Channel Islands in 1996. *British Birds* 91: 77-89.

Figures



Legend

-  Breeding bird survey area
-  Cetti's warbler survey area



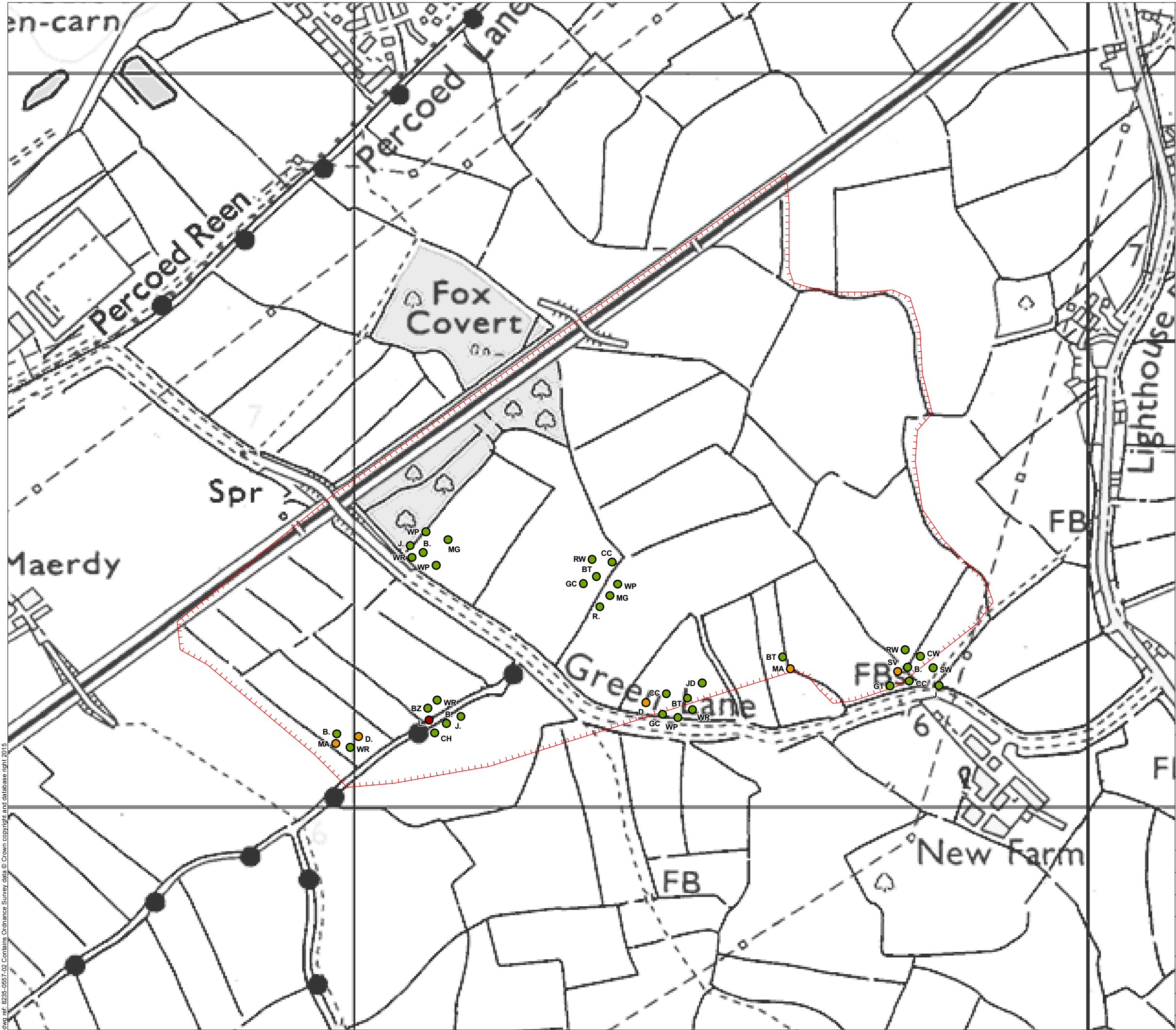
Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

**Location and extent of 2016
ornithological survey areas**

Figure: 1	Revision: –
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC





Legend

Breeding bird survey area

Breeding Bird Survey observations by BOCC4 status

Green list species

- Blackbird (B.)
- Blue Tit (BT)
- Buzzard (BZ)
- Cetti's Warbler (CW)
- Chaffinch (CH)
- Chiffchaff (CC)
- Goldcrest (GC)
- Great Tit (GT)
- Jackdaw (JD)
- Jay (J.)
- Magpie (MG)
- Reed Warbler (RW)
- Robin (R.)
- Sedge Warbler (SW)
- Woodpigeon (WP)
- Wren (WR)

Red list species

- Lapwing (L.)

Amber list species

- Dunnock (D.)
- Mallard (MA)
- Shoveler (SV)

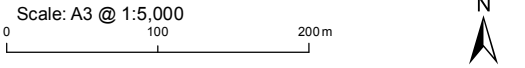


Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

**Breeding Bird Survey 2016 Records
Visit 1, Area 1**

Figure: 2	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC





Legend

Breeding bird survey area

Breeding Bird Survey observations by BOCC4 status

Green list species

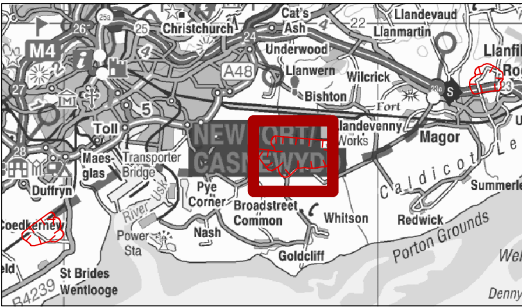
- Blackbird (B.)
- Blackcap (BC)
- Blue Tit (BT)
- Cetti's Warbler (CW)
- Chaffinch (CH)
- Chiffchaff (CC)
- Great Tit (GT)
- Jay (J.)
- Long-tailed Tit (LT)
- Magpie (MG)
- Pied Wagtail (PW)
- Reed Warbler (RW)
- Sedge Warbler (SW)
- Treecreeper (TC)

Red list species

- House Sparrow (HS)
- Song Thrush (ST)

Amber list species

- Bullfinch (BF)
- Shelduck (SU)



Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

Breeding Bird Survey 2016 Records
Visit 1, Area 2

Figure: 3	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC

Scale: A3 @ 1:8,000
0 100 200m

dwg ref: 8235-0557-02 Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

Breeding bird survey area

Breeding Bird Survey observations by BOCC4 status

Green list species

- Blackbird (B.)
- Blackcap (BC)
- Blue Tit (BT)
- Buzzard (BZ)
- Carrion Crow (C.)
- Chaffinch (CH)
- Chiffchaff (CC)
- Goldfinch (GO)
- Great Spotted Woodpecker (GS)
- Great Tit (GT)
- Green Woodpecker (G.)
- Jay (J.)
- Long-tailed Tit (LT)
- Magpie (MG)
- Nuthatch (NH)
- Pied Wagtail (PW)
- Robin (R.)
- Swallow (SL)
- Woodpigeon (WP)
- Wren (WR)

Red list species

- Grasshopper Warbler (GH)
- House Sparrow (HS)
- Mistle Thrush (M.)
- Song Thrush (ST)
- Starling (SG)

Amber list species

- Dunnock (D.)

Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

Breeding Bird Survey 2016 Records
Visit 1, Area 3

Figure: 4	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC

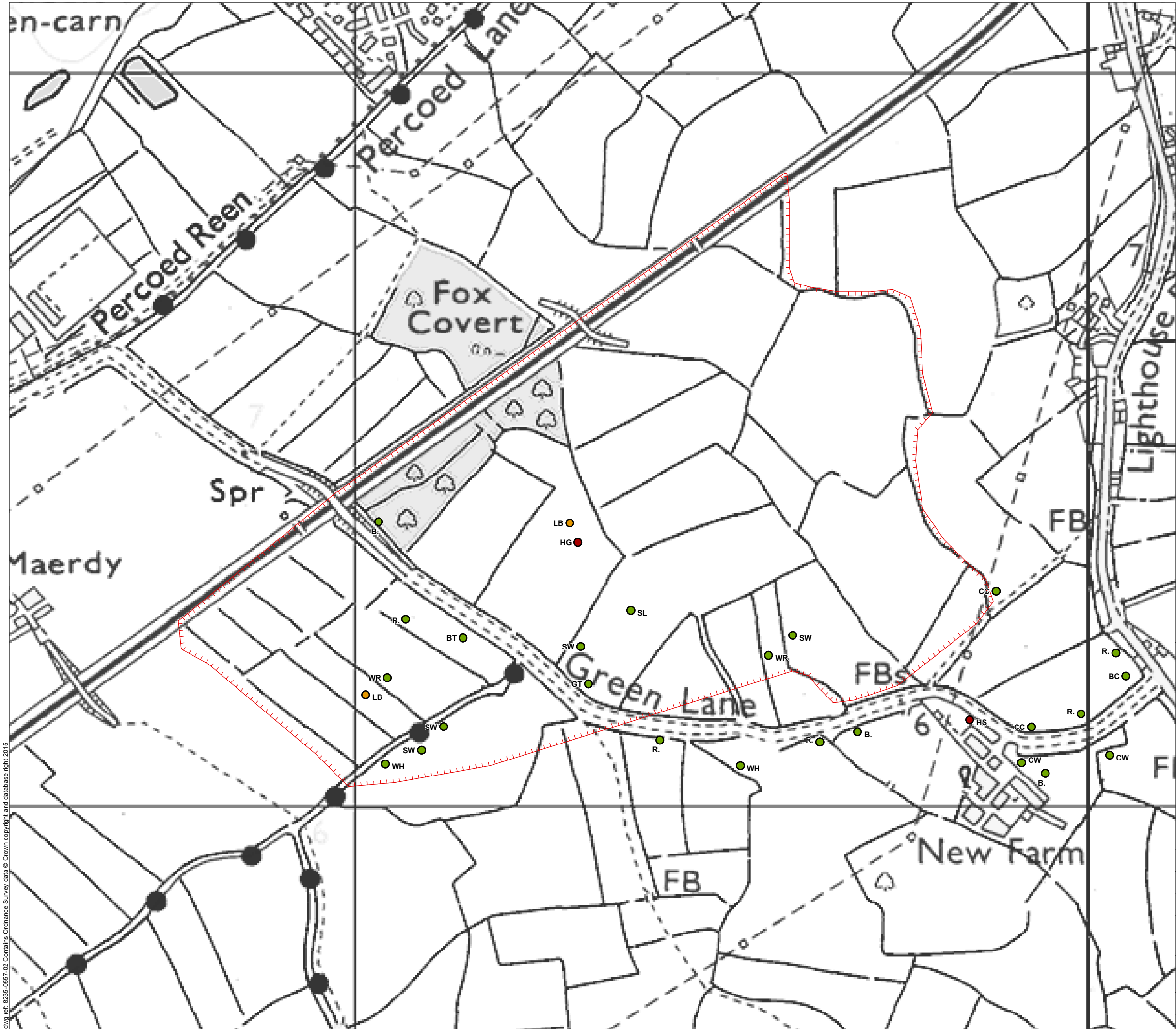
Scale: A3 @ 1:5,000

0 100 200 m

N

© Crown copyright and database right 2016. Ordnance Survey 100021874. Welsh Government.
© Hawlfraint a hawliau cronfa ddata'r Goron 2016. Rhif Trwydded yr Arolwg Ordnans 100021874.

dwg ref: 8235-0557-02



Legend

Breeding bird survey area

Breeding Bird Survey observations by BOCC4 status

Green list species

- Blackbird (B.)
- Blackcap (BC)
- Blue Tit (BT)
- Cetti's Warbler (CW)
- Chiffchaff (CC)
- Great Tit (GT)
- Robin (R.)
- Sedge Warbler (SW)
- Swallow (SL)
- Whitethroat (WH)
- Wren (WR)

Red list species

- Herring Gull (HG)
- House Sparrow (HS)

Amber list species

- Lesser Black-backed Gull (LB)



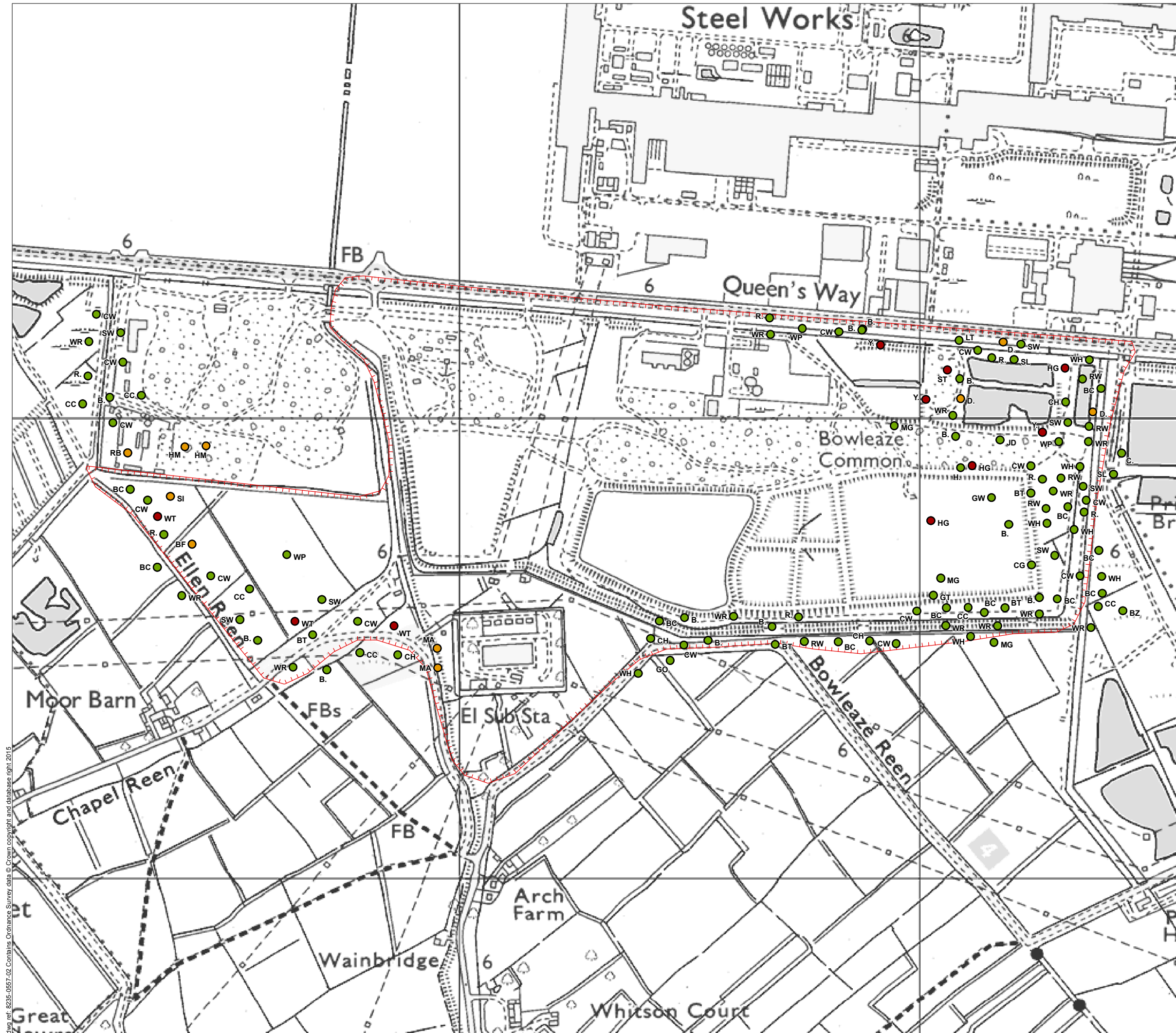
Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

**Breeding Bird Survey 2016 Records
Visit 2, Area 1**

Figure: 5	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC





Legend

Breeding bird survey area

Breeding Bird Survey observations by BOCC4 status

Green list species

- Blackbird (B.)
- Blackcap (BC)
- Blue Tit (BT)
- Buzzard (BZ)
- Canada Goose (CG)
- Carrion Crow (C.)
- Cetti's Warbler (CW)
- Chaffinch (CH)
- Chiffchaff (CC)
- Garden Warbler (GW)
- Goldfinch (GO)
- Great Tit (GT)
- Grey Heron (H.)
- Jackdaw (JD)
- Long-tailed Tit (LT)
- Magpie (MG)
- Reed Warbler (RW)
- Robin (R.)
- Sedge Warbler (SW)
- Swallow (SL)
- Whitethroat (WH)
- Woodpigeon (WP)
- Wren (WR)

Red list species

- Herring Gull (HG)
- Song Thrush (ST)
- Willow Tit (WT)
- Yellowhammer (Y.)

Amber list species

- Bullfinch (BF)
- Duncock (D.)
- House Martin (HM)
- Mallard (MA)
- Reed Bunting (RB)
- Swift (SI)

Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

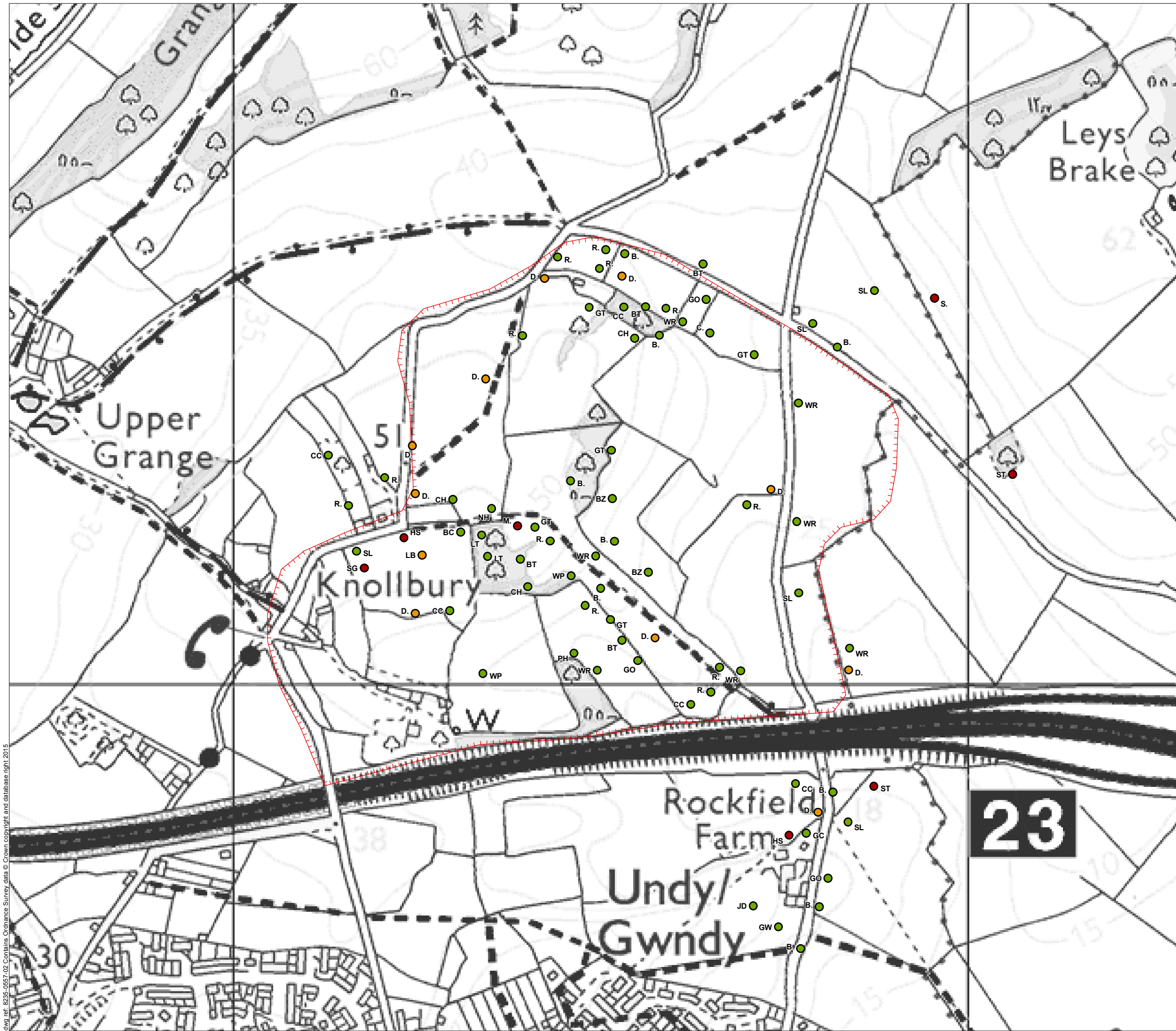
Breeding Bird Survey 2016 Records
Visit 2, Area 2

Figure: 6	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC

Scale: A3 @ 1:8,000
0 100 200m

© Crown copyright and database right 2016. Ordnance Survey 100021874. Welsh Government.
© Hawlfraint a hawliau cronfa ddata'r Goron 2016. Rhif Trwydded yr Arolwg Ordnans 100021874.
dwg ref: 8235-0557-02

dwg ref: 8235-0557-02 Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- Breeding bird survey area
- Breeding Bird Survey observations by BOCC4 status
- Green list species

 - Blackbird (B.)
 - Blackcap (BC)
 - Blue Tit (BT)
 - Buzzard (BZ)
 - Carrion Crow (C.)
 - Chaffinch (CH)
 - Chiffchaff (CC)
 - Garden Warbler (GW)
 - Goldcrest (GC)
 - Goldfinch (GO)
 - Great Tit (GT)
 - Jackdaw (JD)
 - Long-tailed Tit (LT)
 - Nuthatch (NH)
 - Pheasant (PH)
 - Robin (R.)
 - Swallow (SL)
 - Woodpigeon (WP)
 - Wren (WR)
- Red list species

 - House Sparrow (HS)
 - Mistle Thrush (M.)
 - Skylark (S.)
 - Song Thrush (ST)
 - Starling (SG)
- Amber list species

 - Dunnock (D.)
 - Lesser Black-backed Gull (LB)



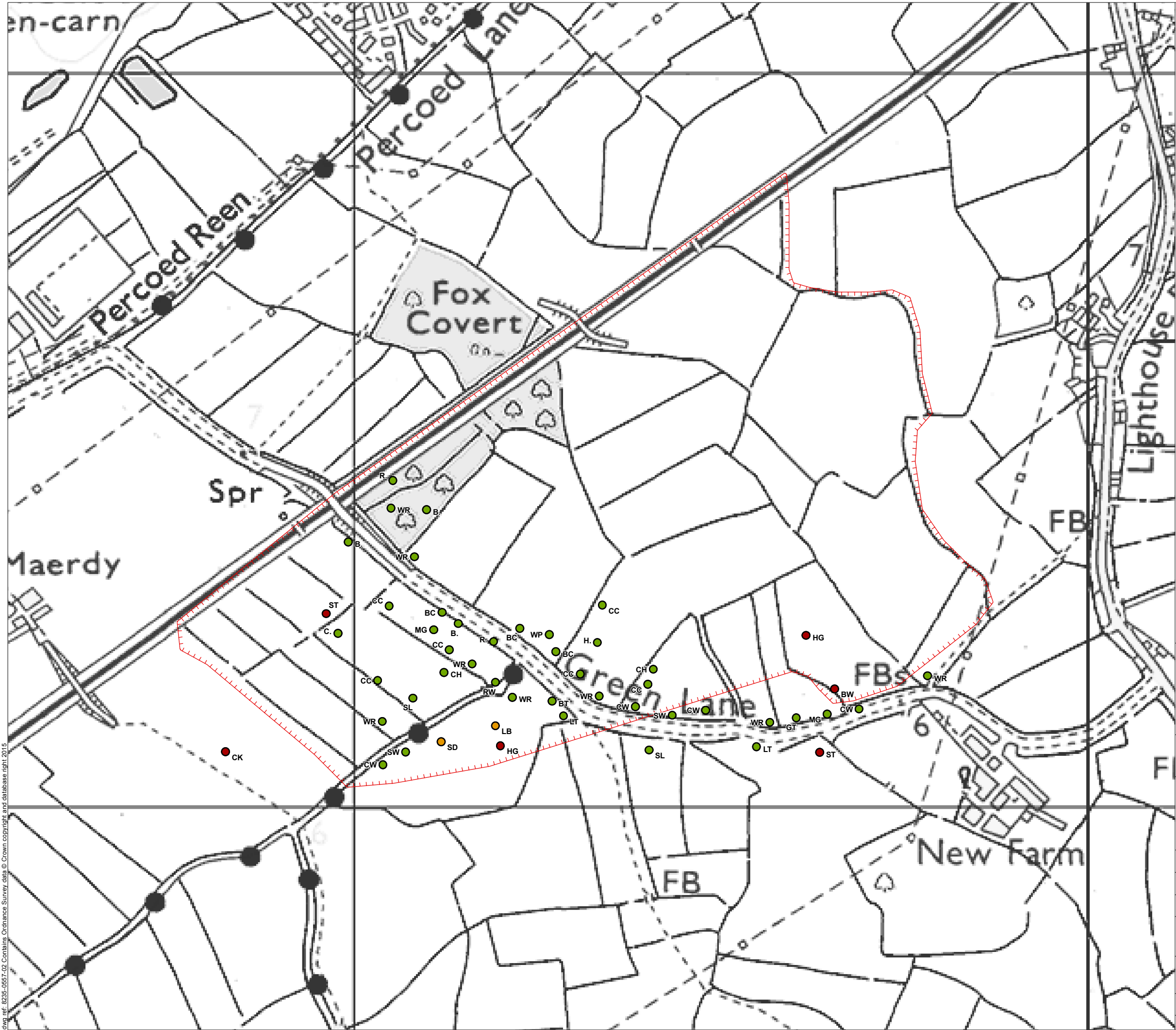
Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

**Breeding Bird Survey 2016 Records
Visit 2, Area 3**

Figure: 7	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC





Legend

Breeding bird survey area

Breeding Bird Survey observations by BOCC4 status

Green list species

- Blackbird (B.)
- Blackcap (BC)
- Blue Tit (BT)
- Carrion Crow (C.)
- Cetti's Warbler (CW)
- Chaffinch (CH)
- Chiffchaff (CC)
- Great Tit (GT)
- Grey Heron (H.)
- Long-tailed Tit (LT)
- Magpie (MG)
- Reed Warbler (RW)
- Robin (R.)
- Sedge Warbler (SW)
- Swallow (SL)
- Woodpigeon (WP)
- Wren (WR)

Red list species

- Black-tailed Godwit (BW)
- Cuckoo (CK)
- Herring Gull (HG)
- Song Thrush (ST)

Amber list species

- Lesser Black-backed Gull (LB)
- Stock Dove (SD)



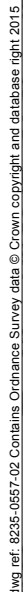
Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

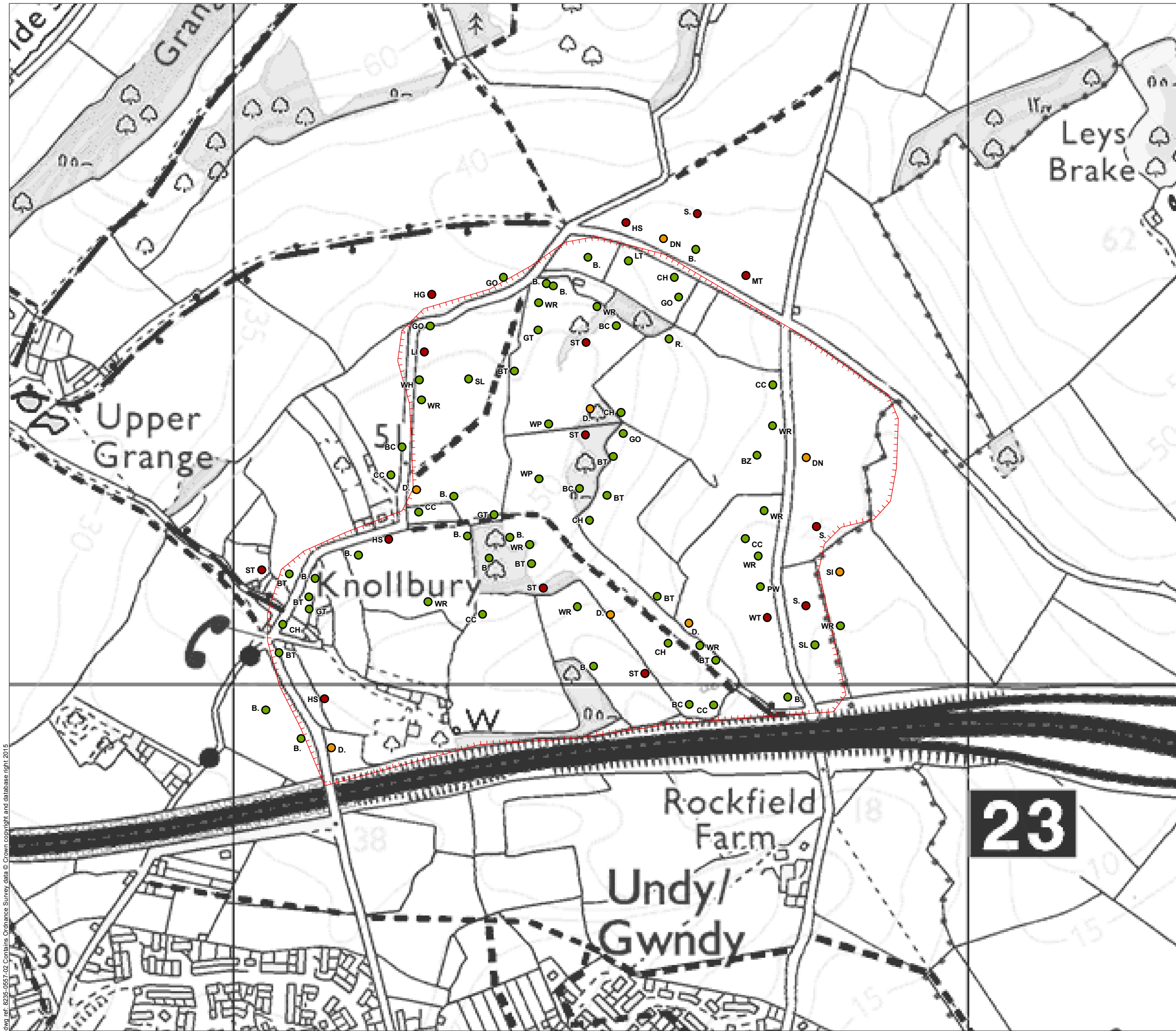
**Breeding Bird Survey 2016 Records
Visit 3, Area 1**

Figure: 8	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC





dwg ref: 8235-0557-02 Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

Breeding bird survey area

Breeding Bird Survey observations by BOCC4 status

Green list species

- Blackbird (B.)
- Blackcap (BC)
- Blue Tit (BT)
- Buzzard (BZ)
- Chaffinch (CH)
- Chiffchaff (CC)
- Goldfinch (GO)
- Great Tit (GT)
- Long-tailed Tit (LT)
- Pied Wagtail (PW)
- Robin (R.)
- Swallow (SL)
- Whitethroat (WH)
- Woodpigeon (WP)
- Wren (WR)

Red list species

- Herring Gull (HG)
- House Sparrow (HS)
- Linnet (LI)
- Marsh Tit (MT)
- Skylark (S.)
- Song Thrush (ST)
- Willow Tit (WT)

Amber list species

- Dunlin (DN)
- Dunnock (D.)
- Swift (SI)

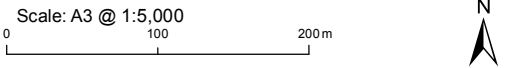


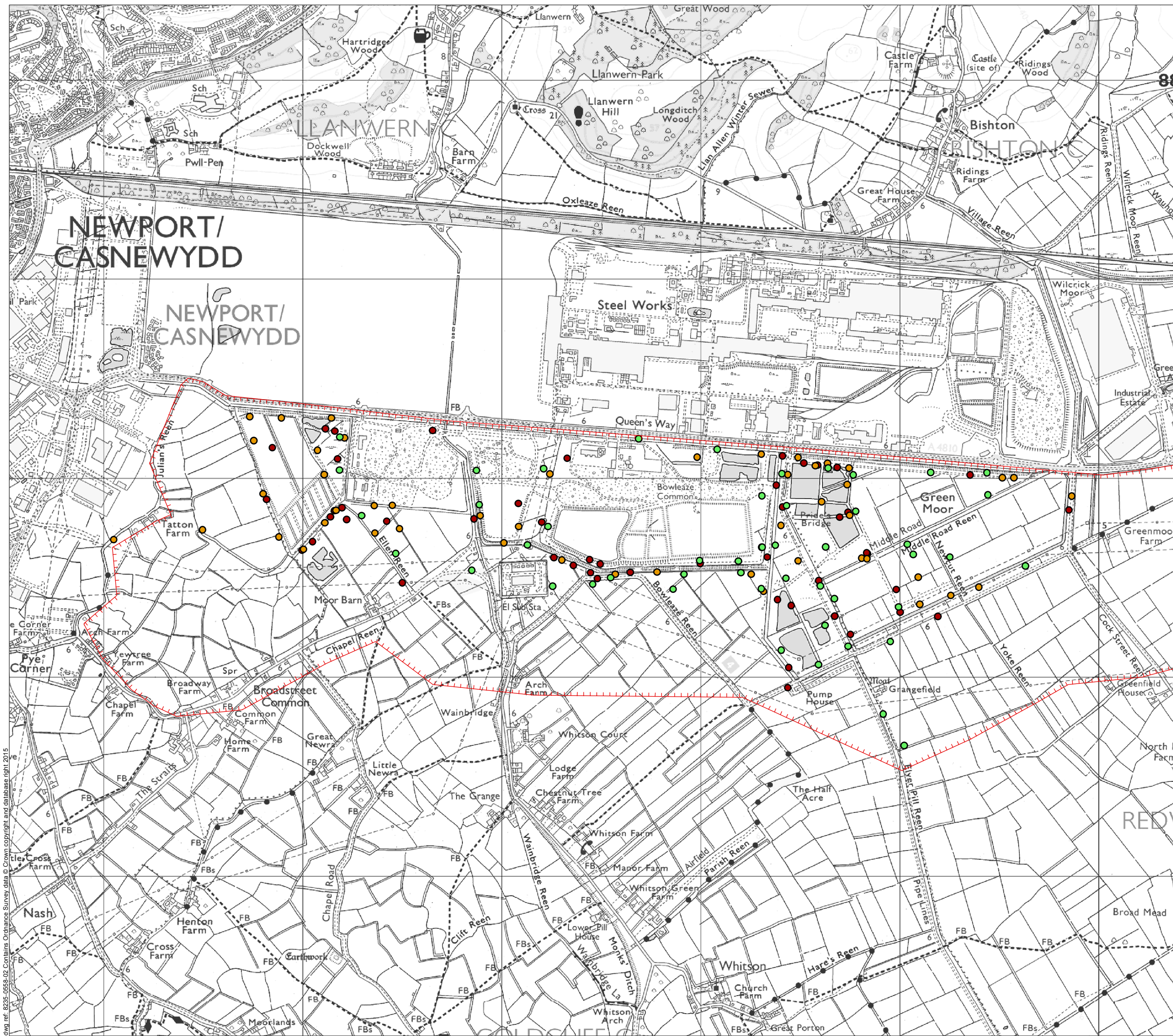
Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

Breeding Bird Survey 2016 Records
Visit 3, Area 3

Figure: 10	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC





Legend
 Cetti's warbler survey area
Cetti's warbler sightings
 Visit 1
 Visit 2
 Visit 3

Llywodraeth Cymru
Welsh Government

ES Supplement - Appendix S10.5

Cetti's Warbler Survey 2016 (All Records)

Figure: 11	Revision: -
Date: Sep 2016	Status: At Issue
Drawn: CH	Checked: AC

Scale: A3 @ 1:18,500

© Crown copyright and database right 2016. Ordnance Survey 100021874. Welsh Government.
© Hawlfraint a hawliau cronfa ddata'r Goron 2016. Rhif Trwydded yr Arolwg Ordnans 100021874.

dwg ref: 8235-0558-02