

Appendix 7I

Breeding Bird Survey Report

Welsh Government

**Global Centre for Rail Excellence
(GCRE)**

Breeding Bird Survey Report; 2019

Rev A | 18 June 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 264904

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Document verification

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Contents

	Page
1 Introduction	1
1.1 Objectives	1
2 Project Background	2
3 Site Description	3
4 Methodologies	4
4.1 Common Bird Census Survey	4
4.2 Goshawk Survey	4
4.3 Honey-buzzard Survey	5
4.4 Surveyors	5
4.5 Survey Details	6
4.6 Limitations	7
5 Results	8
5.1 Common Bird Census Survey	8
5.2 Goshawk Survey	12
5.3 Honey-buzzard Survey	12
6 Summary	13
Figure 1 Study Area	
Figure 2 Transect Details	
Figure 3 Drawings 1-15: BBS Results for Species of Conservation Significance	

1 Introduction

Ove Arup & Partners Ltd (Arup) was commissioned by the Welsh Government (WG) to undertake a range of consultancy services in relation to the Global Centre for Rail Excellence (GCRE), hereafter referred to as ‘the Project’.

As part of that commission, a range of ecological surveys have been undertaken to identify the baseline ecological conditions of the Project area, to inform the assessment of impacts as part of the Environmental Impact Assessment (EIA) process.

This document reports on the breeding bird surveys undertaken to inform the EIA for the Project.

Nomenclature within this report follows the British (English) vernacular name within the British Ornithologists’ Union (BOU) British list¹.

1.1 Objectives

The objective of the surveys covered by this report was to provide data on the assemblage, numbers and distribution of breeding birds within the Study Area (Figure 1) and to determine the presence/likely absence of rare breeding species potentially present in the area (namely Goshawk *Accipiter gentilis* and Honey-buzzard *Pernis apivorus*) within appropriate buffer zones.

¹ BOU (2015). *The British List; The official list of bird species recorded in Britain* [online] available at: <https://www.bou.org.uk/british-list/category-a-b-c-species/>

2 Project Background

The WG are proposing to develop a rail testing, maintenance, research, development and storage facility (also referred to as the Global Rail Centre for Excellence) at the site of the Onllwyn washery and Nant Helen open cast mine site. The site for development is approximately 475 ha.

The proposed site is currently being mined by Celtic Energy, who will cease extraction operations in 2021, at which point Celtic Energy will be required to restore the land in accordance with regulatory requirements and agreements with Powys County Council (PCC) and Neath Port Talbot County Borough Council (NPTCBC). This includes Section 106 planning obligations and planning conditions that need to be discharged.

Celtic Energy has submitted two recent planning applications for the site, including: the revised restoration strategy for approval (Planning reference number: 19/1899/REM) which would change the existing approved restoration scheme (for planning application ref 18/1070/REM). And, the Nant Helen complementary earthworks application for approval (Planning reference number: 20/0738/FUL) The purpose of these applications is to allow for a 'flexible and adaptable landform for a variety of future uses on restoration, including the use of the site as a rail testing and storage facility, proposed by the WG.

3 Site Description

The Project site is within the Dulais Valley located within Powys and Neath Port Talbot, with the Brecon Beacons National Park Authority boundary immediately to the north. Nearby settlements include Onllwyn, Seven Sisters, Ystradgynlais, Caehopkin, Abercrave or Coelbren.

The site is predominantly brownfield land that has been heavily worked by open cast mining. Much of the site has been revegetated.

4 Methodologies

4.1 Common Bird Census Survey

Prior to the completion of the first survey, five transect routes were identified (Figure 2). These transect routes were determined with the intention of providing coverage of key areas within the Study Area which may support important species/numbers of breeding birds based on habitat type/extent.

Field surveys broadly followed the ‘territory mapping’ or Common Bird Census (CBC) methodology^{2,3} albeit with a reduced number of visits (three). CBC territory mapping is the most accurate practical way to determine the numbers and distribution of breeding birds where a high level of detail is required. Essentially, the method involves mapping all birds seen or heard during walkover visits to the Study Area, paying particular attention to behaviour which indicates breeding (e.g. singing or carrying nesting material or food). By combining the results of all visits, it is possible to determine the species present within the survey area and provides an indication of the numbers of breeding territories.

Three survey visits were completed, during which each transect was walked, between 23 April 2019 and 24 June 2019 (Table 1).

Surveys commenced around one hour after sunrise and were completed by 13:00. The start point of surveys was alternated between visits to ensure all parts of the Study Area received adequate coverage during peak periods of bird activity.

During each survey the surveyor recorded all observations on field maps using standard British Trust for Ornithology (BTO) coding in relation to species and behaviour. Observations of birds outside the Study Area were also logged when seen.

The direction of surveys was alternated between visits to ensure all parts of the Study Area received adequate coverage during different periods of the day.

4.2 Goshawk Survey

Goshawks breed preferentially within large tracts of mature woodland, but can occupy smaller woods. Nests are usually located in areas with a high density of mature trees and a well-developed canopy. Due to the presence of potentially suitable breeding habitat in the vicinity of the site a Goshawk survey adhering to the methodology outlined within Hardey et al. (2009)⁴ was completed.

Surveys focused on all suitable habitat within the Study Area and a 1km buffer zone. All suitable habitat was surveyed twice during suitable weather conditions in March 2019. During these surveys, viewpoints were utilised to provide

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

3 Marchant, J. H. (1983) *BTO Common Birds Census Instructions*. BTO, Tring.

4 Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B., & Thompson, D. (2009). *Raptors. A field guide for surveys and monitoring*.

coverage of potentially suitable breeding habitat, from which at least two-hour watches were completed to assess the potential presence of displaying birds.

In addition, surveys during June and July were completed of suitable habitat on foot. At this time young would have fledged and birds become more vocal, making the identification of territories easier in dense woodland.

4.3 Honey-buzzard Survey

Survey work was undertaken in a wide area around the Study Area, concentrating on woodland deemed suitable for breeding Honey-buzzards. This included all potential Honey-buzzard breeding woodland in the Crynant valley and liaison with surveyors in the Neath valley (the nearest known nest) for potential flights into the Crynant valley.

Ten days of survey was completed, utilising various viewpoints during the period of maximum potential for observing Honey-buzzards; mid-July to mid-August. This is the period when breeding pairs would be provisioning young with food and undertaking long foraging flights to and from nest sites.

All observation days were undertaken in appropriate weather conditions when foraging birds are most likely to circle up high from nest sites to forage, or from foraging sites to return to the nest.

4.4 Surveyors

CBC and Goshawk Surveys were completed by Martyn Owen MCIEEM and Stuart Thomas MCIEEM.

Martyn is an experienced consultant ornithologist and was Shropshire County Bird Recorder from 2012-2017, former editor of the Shropshire Ornithological Society's Annual Bird Report and remains on the Shropshire Ornithological Society Rarity Committee. Martyn has completed bird survey work at many sites in Wales (and elsewhere) employing the full range of ornithological survey techniques and data analysis in relation to many projects over the previous 15 years. Martyn holds numerous Natural Resources Wales (NRW) Schedule 1 survey licences (including Goshawk and Honey-buzzard).

Honey-buzzard surveys were completed by Steve Roberts, who has been studying Honey-buzzards for 35 years, in Wales and across much of southern England. He has published land-mark papers on breeding Honey-buzzards in Britain in the ornithological journal *British Birds* along with several short papers.

Steve holds a NRW schedule 1 licence for Honey-buzzard for the whole of Wales, Kent, Sussex, Surrey, Hants, West Midlands and Dorset. Survey assistants are accredited agents on these licences, if licencing required.

4.5 Survey Details

Detail in relation to survey dates and weather are provided within Tables 1 and 2.

Table 1. CBC and Goshawk survey details

Survey Visit	Date	Surveyor	Time	Weather				
				Wind Speed (Beaufort)	Wind Direction	Cloud Cover (Oktas)	Temp (°C)	Precip.
Common Bird Census Surveys								
Transect 1								
1	23/04/19	ST	07:45-12:15	1-2	SE	2-6	14-20	Nil
2	09/05/19	ST	06:50-10:35	1	SW	8	7-9	Oc. light showers
3	12/06/19	ST	06:20-11:20	1	NE	4-8	10-12	Nil
Transect 2								
1	23/04/19	MO	07:30-12:00	1-2	SE	2-6	14-20	Nil
2	09/05/19	MO	06:50-10:35	1	SW	8	7-9	Oc. light showers
3	13/06/19	MO	08:20 ⁵ -12:30	1	NW	7-8	10-12	Inf. light rain
Transect 3								
1	24/04/19	MO	06:55-10:50	1	S	4-8	11-12	Inf. light showers
2	10/05/19	MO	07:00-11:20	1	SW	4-7	7-12	Nil
3	12/06/19	MO	06:20-11:30	1	NE	4-8	10-12	Nil
Transect 4								
1	29/04/19	MO	07:05-11:25	1	SE	8	9-11	Rain for second half of survey
2	11/05/19	MO	06:50-10:00	0-1	N	2-3	7-12	Nil
3	24/06/19	MO	06:20-10:40	0-2	W	8	14-16	Nil
Transect 5								
1	24/04/19	ST	06:55-10:50	1	S	4-8	11-12	Inf. light showers
2	10/05/19	ST	07:00-11:20	1	SW	4-7	7-12	Nil
3	13/06/19	ST	08:10 ⁴ -13:00	1	NW	7-8	10-12	Inf. light rain
Goshawk Surveys								
1	07/03/19	MO	09:15-11:30	2-3	N	5-8	8-10	Nil
2	21/03/19	MO	07:00-14:00	1-2	N	4-8	12-15	Nil
3	25/03/19	MO	07:45-14:45	0-1	N	1-3	10-12	Nil
4	11/06/19	MO	08:00-13:00	1-2	NE	7-8	9-12	Inf light showers
5	10/07/19	MO	08:00-12:00	1	SW	3-4	14-16	Nil

⁵ Late start due to early rain.

Table 2. Honey-buzzard survey details

Survey Visit	Date	Time	Weather	Notes
1	13/05/19	08:00-15:00	Mostly sunny, a few clouds, breezy	From SN831075 looking NW over Seven Sisters/Blaendulais
2	25/05/19	08:00-15:30	Cloudy with sunny spells	From SN829085 looking south to South East over forest
3	01/06/19	07:30-16:00	Mainly cloudy ,a few sunny spells	From SN886092 looking N/NE over Coed y Rhaiadr
4	09/07/19	07:00-15:30	Mostly cloudy, short periods of sunshine	From SN875093 Looking NE over Coed y Rhaiadr
5	13/06/19	07:15-15:30	Grey sky, patches of light drizzle	From SN853072 looking SW to N down Neath Valley and up to ridge above Seven Sisters
6	15/07/19	07:30-15:00	Sunny in the morning, largely cloudy in the afternoon	From SN861100 looking north over Y Wern forest
7	17/07/19	07:00-15:00	Hazy sunshine early on which cleared late morning. Cloudy in the afternoon.	From SS783053 looking S to NE over Crynant and Seven Sisters.
8	23/07/19	07:45-16:00	Low cloud early on, sunny later	From SN835057 looking N to SW covering the ridge above Seven Sisters and the Neath Valley
9	24/07/19	07:00-15:30	Early haze, clearing to give sunny spells	From SN935085 looking W to N over Coed Y Rhaiadr
10	02/08/19	07:50-15:00	Mostly sunny with patchy clouds, warm with light breeze	From SN845083 looking SW to N down Dulais Valley and over Seven Sisters/Blaendulais forest

4.6 Limitations

The findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of plants and animals, such as the time of year, migration patterns and behaviour.

The breeding bird transect routes did not include the entirety of all potential breeding bird habitat within the Study Area, given its size and the uniform nature of much of the area. The number of breeding bird territories reported on within the Study Area may therefore be an under-estimation. No attempt has been made to extrapolate the number of territories present outside of the transect Study Area, given the number of variables associated with breeding, e.g. territory size and habitat quality. However, the transects are likely to provide a fair representation of the bird population within the Study Area.

Three CBC survey visits were completed. Whilst this does not conform to the requirements of a full CBC survey (eight-ten visits), it is deemed adequate in this instance to provide an appropriate indication of the breeding bird assemblage and numbers of pairs within the Study Area.

5 Results

5.1 Common Bird Census Survey

Table 3 provides a summary of all species considered likely to have bred within the Study Area during the survey period. A summary of all other species logged during surveys, but for which no evidence of breeding was identified is included within Table 4.

A total 62 species were logged, of which 52 species were considered to have bred within the Study Area. Of these species ten are included on the Birds of Conservation Concern Wales (BoCCW)⁶ 3 Red list, 13 are included on the BoCCW3 Amber list with 14 being included on Section 7 (S7) of the Environment (Wales) Act 2016, being of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. The locations of these species of conservation significance are shown on Figure 3.

One species (Common Crossbill *Loxia curvirostra*) that is included on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) bred within the Study Area.

Species considered likely to breed within the Study Area are summarised in Table 3 with non-breeding species results presented in Table 4.

⁶ Johnstone I., Bladwell S. (2016). *Birds of Conservation Concern in Wales 3: the population status of birds in Wales*. Birds in Wales, vol.14 No.1

Table 3. Results summary – breeding species

Species	BTO Code	Conservation Status	Approximate Number of Breeding Pairs					
			Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	TOTAL
Greater Canada Goose <i>Branta canadensis</i>	CG	-	-	1	1	-	-	2
Mallard <i>Anas platyrhynchos</i>	MA	BoCCW3 Amber	-	-	1	-	-	1
Common Buzzard <i>Buteo buteo</i>	BZ	-	1	-	-	1	-	2
Lapwing <i>Vanellus vanellus</i>	L.	BoCCW3 Red S7	-	2	-	-	-	1
Curlew <i>Numenius arquata</i>	CU	BoCCW3 Red S7	-	-	1	-	-	1
Woodpigeon <i>Columba palumbus</i>	WP	-	-	-	1	-	-	1
Collard Dove <i>Streptopelia decaocto</i>	CD	-	-	-	-	1	-	1
Cuckoo <i>Cuculus canorus</i>	CK	BoCCW3 Red S7	3	-	-	2	3	8
Nightjar ⁷ <i>Caprimulgus europaeus</i>	NJ	BoCCW3 Amber	-	-	-	1	-	1
Great Spotted Woodpecker <i>Dendrocopos major</i>	GS	-	1	-	-	1	2	4
Jay <i>Garrulus glandarius</i>	J.	-	-	-	-	1	-	1
Magpie <i>Pica pica</i>	MG	-	-	-	1	-	-	1
Jackdaw <i>Corvus monedula</i>	JD	-	-	-	20	-	-	20
Carrion Crow <i>Corvus corone</i>	C.	-	-	1	1	-	-	2
Raven <i>Corvus corax</i>	RN	-	-	1	-	-	-	1
Goldcrest <i>Regulus regulus</i>	GC	BoCCW3 Amber	4	-	-	2	-	6
Blue Tit <i>Cyanistes caeruleus</i>	BT	-	16	-	2	2	6	26
Great Tit <i>Parus major</i>	GT	-	7	-	2	1	4	14
Coal Tit <i>Periparus ater</i>	CT	-	2	6	1	1	1	12
Skylark <i>Alauda arvensis</i>	S.	BoCCW3 Amber S7	8	43	15	16	57	139
Long-tailed Tit <i>Aegithalos caudatus</i>	LT	BoCCW3 Amber	-	-	2	-	-	2
Chiffchaff <i>Phylloscopus collybita</i>	CC	-	6	-	4	3	-	13

7 Identified during nocturnal bat surveys.

Species	BTO Code	Conservation Status	Approximate Number of Breeding Pairs					
			Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	TOTAL
Willow Warbler <i>Phylloscopus trochilus</i>	WW	BoCCW3 Red	25	24	21	16	23	109
Blackcap <i>Sylvia atricapilla</i>	BC		22	-	15	3	2	42
Garden Warbler <i>Sylvia borin</i>	GW		8	-	-	-	-	8
Whitethroat <i>Sylvia communis</i>	WH	BoCCW3 Red	1	2	1	7	-	11
Grasshopper Warbler <i>Locustella naevia</i>	GH	BoCCW3 Red	2	-	4	9	17	34
Sedge Warbler <i>Acrocephalus schoenobaenus</i>	SW		-	4	5	2	-	11
Wren <i>Troglodytes troglodytes</i>	WR	-	45	8	27	9	20	109
Starling <i>Sturnus vulgaris</i>	SG	BoCCW3 Red S7	-	-	-	-	1	1
Blackbird <i>Turdus merula</i>	B.	-	12	2	5	3	7	29
Song Thrush <i>Turdus philomelos</i>	ST	BoCCW3 Amber S7	9	4	4	5	1	23
Mistle Thrush <i>Turdus viscivorus</i>	M.	BoCCW3 Amber	1	1	-	-	1	2
Robin <i>Erithacus rubecula</i>	R.	-	23	-	12	3	2	40
Redstart <i>Phoenicurus phoenicurus</i>	RT		1	-	-	-	3	4
Stonechat <i>Saxicola rubicola</i>	SC	-	-	15	2	12	20	49
Wheatear <i>Oenanthe oenanthe</i>	W.		-	8	-		1	9
Dunnock <i>Prunella modularis</i>	D.	S7	3	-	1	-	1	5
House Sparrow <i>Passer domesticus</i>	HS	BoCCW3 Amber S7	-	-	5	-	-	5
Pied Wagtail <i>Motacilla alba</i>	PW	-	-	4	4	-	1	9
Grey Wagtail <i>Motacilla cinerea</i>	GL	BoCCW3 Amber	-	-	-	1	-	1
Tree Pipit <i>Anthus trivialis</i>	TP	BoCCW3 Amber S7	1	1	-	1	-	3
Meadow Pipit <i>Anthus pratensis</i>	MP	BoCCW3 Amber	8	27	14	42	48	139
Chaffinch <i>Fringilla coelebs</i>	CH	-	23	4	13	6	4	50
Bullfinch <i>Pyrrhula pyrrhula</i>	BF	BoCCW3 Red S7	-	-	4	2	-	6
Linnet <i>Linaria cannabina</i>	LI	BoCCW3 Red S7	-	3	2	2	-	7

Species	BTO Code	Conservation Status	Approximate Number of Breeding Pairs					
			Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	TOTAL
Lesser Redpoll <i>Acanthis cabaret</i>	LR	BoCCW3 Amber S7	-	3	5	6	-	14
Crossbill	CR	S1	2	-	-	1	-	3
Goldfinch <i>Carduelis carduelis</i>	GO	-	2	-	6	2		10
Siskin <i>Spinus spinus</i>	SK		5	-	-	2	1	8
Yellowhammer <i>Emberiza citrinella</i>	Y.	BoCCW3 Red S7	-	-	-	-	1	1
Reed Bunting <i>Emberiza schoeniclus</i>	RB	BoCCW3 Amber S7	-	5	8	10	9	32

Table 4. Results summary – non-breeding species

Species	Conservation Status	Notes
Goosander <i>Mergus merganser</i>	-	29/04/19 – Adult female flew over southeast
Red Kite <i>Milvus milvus</i>	BoCCW3 Amber S1	10/05/19 – Adult foraging in north of Study Area 11/05/19 – Adult foraging in south of the Study Area 12/06/19 – adult foraging on the north of the Study Area No evidence of breeding within the Study Area or adjacent areas. Anecdotally, (farmer, pers comm.), breeding in valley to the north of the site.
Lesser Black-backed Gull <i>Larus fuscus</i>	BoCCW3 Amber	24/04/19 - One adult in flight over the Study Area and 15 foraging in pasture. 09/05/19 – Two in flight over centre of Study Area
Herring Gull <i>Larus argentatus</i>	BoCCW3 Red S7	23/04/19 – Two adults in flight over the Study Area 24/04/19 - Six adults in flight and 75 foraging within pasture in the east of the Study Area 09/05/19 – one in flight over Study Area
Kestrel <i>Falco tinnunculus</i>	BoCCW3 Red S7	09/05/19 – Adult female foraging in centre of Study Area
Hobby <i>Falco subbuteo</i>	S1	24/06/19 – Adult in flight in the south of the Study Area
Sand Martin <i>Riparia riparia</i>	-	24/04/19 – two in flight in the east of the Study Area 10/05/19 - ten in flight in the east of the Study Area
Swallow <i>Hirundo rustica</i>	-	Recorded during each survey foraging over the Study Area
House Martin <i>Delichon urbicum</i>	-	24/04/19 – five in flight in the south of the Study Area
Rook <i>Corvus frugilegus</i>	-	Logged during each survey foraging within pasture in the north and east of the Study Area

5.2 Goshawk Survey

There were no observations of Goshawk during the targeted surveys, and this species is consequently considered absent from the Study Area and 1km buffer zone.

The sole observations during the survey period related to birds seen on 9 July and 23 July during Honey-buzzard surveys. Both observations were in excess of 4km from the site.

5.3 Honey-buzzard Survey

There was no evidence of breeding Honey-buzzard within the Study Area or 2km buffer zone. Throughout the survey period, there were only two distant Honey-buzzard sightings, both in excess of 4km from the site.

The nearest known nest site in this well studied area is approximately 4.5 km from the site.

6 Summary

A suite of breeding bird surveys to inform the proposed complementary restoration works at Nant Helen was completed during 2019. These surveys included a CBC survey and targeted Goshawk and Honey-buzzard surveys.

During CBC surveys all species observed or heard were recorded. A total 62 species were logged, of which 52 species were considered to have bred within the Study Area. Of these species ten are included on the BoCCW 3 Red list, 13 on the BoCCW 3 Amber list with 14 being included on Section 7 of the Environment (Wales) Act 2016. One species (Common Crossbill) that is included on Schedule 1 of the Wildlife and Country 1981 (as amended) bred within the survey area.

No territories of Goshawk or Honey-buzzard were present within the Study Area or relevant buffers. A number of observations of Red Kite occurred during the survey period, although no evidence of breeding within the Study Area was noted.

Figures

- Figure 1** Study Area
- Figure 2** Transect Details
- Figure 3** Drawings 1-15: BBS Results for Species of Conservation Significance

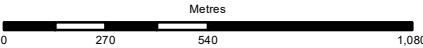


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Study Area

F1	2019-11-14	EA	CP	
Issue	Date	By	Chkd	Appd



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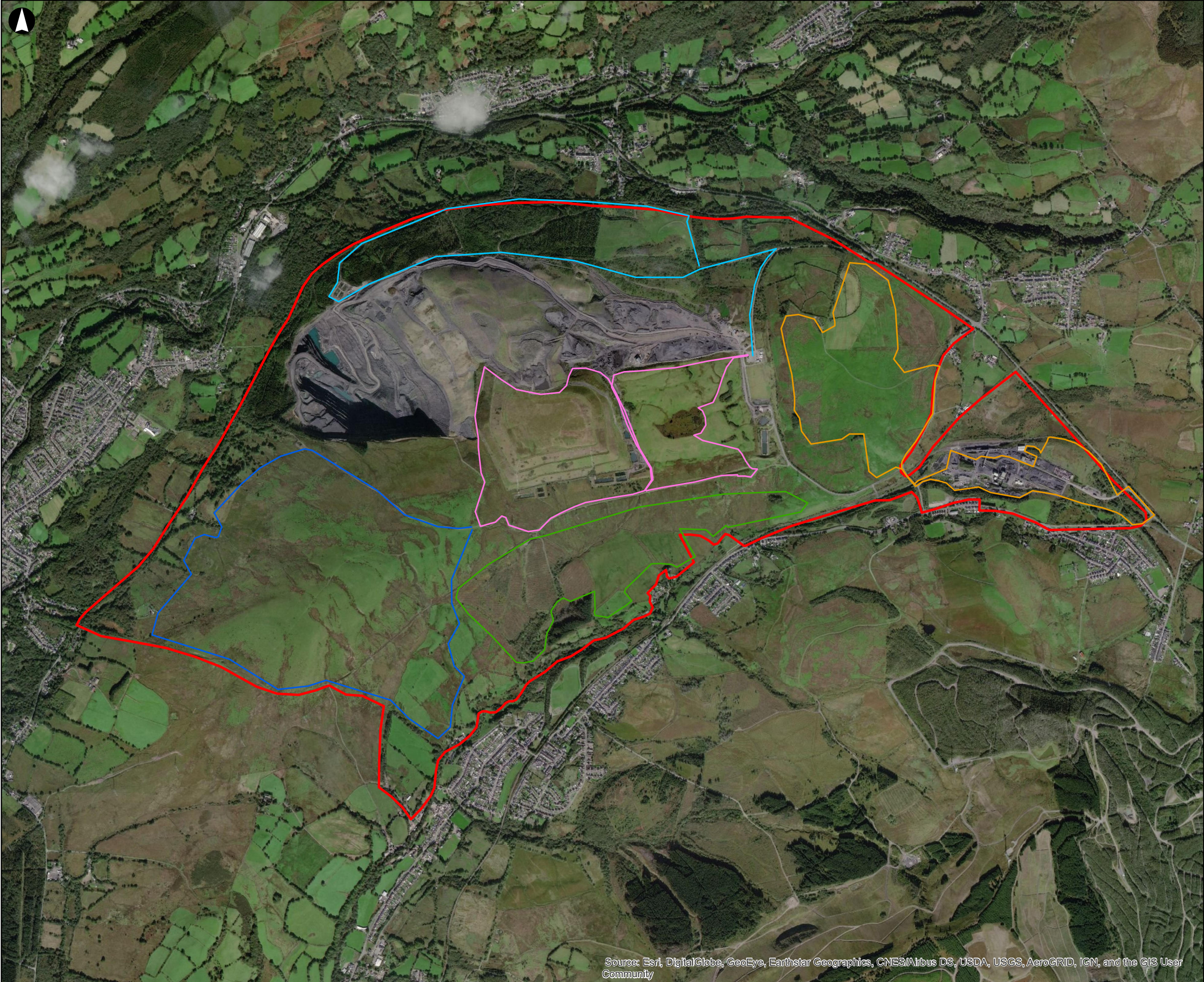
Client
Welsh Government

Job Title
**Global Centre for Rail
Excellence**

**Figure 1
Study Area**

Scale at A3
1:20,000

Job No 264904	Drawing Status For Issue	Issue F1
Drawing No 001		



Legend

- BBS Transect 1
- BBS Transect 2
- BBS Transect 3
- BBS Transect 4
- BBS Transect 5
- Survey Area

P0	2019-11-13	KJ	CP	PC
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Issue	Date	By	Chkd	Appd
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Metres

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Client

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Job Title

Global Centre for Rail Excellence

Survey Details

Scale at A3

1:21,000

Job No	Drawing Status
264904	For Issue

Drawing No	Issue
002	P0

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



- BF Bullfinch
- CK Cuckoo
- GC Goldcrest
- GH Grasshopper Warbler
- LI Linnet
- LT Long-tailed Tit
- M. Mistle Thrush
- MP Meadow Pipit
- RB Reed Bunting
- S. Skylark
- ST Song Thrush
- WH Whitethroat
- WW Willow Warbler

Legend

- Study Area
- Transect 1
- Transect 2
- Transect 3
- Transect 5
- R. Away
- R. Away, Alarm
- R. Away, Call
- ♂R. Away, Male
- R. - R.Different Simultaneous
- R. - Flight
- R. Land
- R. - RSimultaneous
- = Alarm
- Call
- ♀ Pair
- R. Sight record
- Song

Metres

Metres

0 105 210 420

F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

ARUP

63 St Thomas Street
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Client
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Project Title
Global Centre for Rail Excellence

Drawing Title
**BBS Transect 1 - April
Species of Conservation
Significance**

Scale at A3
1:8,250

Role

Suitability

For Issue

Arup Job No 264904	Rev F1
Name 001	



- CK Cuckoo
- D. Dunnock
- GC Goldcrest
- L. Lapwing
- LI Linnet
- M. Mistle Thrush
- MP Meadow Pipit
- RB Reed Bunting
- S. Skylark
- ST Song Thrush
- TP Tree Pipit
- WH Whitethroat
- WW Willow Warbler

Legend

- Study Area
- Transect 1
- Transect 2
- Transect 3
- Transect 5
- R. - Away
- R. - R. Different Simultaneous
- R. - Flight
- R. - Flight, Call
- R. - Land
- R. - Land, Male
- R. - R Simultaneous
- Song, two locations, same bird
- Alarm
- Call
- Nest
- Sight record
- Song

Metres

0105210420

F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Global Centre for Rail Excellence

Drawing Title
BBS Transect 1 - May Species of Conservation Significance

Scale at A3
1:8,250

Role

Suitability

For Issue

Arup Job No 264904	Rev F1
Name 002	



- BF Bullfinch

CK Cuckoo

CR Crossbill (common)

D. Dunnock

GC Goldcrest

GH Grasshopper Warbler

L. Lapwing

LI Linnet
- MP Meadow Pipit

RB Reed Bunting

S. Skylark

SG Starling

ST Song Thrush

TP Tree Pipit

WH Whitethroat

WW Willow Warbler

Legend

Study Area

Transect 1

Transect 2

Transect 3

Transect 5

R. Away

R. Away, Alarm

R. Away, Call

R. R.Different Simultaneous

R. Flight

Flight, Song

R. Land

R. Land, Male

Land, Song

R. RSimultaneous

Alarm

Call

Call, Food

Call, Male

R. Sight record

Song

Metres

0105210420

F12020-02-03AMPCPC

RevDateByChkdAppd

Coordinate System: British National Grid

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Global Centre for Rail Excellence

Drawing Title

BBS Transect 1 - June
Species of Conservation
Significance

Scale at A3

1:8,250

Role

Suitability

For Issue

Arup Job No

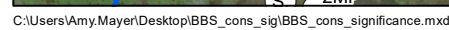
264904

Rev

F1

Name

003



A close-up photograph of a green, textured surface, possibly a wall or fabric, with a prominent pink line running diagonally across it. The texture is mottled and uneven.



An aerial photograph showing a road intersection. A yellow line is drawn across the image, likely indicating a lane or boundary. The text 'M' is visible in the top right corner.

MP — MP

Year	Very satisfied (%)
2009	45
2010	55
2011	45
2012	55
2013	45
2014	55



Rev	Date
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Drawing Title

Species of Conservation Significance

1:6,000

Role

Arjun Job No
264904

up



- CK Cuckoo
- GH Grasshopper Warbler
- HS House Sparrow
- L. Lapwing
- LI Linnet
- M. Mistle Thrush
- MP Meadow Pipit
- RB Reed Bunting
- S. Skylark
- TP Tree Pipit
- WH Whitethroat
- WW Willow Warbler

Legend

- Study Area
- Transect 1
- Transect 2
- Transect 4
- Transect 5
- Aggressive
- Away
- Away, Alarm
- R. Different Simultaneous
- Flight
- Flight, Alarm
- Flight, Call
- R. food Flight, Food
- Land
- R. Simultaneous
- Song, two locations, same bird
- Alarm
- Call
- Nest
- on On
- Sight record
- Song

Metres



075150300

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Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
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Project Title
Global Centre for Rail Excellence

Drawing Title
**BBS Transect 2 - May
Species of Conservation
Significance**

Scale at A3
1:6,000

Role

Suitability

For Issue

Arup Job No 264904	Rev F1
Name 005	



- BF Bullfinch
- CK Cuckoo
- D. Duncock
- GH Grasshopper Warbler
- GL Grey Wagtail
- L. Lapwing
- LI Linnet
- MP Meadow Pipit
- RB Reed Bunting
- S. Skylark
- SG Starling
- SL Lapwing
- ST Song Thrush
- TP Tree Pipit
- WH Whitethroat
- WW Willow Warbler

Legend

- Study Area
- Transect 1
- Transect 2
- Transect 4
- Transect 5
- R. Away
- R. Away, Alarm
- R. Away, Call
- R. R. Different Simultaneous
- R. Flight
- R. Land, Male
- R. R. Simultaneous
- = Alarm
- = Call
- fam Family
- ♀ Female
- ♂ Male
- * Nest
- R. Sight record
- Song

Metres

0	75	150	300
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F1	2020-02-03	AM	PC	PC
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Rev	Date	By	Chkd	Appd
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Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Project Title
Global Centre for Rail Excellence

Drawing Title
**BBS Transect 2 - June
Species of Conservation
Significance**

Scale at A3
1:6,000

Role

For Issue	Rev
Arup Job No 264904	F1
Name 006	



- BF Bullfinch

CK Cuckoo

CU Curlew

D. Dunnock

GH Grasshopper Warbler

HS House Sparrow

L. Lapwing

LI Linnet

LT Long-tailed Tit

M. Mistle Thrush

MA Mallard

MP Meadow Pipit

RB Reed Bunting

S. Skylark

SG Starling

ST Song Thrush

WH Whitethroat

WW Willow Warbler

Legend

Study Area

Transect 1

Transect 2

Transect 3

Transect 4

Away

Away, Call

R Different Simultaneous

R Flight

R Flight, Call, Female

Land

RSimultaneous

Alarm

Call

Sight record

Song

Metres

0

100

200

400

F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Global Centre for Rail
Excellence

Drawing Title
BBS Transect 3 - April
Species of Conservation
Significance

Scale at A3
1:7,750
Role

Suitability	
For Issue	
Arup Job No 264904	Rev F1
Name 007	



- BF Bullfinch

D. Dunnock

GH Grasshopper Warbler

HS House Sparrow

LI Linnet

LT Long-tailed Tit

M. Mistle Thrush

MP Meadow Pipit

RB Reed Bunting

S. Skylark

SG Starling

ST Song Thrush
- TP Tree Pipit

WH Whitethroat

WW Willow Warbler

Legend

Study Area

Transect 1

Transect 2

Transect 3

Transect 4

Aggressive

Away

R. - R. Different Simultaneous

R. - Flight

R. - Flight, Alarm

R. - R Simultaneous

Song, two locations, same bird

Alarm

Call

Male

Sight record

Song

Metres

0	100	200	400
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F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Project Title

Global Centre for Rail Excellence

Drawing Title

BBS Transect 3 - May
Species of Conservation
Significance

Scale at A3

1:7,750

Role

Suitability

For Issue

Arup Job No
264904

Rev
F1

Name
008



- BF Bullfinch

CR Crossbill (common)

D. Dunnock

GH Grasshopper Warbler

GL Grey Wagtail

L. Lapwing

LI Linnet

M. Mistle Thrush

MP Meadow Pipit

RB Reed Bunting

S. Skylark

SG Starling
- SL Lapwing

ST Song Thrush

TP Tree Pipit

WH Whitethroat

WW Willow Warbler

Legend

Study Area

Transect 2

Transect 3

Transect 4

Transect 5

R. Away

R. Away, Call

R. Different Simultaneous

R. Flight

R. Flight, Alarm

R. Land

Land, Song

R. Simultaneous

= Alarm

Call

fam Family

Female

Fight

foodFood

Male

Nest

Pair

Sight record

Song

Metres

0	87.5	175	350	
F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Project Title

Global Centre for Rail Excellence

Drawing Title

BBS Transect 3 - June Species of Conservation Significance

Scale at A3

1:6,750

Role

Suitability

For Issue

Arup Job No

264904

Rev

F1

Name

009

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© Arup



- BF Bullfinch

CK Cuckoo

CU Curlew

GH Grasshopper Warbler

HS House Sparrow

LI Linnet

MA Mallard

MP Meadow Pipit

RB Reed Bunting

S. Skylark

SG Starling
- ST Song Thrush

WH Whitethroat

WW Willow Warbler

Legend

Study Area

Transect 2

Transect 3

Transect 4

Transect 5

R. Away

R. Away, Alarm

R. Away, Call

R. R.Different Simultaneous

R. Flight

R. Flight, Call

R. Land

R. Land, Song

R. RSimultaneous

Alarm

Call

* Nest

R. Sight record

Song

Metres

087.5175350

F12020-02-03AMPCPC

RevDateByChkdAppd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Project Title

Global Centre for Rail Excellence

Drawing Title

BBS Transect 4 - April
Species of Conservation
Significance

Scale at A3

1:6,750

Role

Suitability

For Issue

Arup Job No

264904

Rev

F1

Name

010



- BF Bullfinch

CK Cuckoo

GC Goldcrest

GH Grasshopper Warbler

HS House Sparrow

L Lapwing

LI Linnet

M Mistle Thrush

MP Meadow Pipit

RB Reed Bunting

S Skylark

SG Starling
- TP Tree Pipit

WH Whitethroat

WW Willow Warbler

Study Area

Transect 2

Transect 3

Transect 4

Transect 5

Aggressive

Away

Away, Alarm

R Different Simultaneous

Flight

Flight, Alarm

Flight, Call

food Flight, Food

Land

Land, Song

R Simultaneous

Song, two locations, same bird

Alarm

Call

Nesting material

Nest

onOn

Sight record

Song

Metres

087.5175350

F12020-02-03AMPCPC

RevDateByChkdAppd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Project Title
Global Centre for Rail
Excellence

Drawing Title
BBS Transect 4 - May
Species of Conservation
Significance

Scale at A3
1:6,750
Role

Suitability	
For Issue	
Arup Job No 264904	Rev F1
Name 011	



- BF Bullfinch

CR Crossbill (common)

D. Dunnock

GH Grasshopper Warbler

GL Grey Wagtail

L. Lapwing

LI Linnet

M. Mistle Thrush

MP Meadow Pipit

RB Reed Bunting

S. Skylark

SG Starling
- SL Lapwing

ST Song Thrush

TP Tree Pipit

WH Whitethroat

WW Willow Warbler

Legend

Study Area

Transect 2

Transect 3

Transect 4

Transect 5

R. Away

R. Away, Call

R.fan Away, Family

R. - R.Different Simultaneous

R. Flight

R. Flight, Alarm

R. Flight, Call

R. Flight, Male

Flight, Song

R. Land

R. Land, Female

R. Land, Male

Land, Song

RSimultaneous

= Alarm

= Alarm, Male

= Alarm, Pair

_ Call

fan Call, Family

fam Family

♀ Female

Fight

food Food

juv Juvenile

♂ Male

* Nest

♀ Pair

R. Sight record

○ Song

Metres

0 87.5 175 350

F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Project Title

Global Centre for Rail Excellence

Drawing Title

BBS Transect 4 - June
Species of Conservation
Significance

Scale at A3

1:6,750

Role

Suitability

For Issue

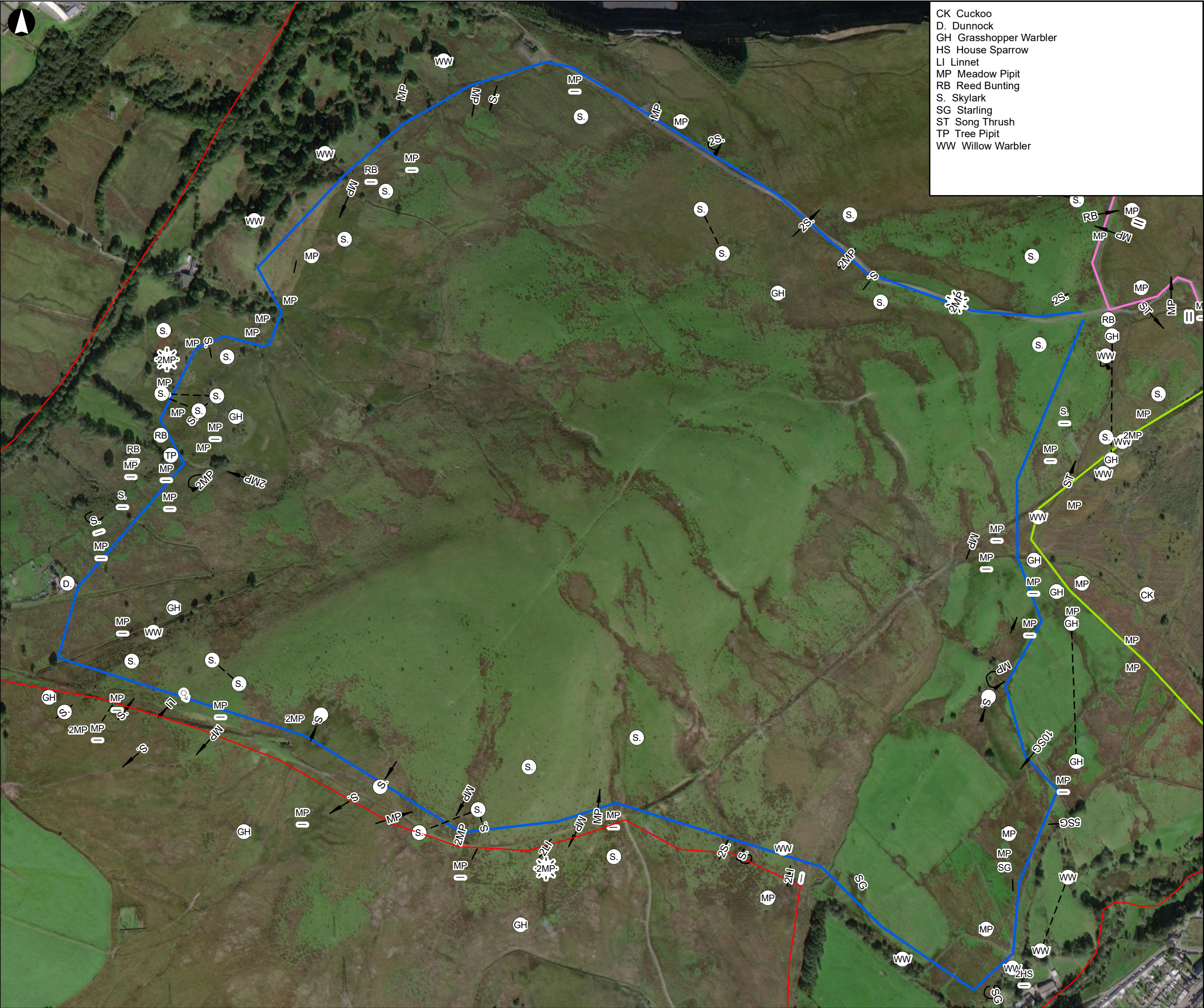
Arup Job No
264904

Rev
F1

Name
012

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© Arup



- CK Cuckoo
- D. Dunnock
- GH Grasshopper Warbler
- HS House Sparrow
- LI Linnet
- MP Meadow Pipit
- RB Reed Bunting
- S. Skylark
- SG Starling
- ST Song Thrush
- TP Tree Pipit
- WW Willow Warbler

Legend

- Study Area
- Transect 2
- Transect 4
- Transect 5
- R. Away
- R. Away, Alarm
- R. R-Different Simultaneous
- R. Flight
- Flight, Aggressive
- R. Flight, Call
- Flight, Song
- R. Land
- R. Land, Male
- Land, Song
- Call
- Fight
- R. Sight record
- Song

Metres				
0	87.5	175	350	
F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Global Centre for Rail Excellence

Drawing Title
**BBS Transect 5 - April
Species of Conservation
Significance**

Scale at A3
1:6,750
Role

Suitability	
For Issue	
Arup Job No 264904	Rev F1
Name 013	



- CK Cuckoo

GH Grasshopper Warbler

L Lapwing

LI Linnet

M Mistle Thrush

MP Meadow Pipit

RB Reed Bunting

S Skylark

SG Starling
- WH Whitethroat

WW Willow Warbler

Y Yellowhammer

Legend

Study Area

Transect 2

Transect 4

Transect 5

R. Away

R. - R-Different Simultaneous

R- Flight

R. Flight, Alarm

Flight, Song

R. Land

Land, Song

R. RSimultaneous

Song, two locations, same bird

Alarm

Call

Fight

R. Sight record

Song

Metres

0

87.5

175

350

F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Global Centre for Rail Excellence

Drawing Title

BBS Transect 5 - May Species of Conservation Significance

Scale at A3

1:6,750

Role

Suitability

For Issue

Arup Job No

264904

Rev

F1

Name

014



- CR Crossbill (common)
- GH Grasshopper Warbler
- LI Linnet
- M. Mistle Thrush
- MP Meadow Pipit
- RB Reed Bunting
- S. Skylark
- SG Starling
- ST Song Thrush
- WH Whitethroat
- WW Willow Warbler

Legend

Study Area

Transect 2

Transect 4

Transect 5

R.→ Away

R. - - R. Different Simultaneous

·R→ Flight

R.→ Flight, Alarm

R.→ Land

○→ Land, Song

R.→ R Simultaneous

= Alarm

= Call

♂ Call, Male

♀ Female

⊙ Fight

♂ Male

R. Sight record

○ Song

Metres

0	87.5	175	350	
F1	2020-02-03	AM	PC	PC
Rev	Date	By	Chkd	Appd

Coordinate System: British National Grid
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus

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Project Title

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Drawing Title

**BBS Transect 5 - June
Species of Conservation
Significance**

Scale at A3

1:6,750

Role

Suitability

For Issue

Arup Job No
264904

Rev
F1

Name
015