

URBAN EDGE  
ENVIRONMENTAL  
CONSULTING

NATURAL PROGRESSION

# Habitats Regulations Assessment for the City of Bradford District Core Strategy

Appropriate Assessment Report for the  
Publication Draft Document (February 2014)

December 2014



# Habitats Regulations Assessment for the City of Bradford District Core Strategy

Appropriate Assessment Report for the  
Publication Draft Document (February 2014)

<b>Client:</b>	City of Bradford Metropolitan District Council
<b>Report No.:</b>	UE-0112 Bradford CS HRA_13_141211
<b>Version:</b>	13
<b>Status:</b>	Final
<b>Date:</b>	December 2014
<b>Author:</b>	JC/NP
<b>Checked:</b>	SP
<b>Approved:</b>	NP

# Contents

<b>Executive Summary</b>	<b>i</b>
E1 Introduction	i
E2 Scope of the Assessment	i
E3 Impact Pathways	ii
E4 Findings	ii
E5 Conclusions	iii
<b>1 Introduction</b>	<b>1</b>
1.1 Background	1
1.2 Requirement for Habitats Regulations Assessment	1
1.3 Bradford Publication Draft Core Strategy (February 2014)	1
1.4 Purpose and Structure of this Document	3
<b>2 Methodology</b>	<b>7</b>
2.1 Guidance and Best Practice	7
2.2 Methodology	8
2.3 Screening	8
2.4 The Appropriate Assessment Stage	10
2.5 In Combination Effects	10
<b>3 European Site Features and Conservation Objectives</b>	<b>11</b>
3.1 Scope of the Assessment	11
3.2 South Pennine Moors Phase 2 SPA	14
3.3 North Pennine Moors SPA	15
3.4 South Pennine Moors SAC	16
3.5 North Pennine Moors SAC	16
3.6 Conservation Objectives	16
<b>4 European Site Characterisation</b>	<b>21</b>
4.1 SPA Bird Populations and Ecology	21
4.2 Habitats of South Pennine Moors SAC	33
4.3 North Pennine Moors SAC	38

---

4.4	Condition (Conservation) Status	38
<b>5</b>	<b>Identifying Impact Pathways</b>	<b>41</b>
5.1	Introduction	41
5.2	Loss of Supporting Habitat	41
5.3	Increased Water Demand	52
5.4	Impacts on Water Quality	55
5.5	Increased Emissions to Air	56
5.6	Wind Turbines (Collision Mortality Risk and Displacement)	61
5.7	Recreational Impacts	64
5.8	Urban Edge Effects	79
<b>6</b>	<b>Avoiding and/or Mitigating Impacts</b>	<b>87</b>
6.1	Introduction	87
6.2	Taking an Evidence-based Approach to Addressing Impacts	87
6.3	Adjusting the Scale and Spatial Distribution of Development	89
6.4	Establishing a Spatial Approach to Avoiding and Mitigating Impacts	91
6.5	Identifying Strategic Avoidance Measures	92
6.6	Designing Management Measures	93
6.7	Small Scale Policy Recommendations	95
6.8	In Combination Effects and Partnership Working	95
<b>7</b>	<b>Impact Assessment</b>	<b>97</b>
7.1	Introduction	97
7.2	South Pennine Moors Phase 2 SPA	97
7.3	South Pennine Moors SAC	101
7.4	North Pennine Moors SPA	103
7.5	North Pennine Moors SAC	106
<b>8</b>	<b>Conclusions</b>	<b>109</b>
8.1	Summary	109
8.2	Scope of the Assessment	109
8.3	Findings	109
8.4	Conclusions	110
	<b>References and Bibliography</b>	<b>111</b>

---

---

<b>Appendix I: Screening Matrix</b>	<b>A</b>
<b>Appendix II: Extent of 2013 Moorland Fringe Habitat Surveys</b>	<b>C</b>
<b>Appendix III: Mapping of SPA Birds, Supporting Habitats and SHLAA Sites</b>	<b>E</b>
<b>Appendix IV: APIS Grid Reference Data</b>	<b>Q</b>

## List of Tables and Figures

Table 1.1: Spatial distribution of residential development	2
Table 2.1: Stages in the HRA process drawing on guidance from DCLG and Natural England	9
Table 3.1: European site qualifying features	13
Table 3.2: Some of the typical species of Annex 1 habitat types present with SAC	20
Table 4.1: SPA selected for their populations of breeding Golden Plover and proportion of the national and biogeographic population they support	22
Table 4.2: Changes in Merlin population within northern England from Ewing et al. (2008)	26
Table 4.3: Distribution of Short-eared Owls within SPA in Britain (JNCC, 2001)	28
Table 4.4: Area of Annex I habitats within the South Pennine Moors SAC (West Yorkshire Ecology, 2009)	34
Table 5.1: Predominant habitat types within surveyed meadows	43
Table 5.2: Distribution of redshank and snipe in relation to SPA, settlements and habitats	46
Table 5.3: SPA bird species recorded within SHLAA sites	47
Table 5.4: Main waste water treatment works serving settlements in Bradford district	55
Table 5.5: Mode of travel to site (%)	66
Table 5.6: Relative sensitivity of moorland plants to trampling pressure (Anderson, 1990)	72
Table 5.7: Summary of potential significance of access impacts on mountain and moor	72
Table 5.8: Estimated annual visit rates to each moorland block	77
Table 5.9: Urban and recreational pressures on lowland heathlands near Whitehill and Bordon, Hampshire (2011), and South Pennine Moors (2012)	80
Table 5.10: High and medium fire density areas in West Yorkshire, Lancashire and Greater Manchester	82
Table 5.11: Total prey caught by cats per 1000 households per annum (Source: Underhill-Day (2005) estimated from Woods et al, 2003, and Howes, 2002)	84
Figure 1.1: Core Strategy Key Diagram	4
Figure 1.2: Relative scale of proposed residential development	5
Figure 3.1: European sites in and around Bradford district	12
Figure 4.1: Annex 1 and typical bird species registrations on Rombalds Moor (Source: Natural England, 2005)	23

---

Figure 4.2: Annex 1 and typical bird species registrations on moors to south & west (Source: Natural England, 2005)	24
Figure 4.3: Annex 1 habitat distribution on Ilkley / Rombalds Moor (Source: West Yorkshire Ecology, 2005)	35
Figure 4.4: Annex 1 habitat distribution on moors to south and west (Source: West Yorkshire Ecology, 2005)	36
Figure 4.5: Habitat extents in North Pennine Moors SAC (Source: NBN Gateway)	39
Figure 4.6: SSSI condition status in the South Pennines Moors SAC close to Bradford	39
Figure 5.1: Grid SWZ preferred solution supply demand balance (Source: Yorkshire Water (August 2014) p.161)	54
Figure 5.2: SAC/SPA locations within 200m of a road corridor, used to query the APIS database	59
Figure 5.3: Transport corridors with increased demand in the preferred option (Source: Steer Davies Gleave, 2010)	60
Figure 5.4: Wind turbine proposals in Bradford district	63
Figure 5.5: Surveyed access points and average penetration distances travelled by visitors to Rombalds and Ilkley Moors during summer 2013	68
Figure 5.6: Surveyed access points and average penetration distances travelled by visitors to moorlands to the south and west of Haworth during summer 2013	69
Figure 5.9: Visitor survey 2013 access point locations	73
Figure 5.8: Cumulative distribution of distances travelled (all visitors) to South Pennine Moors SAC/SPA in summer 2013, excluding outliers >50km	75
Figure 5.9: Cumulative distribution of distances travelled (by Bradford residents) to South Pennine Moors SAC/SPA in summer 2013	75
Figure 5.10: Moorland fire density map of incidents attended between 2000-2008 at 2x2km cell resolution. Green indicates few to no fire occurrences, whilst red indicates fire hot spots (Source: Walker et al., 2009)	83
Figure 6.1: Zones of Influence around the South Pennine Moors SAC/SPA in Bradford district	94

## Abbreviations

AA	Appropriate Assessment
BBS	Breeding Bird Survey
BoCC	Bird of Conservation Concern
CRoW Act	Countryside and Rights of Way Act 2001
Dph	Dwelling per hectare
DPD	Development Plan Document
FCT	Favourable Condition Tables
HRA	Habitats Regulations Assessment
LDF	Local Development Framework
MI	Megalitres
MI/d	Megalitres per day
NO <sub>x</sub>	Oxides of nitrogen
RSS	Regional Spatial Strategy
SAC	Special Area of Conservation
SEGI	Site of Ecological or Geological Importance
SHLAA	Strategic Housing Land Availability Assessment
SPA	Special Protection Area
Sqm	Square metres
SSSI	Site of Special Scientific Interest
WRMP	Water Resource Management Plan
WWTW	Waste Water Treatment Works



# Executive Summary

## **E1 Introduction**

E1.1 The City of Bradford Metropolitan District Council is preparing the Core Strategy Development Plan Document as part of the district's Local Plan. As an integral part of this process, the Council is undertaking a Habitats Regulations Assessment to ensure that the Core Strategy does not lead to adverse effects on the ecological integrity of internationally important habitats or species assemblages within or close to the district.

E1.2 Habitats Regulations Assessment (HRA) is a requirement of the Conservation of Habitats and Species Regulations 2010 (as amended; commonly referred to as 'the Habitats Regulations'), and must be applied to any plan or project in England and Wales with the potential to adversely affect the ecological integrity of any sites designated for their nature conservation importance as part of a system known collectively as the Natura 2000 network of European sites.

E1.3 The Council previously undertook a joint HRA screening assessment for the Draft Core Strategy and Draft Waste Management DPD (Environ, 2012) which found that the Core Strategy was considered likely to lead to significant effects on European sites in and around the district. Following this, a more detailed Appropriate Assessment (UEEC, 2013) of issues affecting the European sites was prepared, which assessed the impacts of the Further Engagement Draft Core Strategy and included preliminary recommendations for avoidance and mitigation.

E1.4 A further iteration of the HRA Report (February 2014) provided an assessment of the Publication Draft Core Strategy (February 2014). It included analysis of baseline information gathered during a number of studies undertaken during 2013, including:

- ▶ Surveys of visitor activity within the SAC/SPA;
- ▶ Breeding bird surveys within 2.5km of the SAC/SPA; and
- ▶ Surveys of moorland fringe habitats.

E1.5 The current HRA Report includes further analysis of this data, particularly in relation to visitor surveys, and an element of review in response to the earlier consultation. Chapters 1 and 2 introduce the Core Strategy, its HRA and the methods used in the assessment.

## **E2 Scope of the Assessment**

E2.1 European sites considered within the scope of this assessment include all those identified during the earlier screening assessment as likely to be significantly affected by Core Strategy developments:

- ▶ South Pennine Moors SAC;
- ▶ North Pennine Moors SAC; and

- ▶ South Pennine Moors Phase 2 SPA;
- ▶ North Pennine Moors SPA.

E2.2 These four European sites have been designated to conserve similar groups of upland habitats, wading birds and raptors, although there are some significant differences between them; see Chapters 3 and 4 for a review of qualifying habitats and species, and their conservation objectives.

### **E3 Impact Pathways**

E3.1 The HRA screening assessment identified a range of likely significant effects on the North and South Pennine Moorlands that could result from the Core Strategy for Bradford district. This list has been reviewed and rationalised, with new impact categories added as part of the Appropriate Assessment procedure. Impact pathways now considered likely to significantly affect the European sites are:

- ▶ Loss of supporting habitats (directly or indirectly);
- ▶ Increased water demand;
- ▶ Impacts on water quality;
- ▶ Increased emissions to air;
- ▶ Collision mortality risk and displacement due to wind turbine developments;
- ▶ Recreational impacts, including walkers, dogs, trampling and erosion; and
- ▶ A range of urban edge effects, including fly-tipping, invasive species, wildfire and increased predation.

E3.2 Chapter 5 describes the available evidence about these impact pathways in relation to the North and South Pennine Moors.

### **E4 Findings**

E4.1 Adverse effects resulting from wind turbine development, increased water demand or impacts on water quality are not considered likely for any of the four European sites.

E4.2 Loss of supporting habitats and urbanisation impacts are unlikely to affect the North Pennine Moors SAC/SPA.

E4.3 Loss of supporting habitats and urban edge effects are assessed as likely to affect the South Pennine Moors SAC/SPA, however, they are considered to be adequately avoided and mitigated by the policy response in the Core Strategy Publication Draft.

E4.4 Recreational impacts are assessed as potentially affecting any of the four sites, however, they are considered to be adequately avoided and mitigated by the Core Strategy policy response.

- E4.5 The likelihood of traffic-related atmospheric pollution will be subject to more detailed traffic modelling during the pre-allocations testing stage.
- E4.6 The distribution and magnitude of impacts differs between the four designated areas. Evidence is presented to indicate that, if left unmitigated, impacts are likely to be greater in relation to the South Pennine Moors sites due to their relative proximity to locations for future development and high levels of accessibility, a key influence on the numbers of people visiting the sites and associated impacts. Chapter 7 describes how the impacts are likely to affect each site, and determines whether there would be adverse effects on ecological integrity.

## **E5 Conclusions**

- E5.1 Taking into account the range of avoidance and mitigation measures incorporated into the plan, it can be concluded that the Core Strategy Publication Draft will not result in adverse effects on the ecological integrity of the North Pennine Moors SAC and SPA, South Pennine Moors SAC and South Pennine Moors Phase 2 SPA.
- E5.2 To ensure that delivery and funding mechanisms for avoidance and mitigation measures are taken forward, the Council will produce a Supplementary Planning Document to guide implementation of the South Pennine Moors Zones of Influence Policy set out in Strategic Core Policy 8 in the Core Strategy Publication Draft.

*This page is intentionally blank.*

# 1 Introduction

## 1.1 Background

1.1.1 The City of Bradford Metropolitan District Council is preparing the Core Strategy Development Plan Document (DPD) as part of the district's Local Plan. As an integral part of this process, the Council is undertaking a Habitats Regulations Assessment to ensure that the Core Strategy does not lead to adverse effects on the ecological integrity of internationally important habitats or species assemblages within or close to the district.

## 1.2 Requirement for Habitats Regulations Assessment

1.2.1 Habitats Regulations Assessment (HRA) is a requirement of the Conservation of Habitats and Species Regulations 2010 (as amended; commonly referred to as 'the Habitats Regulations'), the UK's transposition of European Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora ('the Habitats Directive').

1.2.2 Under Regulation 102, HRA must be applied to any land use plan in England and Wales with the potential to adversely affect the ecological integrity of any sites designated for their nature conservation importance as part of a system known collectively as the Natura 2000 network of European sites.

1.2.3 European sites provide ecological infrastructure for the protection of rare, endangered or vulnerable natural habitats and species of exceptional importance within the European Union. These sites consist of Special Areas of Conservation (SAC, designated under the Habitats Directive) and Special Protection Areas (SPA, designated under European Council Directive 2009/147/EC on the conservation of wild birds ('the Birds Directive')). Meanwhile, the National Planning Policy Framework (DCLG, 2012) and Circular 06/05 (ODPM, 2005) require that Ramsar sites (UNESCO, 1971) are treated as if they are fully designated European sites for the purposes of considering development proposals that may affect them.

1.2.4 An HRA must determine whether or not a plan or project will adversely affect the integrity of the European site(s) concerned, in view of the site's conservation objectives.

## 1.3 Bradford Publication Draft Core Strategy (February 2014)

1.3.1 The Publication Draft Core Strategy is the culmination of several years' work and forms the central strategic planning document for the district. It will govern the way in which development is planned and managed for the period through to 2030.

1.3.2 The Strategic Core Policies, Sub Area Policies and policies EC3, HO1, HO2 and HO3 identify the following development aims for the district over the plan period and provide for:

- ▶ A total of 42,100 dwellings and 135ha of employment land between 2013 and 2030;
- ▶ Identifying the Regional City of Bradford as the prime focus for development and growth within the district. Identifying Keighley, Bingley and Ilkley as Principal Towns where development albeit at a lesser scale will also be focused and identifying the smaller settlements of Queensbury, Silsden, Steeton with Eastburn and Thornton as Local Growth Centres;
- ▶ Growth areas including Bradford City Centre and the Shipley Canal Road Corridor, an urban extension (at Holme Wood), local green belt deletions and a focus on previously developed land; and
- ▶ A wide variety of infrastructure, ancillary and supporting development to achieve regeneration and build sustainable communities.

1.3.3 The Key Diagram for the Core Strategy (Publication Draft, February 2014) is shown at Figure 1.1. The distribution of residential development (which is a primary focus of the HRA) is listed in Table 1.1. The relative scale of residential development is illustrated at Figure 1.2.

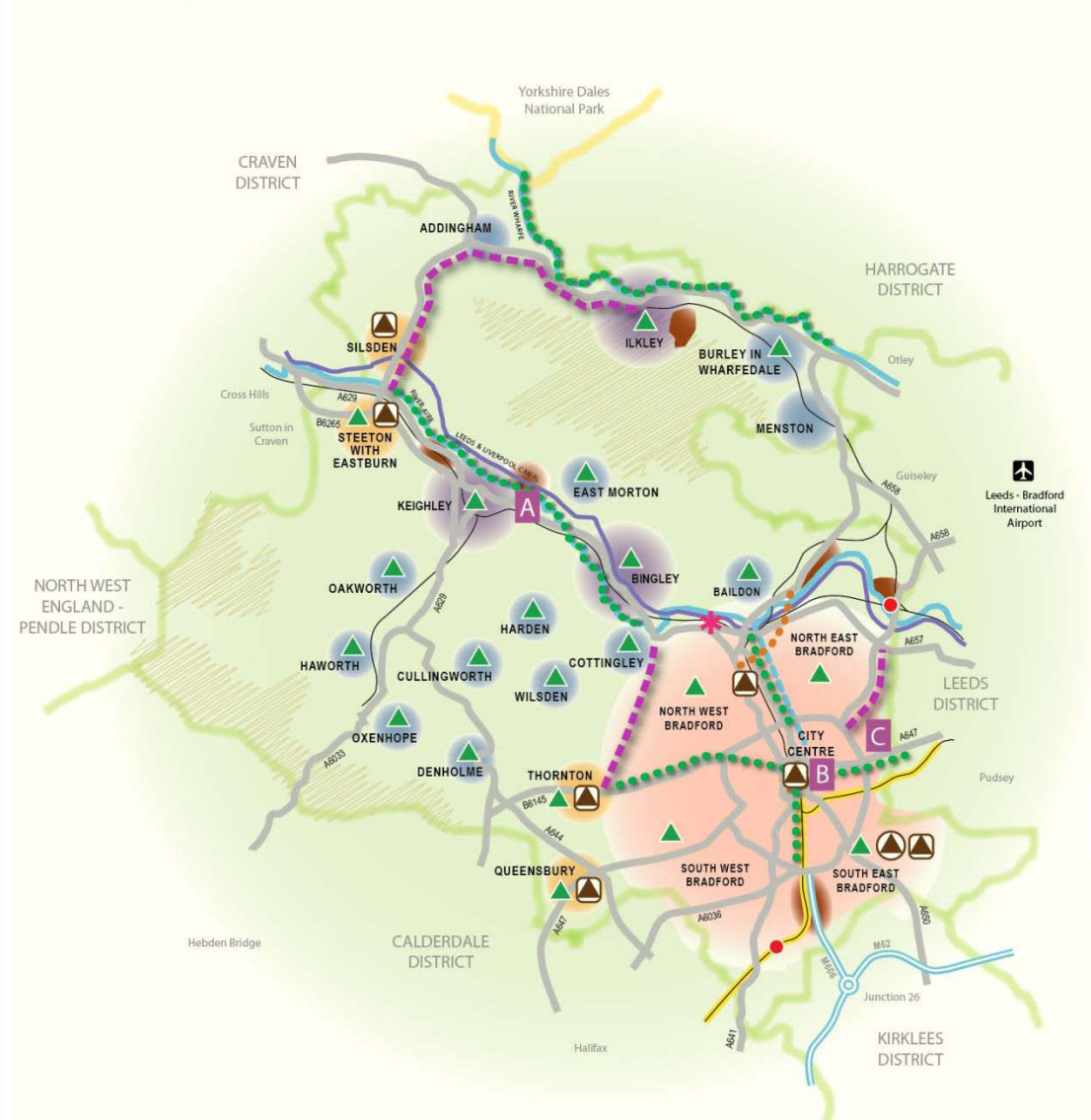
**Table 1.1: Spatial distribution of residential development**

<b>Spatial distribution of residential development</b>			
<b>Regional City of Bradford</b>			
<b>Bradford City Centre</b>	3500	<b>Canal Road</b>	3200
<b>Shipley</b>	1250	<b>SE Bradford</b>	6000
<b>NE Bradford</b>	4700	<b>SW Bradford</b>	5500
<b>NW Bradford</b>	4500	-	-
<b>Principal Towns</b>			
<b>Keighley</b>	4500	<b>Bingley</b>	1400
<b>Ilkley</b>	800	-	-
<b>Local Growth Centres</b>			
<b>Queensbury</b>	1000	<b>Silsden</b>	1000
<b>Steeton w/ Eastburn</b>	700	<b>Thornton</b>	700
<b>Local Service Centres</b>			
<b>Addingham</b>	200	<b>Baildon</b>	450
<b>Burley in Wharfedale</b>	200	<b>Cullingworth</b>	350
<b>Cottingley</b>	200	<b>East Morton</b>	100
<b>Denholme</b>	350	<b>Haworth</b>	500
<b>Harden</b>	100	<b>Oxenhope</b>	100
<b>Oakworth</b>	200	<b>Menston</b>	400
<b>Wilsden</b>	200	-	-

## 1.4 Purpose and Structure of this Document

- 1.4.1 The Council previously undertook a joint HRA screening assessment for the Draft Core Strategy and Draft Waste Management DPD (Environ, 2012) which found that the Core Strategy was considered likely to lead to significant effects on European sites in and around the district. Following this, a more detailed Appropriate Assessment (JEEC, 2013) of issues affecting the European sites was prepared, which assessed the impacts of the Further Engagement Draft Core Strategy and included preliminary recommendations for avoidance and mitigation.
- 1.4.2 A further iteration of the HRA Report (February 2014) provided an assessment of the Publication Draft Core Strategy (February 2014). It included analysis of baseline information gathered during a number of studies undertaken during 2013, including:
- ▶ Surveys of visitor activity within the SAC/SPA;
  - ▶ Breeding bird surveys within 2.5km of the SAC/SPA; and
  - ▶ Surveys of moorland fringe habitats (JEEC, 2014).
- 1.4.3 The current HRA Report includes further analysis of this data, particularly in relation to visitor surveys, and an element of review in response to the earlier consultation. The findings of the report include information in relation to:
- ▶ **Chapter Two:** HRA methodology;
  - ▶ **Chapter Three:** European site features and conservation objectives;
  - ▶ **Chapter Four:** Baseline information about the European sites;
  - ▶ **Chapter Five:** Identifying impact pathways;
  - ▶ **Chapter Six:** Discussion of avoidance and mitigation measures;
  - ▶ **Chapter Seven:** Assessment of impacts and determining whether there will be adverse effects on integrity; and
  - ▶ **Chapter Eight:** Summary and conclusions.

**Location Strategy**



**KEY**

**Settlement Hierarchy Categories (Policy SC1, SC4, SC5)**

- Regional City (Policy BD1)**  
(City of Bradford with Shipley & Lower Baildon) 61%
- Principal Towns (Policy AD1, WD1)**  
(Ilkley, Keighley & Bingley) 18%
- Local Growth Centres (Policy AD1 WD1 PN1)**  
14%
- Local Service Centres (Policy AD1, WD1, N1)**  
7%

**Other Notations**








- Economic Growth Area (Policy SC1)**
- Urban Extension (Policy HO2) - Holme Wood and SE Bradford**
- Growth Areas (Policy HO2) - City Centre, Shipley and Canal Road Corridor, Silsden, Steeton with Eastburn, Thornton, Queensbury**
- Potential Localised Green Belt Deletions**  
\*Locations are only indicative and may include other settlements
- Regeneration Partnerships**
- A** Airedale
- B** Bradford City Centre
- C** Leeds Bradford Corridor

- District Boundary
- Yorkshire Dales National Park Boundary
- Main Roads
- Proposed Quality Bus Corridor
- River / Beck
- Motorway
- Leeds and Liverpool Canal
- Proposed Bradford Canal
- Railway Line
- Electrification of Caldervale Line
- Proposed New Railway Station
- Proposed Road Infrastructure
- UNESCO Saltire World Heritage Site
- Green Infrastructure Corridor (Policy SC6)
- General Extent of Greenbelt (Policy SC7)
- South Pennine Moors SPA and SAC (Policy SC8)

**Figure 1.1: Core Strategy Key Diagram**



# Bradford Core Strategy HRA: Settlement Housing Targets

-  SAC
-  SPA
-  County Boundaries
-  Local Authority Boundaries
-  CBMDC Outline
- CBMDC Settlements
-  3,000
-  Dwellings - Publication Draft



Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 141,068	<b>Date</b> Nov2014
<b>Created by</b> NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0112_Bradford_Settlement _Quotas_3_141107	

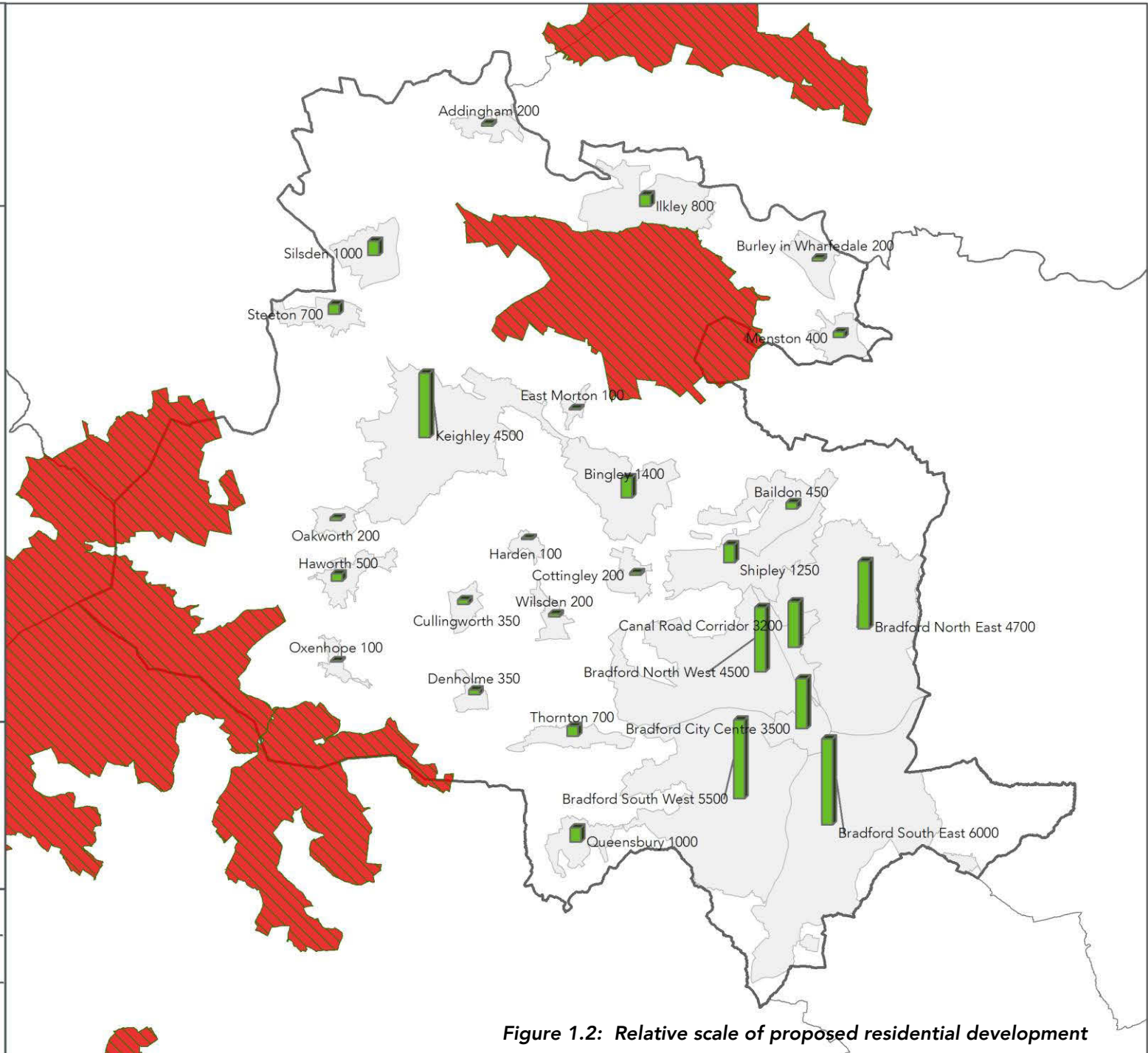


Figure 1.2: Relative scale of proposed residential development

*This page is intentionally blank.*

## 2 Methodology

### 2.1 Guidance and Best Practice

2.1.1 Draft guidance on HRA has been defined by DCLG (2006) with more detailed draft guidance from Natural England (Tyldesley, 2009) and a range of other bodies<sup>1</sup>. The guidance recognises that there is no statutory method for undertaking Habitats Regulations Assessment and that the adopted method must be appropriate to its purpose under the Habitats Directive and Regulations. DCLG guidance identifies three main stages to the HRA process:

- ▶ **Screening:** Analysing draft options for likely significant effects on internationally designated sites;
- ▶ **Appropriate Assessment:** Ascertaining the effects on site integrity; and
- ▶ **Alternative Solutions:** Devising alternatives to the plan options, avoidance or mitigation measures.

2.1.2 An HRA must determine whether or not a plan or project will adversely affect the integrity of the European site(s) concerned, in view of the site's conservation objectives. Where adverse effects are anticipated changes must be made to the plan or project. The process is characterised by the precautionary principle. The European Commission (2000a) describes the principle as follows:

*"If a preliminary scientific evaluation shows that there are reasonable grounds for concern that a particular activity might lead to damaging effects on the environment, or on human, animal or plant health, which would be inconsistent with the protection normally afforded to these within the European Community, the Precautionary Principle is triggered.*

*"Decision-makers then have to determine what action to take. They should take account of the potential consequences of taking no action, the uncertainties inherent in the scientific evaluation, and they should consult interested parties on the possible ways of managing the risk. Measures should be proportionate to the level of risk, and to the desired level of protection. They should be provisional in nature pending the availability of more reliable scientific data.*

*"Action is then undertaken to obtain further information enabling a more objective assessment of the risk. The measures taken to manage the risk should be maintained so long as the scientific information remains inconclusive and the risk unacceptable."*

2.1.3 The hierarchy of intervention is important: where significant effects are likely or uncertain, decision-makers must firstly seek to avoid the effect through for example, a change of policy. If

---

<sup>1</sup> For example European Commission (2001) and RSPB (Dodd et al, 2007)

this is not possible, mitigation measures should be explored to remove or reduce significant effects.

- 2.1.4 If neither avoidance, nor subsequent mitigation is possible, alternatives to the plan or project should be considered. Such alternatives should explore ways of achieving the objectives that avoid significant effects entirely. If there are no alternatives suitable for removing an adverse effect, decision-makers must demonstrate that there are Imperative Reasons of Overriding Public Interest to continue with the proposal. This is widely perceived as an undesirable position and should be avoided if at all possible.

## 2.2 Methodology

- 2.2.1 The guidance from DCLG and Natural England was written for use in assessing strategic plans. Where individual projects come into play, as may be the case for any individual site allocation requiring Appropriate Assessment for instance, it may prove to be more suitable to use previous guidance from Natural England’s forerunner, English Nature (1997a&b, 1999 and 2001) in conjunction with guidance European Commission (2001) and Countryside Council for Wales (Tyldesley, 2011).
- 2.2.2 The overall objective of an Appropriate Assessment will be to ascertain whether any part of the plan will lead to an adverse effect on the ecological integrity of nearby European sites and, if so, make recommendations on how such effects can be avoided or mitigated. It will be carried out in accordance with the draft Natural England guidance (Tyldesley, 2009) as summarised in Table 2.1.

## 2.3 Screening

- 2.3.1 All proposed policies were screened for likely significant effects on the European sites. Such effects can be sorted into one of 17 categories which are derived from the draft HRA guidance document produced for Natural England (Tyldesley, 2009). They help to determine which, if any, elements of the plan would be likely to have a significant effect on any interest feature of any European site, alone or in combination with other projects and plans, directly or indirectly. The 17 categories fall into four broader sections which are described as:

<b>Category A</b>	Elements of the plan / options that would have no negative effect on a European site at all
<b>Category B</b>	Elements of the plan / options that could have an effect, but the likelihood is there would be no significant negative effect on a European site either alone or in combination with other elements of the same plan, or other plans or projects
<b>Category C</b>	Elements of the plan / options that could or would be likely to have a significant effect alone and will require the plan to be subject to an appropriate assessment before the it may be adopted
<b>Category D</b>	Elements of the plan / options that would be likely to have a significant effect in combination with other elements of the same plan, or other plans or projects and will require the plan to be subject to an appropriate assessment before the plan may be adopted

**Table 2.1: Stages in the HRA process drawing on guidance from DCLG and Natural England**

DCLG Stage	Natural England (Tyldesley) Steps	
AA1: Likely significant effects	1. Gather the evidence base about international sites.	
	2. Consult Natural England and other stakeholders on the method for HRA and sites to be included.	
	3. Screen elements of the plans for likelihood of significant effects.	
	4. Eliminate likely significant effects by amending the plan / option.	
	5. Consult Natural England and other stakeholders on the findings of the screening stage, and scope of the Appropriate Assessment if required.	
AA2: Appropriate Assessment and ascertaining the effect on integrity	6. Appropriate Assessment of elements of the plan likely to have significant effects on a European site.	8. Assess additions and changes to the plan and prepare draft HRA record.
AA3: Mitigation measures and alternative solutions	7. Amend the plan / option or take other action to avoid any adverse effect on integrity of European site(s).	9. Complete the draft Appropriate Assessment and draft HRA record.
Reporting and recording	10. Submit draft HRA and supporting documents to Natural England.	
	11. Consult Natural England, other stakeholders and the public (if suitable).	
	12. Publish final HRA record and submit with Natural England letter to Inspector for Examination.	
	13. Respond to any representations relating to the HRA and to Inspector's questions.	
14. Check changes to the plan, complete HRA record and establish any monitoring required.		<b>ITERATIVE</b>

2.3.2 Categories A, C and D are subdivided so that the specific reason why the assessor has allocated the policy or proposal to that category is more transparent, and more directly related to the ways in which the plan may affect a European site. These subdivisions are detailed in Appendix I together with the findings of a revised screening exercise. The categories, and traffic light colour-coded sub-categories, provide the means of recording the results of the assessment in such a way that important issues are identified whilst policies that have no effect are screened out.

2.3.3 The ways in which each site might be significantly affected by proposed Core Strategy policies are described in Chapter 5.

## **2.4 The Appropriate Assessment Stage**

2.4.1 The purpose of the Appropriate Assessment (HRA Stage AA2) is to further analyse likely significant effects identified during the screening stage, as well as any effects which were uncertain or not well understood and taken forward for assessment in accordance with the precautionary principle. The assessment first focuses on the effects generated by the proposed policies of the Core Strategy and considers ways in which they can be avoided altogether. Where adverse effects cannot be avoided by changes to the plan, mitigation measures are introduced to remove or reduce the effects to the level of non-significance (Chapter 6). The impact assessment (Chapter 7) seeks to establish whether or not the plan's effects, either alone or in combination with other plans or projects, will lead to adverse effects on site integrity, in view of the site's conservation objectives (see Chapter 3).

2.4.2 Site integrity can be described as follows (ODPM, 2005):

*"The integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified."*

## **2.5 In Combination Effects**

2.5.1 Other plans and projects being prepared or implemented in the area may have the potential to cause negative effects on the integrity of European sites. These effects may be exacerbated when experienced in combination with the effects of the Core Strategy, possibly leading to an insignificant effect becoming significant, or a particular effect becoming of increased significance due to in-combination effects. It is therefore important to consider which other plans and projects could generate similar effects as development within Bradford district, at the same European sites, and which may act in-combination. The following plans or projects could act in combination:

- ▶ Bradford Metropolitan District Council Waste Management DPD (Preferred Option stage);
- ▶ Burnley Borough Council Emerging Local Plan;
- ▶ Craven District Council Draft New Local Plan;
- ▶ Calderdale Metropolitan Borough Council Emerging Local Plan;
- ▶ Harrogate Borough Council Emerging District Local Plan;
- ▶ Leeds City Council Adopted Core Strategy;
- ▶ Pendle Borough Council Pre Submission Core Strategy; and
- ▶ West Yorkshire Local Transport Plan 2011 – 2026.

2.5.2 In combination effects are considered in Chapters 5 and 7.

## 3 European Site Features and Conservation Objectives










### 3.1 Scope of the Assessment

- 3.1.1 Each European site has its own intrinsic qualities, besides the habitats or species for which it has been designated, that enable the site to support the ecosystems that it does. For example, an intrinsic quality of any European site is its functionality at the landscape ecology scale; in other words, how the site interacts with the zone of influence of its immediate surroundings, as well as the wider area.
- 3.1.2 Hence the ecological integrity of a site is influenced by natural and human-induced activities in the surrounding environment. This is particularly the case where there is potential for development to take land, generate water- or air-borne pollutants, use water resources or otherwise affect water levels, or involve an extractive or noise emitting use. Adverse effects may also occur via impacts to mobile species occurring outside of a designated site but which are qualifying features of the site. For example, there may be effects on protected birds that use land outside the designated site for foraging or roosting.
- 3.1.3 European sites considered within the scope of this assessment include all those identified during the earlier screening assessment (Environ, 2012) as likely to be significantly affected by Core Strategy developments, as shown on Figure 3.1 and listed below:
- ▶ South Pennine Moors SAC;
  - ▶ North Pennine Moors SAC; and
  - ▶ South Pennine Moors Phase 2 SPA;
  - ▶ North Pennine Moors SPA.
- 3.1.4 These four European sites have been designated to conserve similar groups of upland habitats, wading birds and raptors, although there are some significant differences between them. Table 3.1 identifies the qualifying features of each site. The SPA qualifying species are listed in various sources including the original citation submitted to the European Commission at the time of classification, the species present in qualifying numbers during the SPA Review undertaken by the Joint Nature Conservation Committee (JNCC) and published in 2001, the Natura 2000 standard data forms published on the JNCC website, and the conservation objectives published on the Natural England website (the latest versions of which were published in July 2014). Each of these sources presents different information regarding the reasons for the sites' selection. We have sought advice from Natural England (pers. comm., 2014a) which indicated that the species listed on the SPA citation should be used in this assessment. We have followed this advice, however, it varies from the most recently published conservation objectives available on Natural England's website<sup>2</sup> which includes Dunlin as a 'named' qualifying species of the South Pennine Moors Phase 2 SPA.

---

<sup>2</sup> Natural England (2014): Conservation objectives for European Sites: Yorkshire and Humber [accessed September 2014]: <http://publications.naturalengland.org.uk/category/5758332488908800>

# Bradford Core Strategy HRA: European Sites

-  SAC
-  Ramsar
-  SPA
-  National Park
-  County Boundaries
-  Local Authority Boundaries
-  CBMDC 10km Buffer
-  CBMDC Outline
-  CBMDC Settlements

0 4 8  
Kilometers



Contains data from Natural England 2012  
© Crown copyright and database right [2012]  
Ordnance Survey 0100019304



ENVIRONMENTAL  
CONSULTING  
Tower Point  
44 North Road  
Brighton  
BN1 1YR

Scale  
1: 247,320  
Date  
Nov 2012

Created by  
SS  
Reviewed by  
NP

Drawing number  
UE-0112\_Bradford\_EUsites  
\_1\_20121102

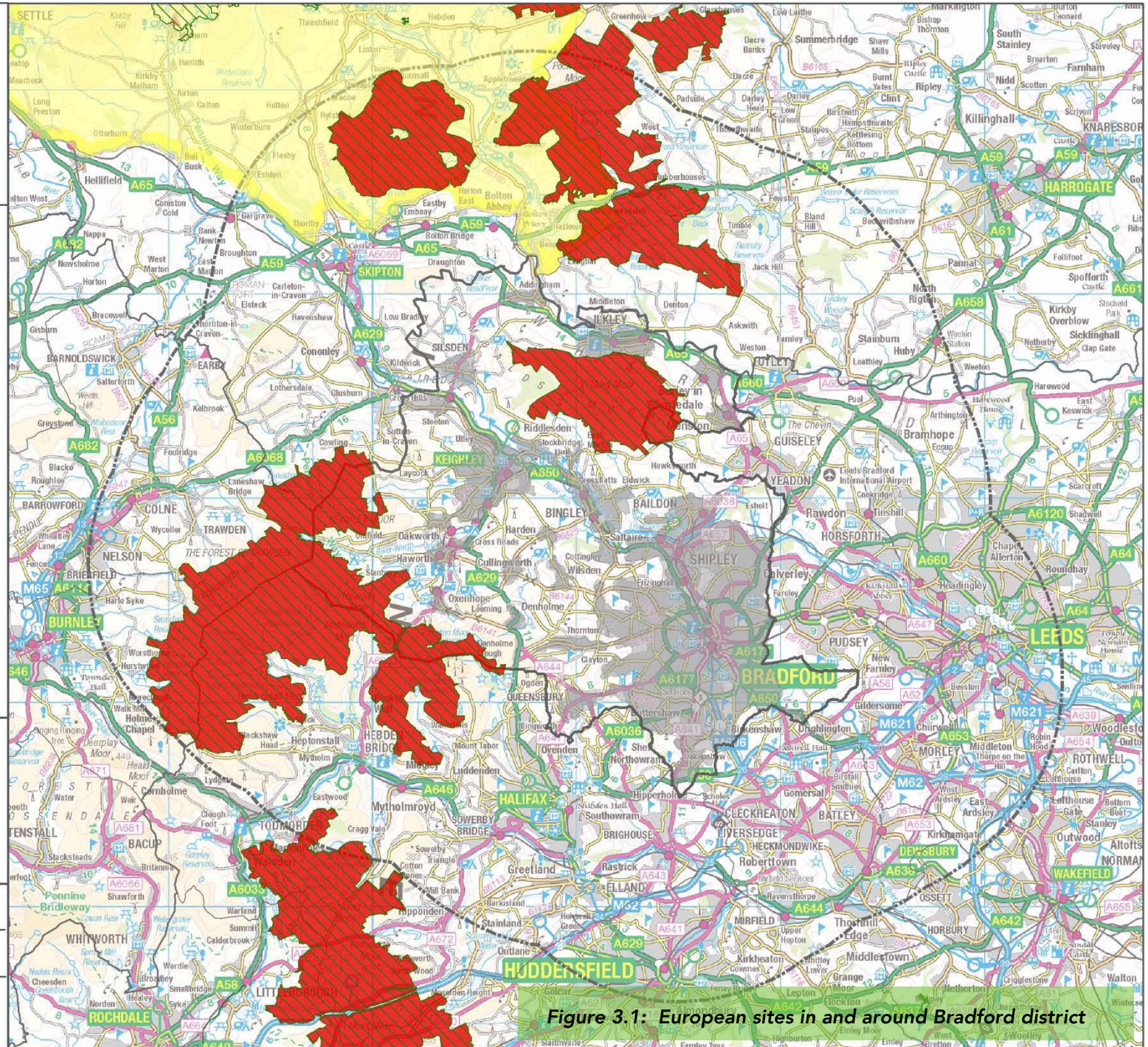


Figure 3.1: European sites in and around Bradford district



**Table 3.1: European site qualifying features**

South Pennine Moors SAC	South Pennine Moors Phase 2 SPA	North Pennine Moors SAC	North Pennine Moors SPA
<p><u>Annex I Habitats (primary)</u></p> <ul style="list-style-type: none"> <li>▪ 4030 - European dry heaths</li> <li>▪ 7130 - Blanket bogs * Priority feature</li> <li>▪ 91A0 - Old sessile oak woods with Ilex and <i>Blechnum</i> in the British Isles</li> </ul> <p><u>Annex I Habitats (not primary) **</u></p> <ul style="list-style-type: none"> <li>▪ 4010 - Northern Atlantic wet heaths with <i>Erica tetralix</i></li> <li>▪ 7140 - Transition mires and quaking bogs</li> </ul> <p>Source: <a href="#">JNCC website</a></p>	<p><u>Article 4.1: Annex I Birds (breeding)</u></p> <ul style="list-style-type: none"> <li>▪ A098 – Merlin <i>Falco columbarius</i></li> <li>▪ A140 - Golden Plover <i>Pluvialis apricaria</i></li> </ul> <p><u>Article 4.2: Regularly occurring migratory birds – internationally important assemblage of breeding birds</u></p> <ul style="list-style-type: none"> <li>▪ Common Sandpiper <i>Actitis hypoleucos</i></li> <li>▪ Short-eared Owl <i>Asio flammeus</i></li> <li>▪ Dunlin <i>Calidris alpina schinzii</i></li> <li>▪ Twite <i>Carduelis flavirostris</i></li> <li>▪ Common Snipe <i>Gallinago gallinago</i></li> <li>▪ Curlew <i>Numenius arquata</i></li> <li>▪ Northern Wheatear <i>Oenanthe oenanthe</i></li> <li>▪ Golden Plover <i>Pluvialis apricaria</i></li> <li>▪ Whinchat <i>Saxicola rubetra</i></li> <li>▪ Redshank <i>Tringa totanus</i></li> <li>▪ Ring Ouzel <i>Turdus torquatus</i></li> <li>▪ Lapwing <i>Vanellus vanellus</i></li> </ul> <p>Source: <a href="#">SPA citation</a></p>	<p><u>Annex I Habitats (primary)</u></p> <ul style="list-style-type: none"> <li>▪ 4030 - European dry heaths</li> <li>▪ 5130 - <i>Juniperus communis</i> formations on heaths or calcareous grasslands</li> <li>▪ 7130 - Blanket bogs * Priority feature</li> <li>▪ 7220 - Petrifying springs with tufa formation (<i>Cratoneurion</i>) * Priority feature</li> <li>▪ 8220 - Siliceous rocky slopes with chasmophytic vegetation</li> <li>▪ 91A0 - Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles</li> </ul> <p><u>Annex I Habitats (not primary) **</u></p> <ul style="list-style-type: none"> <li>▪ 4010 - Northern Atlantic wet heaths with <i>Erica tetralix</i></li> <li>▪ 6130 - Calaminarian grasslands of the <i>Violetalia calaminariae</i></li> <li>▪ 6150 - Siliceous alpine and boreal grasslands</li> <li>▪ 6210 - Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>)</li> <li>▪ 7230 - Alkaline fens</li> <li>▪ 8110 - Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>)</li> <li>▪ 8210 - Calcareous rocky slopes with chasmophytic vegetation</li> </ul> <p><u>Annex II Species **</u></p> <ul style="list-style-type: none"> <li>▪ 1528 - Marsh saxifrage <i>Saxifraga hirculus</i></li> </ul> <p>Source: <a href="#">JNCC website</a></p>	<p><u>Article 4.1: Annex I Birds (breeding)</u></p> <ul style="list-style-type: none"> <li>▪ A082 -Hen Harrier <i>Circus cyaneus</i></li> <li>▪ A098 – Merlin <i>Falco columbarius</i></li> <li>▪ A103 - Peregrine Falcon <i>Falco peregrinus</i></li> <li>▪ A140 - Golden Plover <i>Pluvialis apricaria</i></li> <li>▪</li> </ul> <p><u>Article 4.2: Regularly occurring migratory birds – internationally important assemblage of breeding birds</u></p> <ul style="list-style-type: none"> <li>▪ No species are listed on the North Pennine Moors SPA citation as qualifying under Article 4.2</li> </ul> <p>Source: <a href="#">SPA citation</a></p>

\* Denotes priority feature

\*\* Present as a qualifying feature but not a primary reason for site selection

3.1.5 The Natural England website also provides guidance on this matter and states:

*“The legal list of qualifying species, for which a Special Protection Area (SPA) has been selected and is managed, is given on the relevant SPA citation (available from the country agency concerned). A review of the UK network of SPAs was co-ordinated by JNCC in the late 1990s. Following formal submission to, and agreement by, relevant Ministers, the results were published in 2001...*

*“However, it is taking some time to revise all the relevant SPA citations in light of the review. Where there is a mismatch between species listed in extant citations and listed in the 2001 Review for the same sites, there has been confusion as to the ‘correct’ list of qualifying species to be used at any site for purposes of management, assessment and development control.*

*“At sites where there remain differences between species listed in the 2001 Review and the extant site citation, then the relevant country agency should be contacted for further guidance.”*

3.1.6 We have sought advice from Natural England (pers. comm., 2014a) which indicated that the species listed on the SPA citation should be used in this assessment. The following sections provide a description of the features for which each European site has been classified or designated. Chapter 4 goes on to provide more detailed information regarding the disposition of these features in the vicinity of Bradford.

### **3.2 South Pennine Moors Phase 2 SPA**

3.2.1 The South Pennine Moors were designated as SPA in two phases in 1996 and 1997 and were further extended in 2000. This assessment focuses on the South Pennine Moors Phase 2 SPA only<sup>3</sup>. The site covers an area of some 20,937ha. It incorporates three component Sites of Special Scientific Interest (SSSI), including the South Pennine Moors SSSI, The Dark Peak SSSI and Standedge Road Cutting SSSI. It includes the major moorland areas of the northern South Pennines from Ilkley in the north to Chase Moss and Pule Hill near Marsden in the south. It covers extensive expanses of semi-natural moorland habitat including upland heath and blanket mire.

3.2.2 The SPA is of European importance for several upland breeding bird species, including birds of prey and waders. Both Merlin *Falco columbarius* and Golden Plover *Pluvialis apricaria* feed upon farmland or in-by-land on the edge of the moors that is outside of the SPA boundary; this is considered important to the long term conservation of the SPA population of these birds. The northern end of the South Pennine Moors SPA is within 10 km of the North Pennine Moors SPA which supports a similar assemblage of upland breeding species.

---

<sup>3</sup> The Peak District Moors (South Pennine Moors Phase 1) SPA is around 16.5km south of Bradford district at its nearest extent. It is considered to be a separate legal entity with its own citation, qualifying features and conservation objectives (which are not the same as those for South Pennine Moors Phase 2 SPA) and is not considered further in this assessment.

- 3.2.3 The South Pennine Moors Phase 2 SPA qualifies under Article 4.1<sup>4</sup> of the Birds Directive (2009/147/EC) by supporting breeding populations of European importance of the following species listed on Annex 1 of the Directive. Population numbers and significance are at time of designation unless otherwise stated:
- ▶ Merlin: 28 pairs representing at least 4.3% of the breeding population of Great Britain; and
  - ▶ Golden Plover: 292 pairs representing at least 1.2% of the breeding population of Great Britain.
- 3.2.4 The subsequent JNCC review, published in 2001, found that Peregrine Falcon *Falco peregrinus*, Short-eared Owl *Asio flammeus* and Dunlin *Calidris alpina schinzii* were also present in qualifying numbers.
- 3.2.5 The site also qualifies under Article 4.2<sup>5</sup> of the Birds Directive by supporting internationally important breeding populations of the following regularly occurring migratory species:
- ▶ Common Sandpiper, Short-eared Owl, Dunlin, Twite, Common Snipe, Curlew, Wheatear, Golden Plover, Whinchat, Redshank, Ring Ouzel and Lapwing.

### 3.3 North Pennine Moors SPA

- 3.3.1 The North Pennine Moors SPA extends north from the Ribble-Aire corridor (Skipton) to the Tyne Gap (Hexham) incorporating the Pennine moorland massif within the local authorities of North Yorkshire, Cumbria, Durham and Northumberland. It extends to a total of 147,246 hectares and encompasses extensive tracts of moorland habitat. It is important for several upland breeding bird species including waders and birds of prey.
- 3.3.2 The North Pennine Moors SPA qualifies under Article 4.1 of the Birds Directive by supporting breeding populations of the following species listed on Annex I of the Directive:
- ▶ Hen Harrier *Circus cyaneus*: 11 pairs representing at least 2.2% of the breeding population of Great Britain (count as at 1993 and 1994);
  - ▶ Merlin: 136 pairs representing at least 10.5% of the breeding population of Great Britain (count as at 1993 and 1994);
  - ▶ Peregrine: 15 pairs representing at least 1.3% of the breeding population of Great Britain (count as at 1991); and
  - ▶ Golden Plover: 1,400 pairs representing at least 6.2% of the breeding population in Great Britain (population minimum based on densities recorded 1960-1993).
- 3.3.3 The 2001 JNCC review found that Dunlin and Curlew *Numenius arquata* were also present in qualifying numbers. No species were listed in the original SPA citation as qualifying under Article 4.2.

---

<sup>4</sup> Article 4.1 relates to populations of birds listed on Annex I of the Birds Directive.

<sup>5</sup> Article 4.2 relates to regularly occurring migratory species not listed on Annex I.

### 3.4 South Pennine Moors SAC

3.4.1 The South Pennine Moors SAC was selected for its representation of three Annex 1 habitat types (European dry heaths, Blanket bogs, and Old sessile oak woodlands) while a further two were subsequently identified as being present as qualifying features within the SAC (Northern Atlantic wet heaths, and Transition mires and quaking bogs). These vegetation communities are described in detail in Chapter 4.

### 3.5 North Pennine Moors SAC

3.5.1 The North Pennine Moors SAC was selected for a total of six Annex 1 habitat types. A further seven habitat types were subsequently identified as being present as qualifying features. Four of the Annex 1 habitat types are the same as those within the South Pennine Moors SAC; Blanket bog, Dry heath, Northern Atlantic wet heath and Old sessile oak woodland. In addition to these extensive habitat types, the North Pennine Moors SAC also contains examples of a number of more localised Annex 1 habitat types:

- ▶ *Juniperus communis* formations on heaths or calcareous grasslands;
- ▶ Petrifying springs with tufa formation (*Cratoneurion*) \* Priority feature\*;
- ▶ Siliceous rocky slopes with chasmophytic vegetation;
- ▶ Calaminarian grasslands of the *Violetalia calaminariae*;
- ▶ Siliceous alpine and boreal grasslands;
- ▶ Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*);
- ▶ Alkaline fens;
- ▶ Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladanii*); and
- ▶ Calcareous rocky slopes with chasmophytic vegetation.

3.5.2 Marsh saxifrage (*Saxifraga hirculus*) is also present as a qualifying Annex II species. The distribution of many of these upland habitats is associated with calcareous and other rocky outcrops and heavy metal contaminated soils found further north in the Pennines and are not considered likely to be affected by proposals within the Bradford Core Strategy.

### 3.6 Conservation Objectives

3.6.1 The Habitats Directive requires that Member States maintain or where appropriate restore habitats and species populations of European importance to favourable conservation status. Guidance from the EC (2000b; p.19) states: “The conservation status of natural habitat types and species present on a site is assessed according to a number of criteria established by Article 1 of the Directive. This assessment is done both at site and network level”. In the UK, the term favourable condition has been used to differentiate the status of habitats and species populations on a given site, as compared to that of the wider network of European sites.

- 3.6.2 Regulation 102<sup>6</sup> requires that an Appropriate Assessment is made of the implications for each site in view of the site's conservation objectives. To make such an assessment, it is necessary to understand in more detail the features of the sites that contribute to their favourable condition or conservation status. Natural England has published detailed Favourable Condition Tables (FCT) in which various attributes of the habitat and species populations are defined for assessing site condition. These have been developed from the definition of Favourable Conservation Status provided in Article 1 of the Habitats Directive (**Box 1** overleaf).
- 3.6.3 The above descriptions of qualifying Annex 1 habitat types within the two SAC identifies a number of habitats, particularly within the North Pennine Moors SAC, that are not likely to be affected by policies within the Bradford Core Strategy. Conservation Objectives for the two SAC are therefore confined to the following four habitat types:
- ▶ European dry heaths;
  - ▶ Blanket bogs;
  - ▶ Northern Atlantic wet heaths with *Erica tetralix*; and
  - ▶ Transition mires and quaking bogs.
- 3.6.4 In addition to those habitats that are not likely to be affected by the Bradford Core Strategy, the location of the Annex II species marsh saxifrage is within the Yorkshire Dales National Park and is not likely to be affected.

**Box 1: Extract from Managing Natura 2000 Sites (EC, 2000)**

Conservation status is defined in Article 1 of the Habitats Directive. For a **natural habitat**, Article 1(e) specifies that it is: *'the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species ...'*.

For a species, Article 1(i) specifies that it is: *'the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its population ...'*

The Member State has therefore to take into account all the influences of the environment (air, water, soil, territory) which act on the habitats and species present on the site.

Favourable conservation status is also defined by Article 1(e) for natural habitats and Article 1(i) for species.

For a **natural habitat**, it occurs when:

- *'its natural range and areas it covers within that range are stable or increasing;*
- *the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and*
- *the conservation status of its typical species is favourable'*.

For a **species**, it occurs when:

- *'the population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations*

<sup>6</sup> Conservation of Habitats and Species Regulations 2010.

*on a long-term basis'.*

The favourable conservation status of a natural habitat or species has to be considered across its natural range, according to Articles 1(e) and 1(i), i.e. at biogeographical and, hence, Natura 2000 network level. Since, however, the ecological coherence of the network will depend on the contribution of each individual site to it and, hence, on the conservation status of the habitat types and species it hosts, the assessment of the favourable conservation status at site level will always be necessary.

The conservation status of natural habitat types and species present on a site is assessed according to a number of criteria established by Article 1 of the Directive. This assessment is done both at site and network level.

### **Conservation objectives of the South Pennine Moors Phase 2 SPA and North Pennine Moors SPA**

- 3.6.5 With regard to the South Pennine Moors Phase 2 SPA and North Pennine Moors SPA, and the individual species and/or assemblage of species for which the sites were classified (the Qualifying Features as listed at Table 3.1), an over-riding conservation objective has been defined by Natural England as:

*“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.”*

- 3.6.6 For the populations of birds within the two SPA, favourable conservation status can be defined by reference to article 1(i) (Box 1). Conservation objectives for the South Pennine Moors Phase 2 SPA and North Pennine Moors SPA would therefore be, subject to natural change, to maintain or restore the:

- ▶ **Objective 1:** Extent and distribution of the habitats of the qualifying features;
- ▶ **Objective 2:** Structure and function of the habitats of the qualifying features;
- ▶ **Objective 3:** Supporting processes on which the habitats of the qualifying features rely;
- ▶ **Objective 4:** Populations of the qualifying features; and
- ▶ **Objective 5:** Distribution of the qualifying features within the site.

### **Conservation objectives of the South Pennine Moors SAC and North Pennine Moors SAC**

- 3.6.7 With regard to the South Pennine Moors SAC and North Pennine Moors SAC, and the natural habitats and/or species for which the sites were designated (the Qualifying Features as listed at Table 3.1), an over-riding conservation objective has been defined by Natural England as:

*“Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features.”*

- 3.6.8 For the SAC habitats that might be affected by policies within the Bradford Core Strategy (listed in section 3.6.3), favourable conservation status can be defined by reference to article 1(e) (Box 1). Conservation objectives for the South Pennine Moors SAC and North Pennine Moors SAC would therefore be, subject to natural change, to maintain or restore the:

- ▶ **Objective 6:** Extent and distribution of the qualifying natural habitats;
- ▶ **Objective 7:** Structure and function (including typical species) of the qualifying natural habitats. A list of some of the typical species associated with the habitat types is given in Table 3.2; and
- ▶ **Objective 8:** Supporting processes on which the qualifying natural habitats rely.

3.6.9 From consideration of the distribution of qualifying habitats and species within the North Pennine Moors SAC (sections 3.5 and 4.3), it has been concluded that only those habitats that also occur within the South Pennine Moors SAC should be considered within the context of Objectives 6 - 8.

3.6.10 In relation to Conservation Objective 7 above, it is important to emphasise that typical species are used to help in assessing impacts on the structure and function of Annex 1 habitat types in accordance with Conservation Objective 7 and should not be regarded as equivalent to Annex II species for which an SAC can be selected, or confused with species for which the SPA have been classified. Some of the species typical of the Annex 1 habitats for the SAC were designated are listed in Table 3.2.

**Table 3.2: Some of the typical species of Annex 1 habitat types present with SAC**

Annex I Habitat Type	SAC in which it occurs	Typical species
4030 European dry heaths	South Pennine Moors SAC North Pennine Moors SAC	<u>Birds</u> Red Grouse <i>Lagopus lagopus scoticus</i> , Skylark <i>Alauda arvensis</i> , Meadow Pipit <i>Anthus pratensis</i> <u>Invertebrates</u> Bilberry Bumblebee <i>Bombus monticol</i> <u>Plants</u> Bilberry <i>Vaccinium myrtillus</i> , Crowberry <i>Empetrum nigrum ssp. nigrum</i> , Cowberry <i>Empetrum vitus-idaea</i> , Heather <i>Calluna vulgaris</i> , Bell Heather <i>Erica cinerea</i>
4010 Northern Atlantic wet heath with <i>Erica tetralix</i>	South Pennine Moors SAC North Pennine Moors SAC	<u>Birds</u> Curlew <i>Numenius arquata</i> <u>Plants</u> Heather, Cross-leaved Heath <i>Erica tetralix</i> , Deer Grass <i>Trichophorum cespitosum</i> , Bog Asphodel <i>Narthecium ossifragum</i>
7130 Blanket bogs *Priority feature*	South Pennine Moors SAC North Pennine Moors SAC	<u>Birds</u> Dunlin <i>Calidris alpina schinzii</i> , Golden Plover <i>Pluvialis apricaria</i> <u>Plants</u> Common Cotton-grass <i>Eriophorum angustifolium</i> , Hare's Tail Cotton-grass <i>Eriophorum vaginatum</i> , bog mosses <i>Sphagnum spp.</i>
7140 Transition mires and quaking bogs	South Pennine Moors SAC	<u>Plants</u> Bottle Sedge <i>Carex rostrata</i> , bog mosses



## 4 European Site Characterisation

### 4.1 SPA Bird Populations and Ecology

4.1.1 The following summaries have been adapted from the UK SPA Review, published by the Joint Nature Conservancy Committee (JNCC; 2001), together with a review of other available literature on the behaviour and ecology of these species.

#### **Golden Plover**

4.1.2 Golden Plovers are ground nesting birds, breeding on heather moorland, blanket bog, acidic grasslands and montane summits, where they prefer to nest on high, flat or gently sloping plateaux, away from the moorland edge. Adjacent pastures with abundant earthworms and crane-fly larvae are important for feeding adults, and chicks may be moved up to 2 km or more to feed in marshy areas rich in invertebrate food (Byrkjedal & Thompson, 1998)<sup>7</sup>. Breeding densities generally vary from 2–7 pairs/km<sup>2</sup>, but exceptionally have been recorded at 16 pairs/km<sup>2</sup> (Ratcliffe, 1976)<sup>8</sup>. Densities in Great Britain are some of the highest within the range (Byrkjedal & Thompson, 1998).

4.1.3 In Europe, breeding occurs through Iceland, Scandinavia, and the Baltic States, northern Russia and in northern/upland parts of Britain and Ireland. In Britain, the species is distributed widely throughout upland areas, with concentrations in northern and western Scotland and the north and south Pennines, and smaller outlying groups breeding in Wales and south-west England (Ratcliffe, 1976; Gibbons *et al.*, 1993<sup>9</sup>). In Ireland, the species breeds mainly in the northern and western uplands. Two-thirds of the British and Irish breeding population occur in Scotland. The English and Welsh populations breed at the southern edge of the species' global range (Gibbons *et al.*, 1993; Byrkjedal & Thompson, 1998).

4.1.4 The South Pennine Moors Phase 2 SPA is one of several in the UK that have been selected for their populations of breeding Golden Plover. Other sites and their populations are shown in Table 4.1.

4.1.5 Breeding Golden Plover populations have been adversely affected by loss of habitat from agricultural improvement and forestry development. A decline in Grouse moor management and associated keeping has also been implicated in declines in some upland areas. Numbers in Britain during the 1980s were estimated at 22,600 pairs, compared with 29,400 during 1968–1972 (Gibbons *et al.*, 1993).

---

<sup>7</sup> Byrkjedal, I. & Thompson, D.B.A. 1998. *Tundra Plovers. The Eurasian, Pacific and American Golden Plovers and Grey Plover*. London, T. & A.D. Poyser. 422 pp.

<sup>8</sup> Ratcliffe, D.A. 1976. Observations on the breeding of the Golden Plover in Great Britain. *Bird Study* **23**: 63-116.

<sup>9</sup> Gibbons, D.W., Reid, J.B. & Chapman, R.A. 1993 *The New Atlas of Breeding Birds in Britain and Ireland: 1988–1991*. London, T. & A.D. Poyser. 520 pp.

4.1.6 The 2005 South Pennine Moors Phase 2 SPA breeding bird survey identified a total of 132 Golden Plover registrations within 5km of settlement boundaries within Bradford. Fourteen of these registrations were from Rombalds/Ilkley Moor with the majority being located on the moors to the south and west of Haworth and Oxenhope; see Figure 4.1 and Figure 4.2. Data on the proximity of breeding Golden Plover to settlement boundaries within the North Pennine Moors SPA boundary is not available.

**Table 4.1: SPA selected for their populations of breeding Golden Plover and proportion of the national and biogeographic population they support**

Site name	Site total	% biogeographic pop. <sup>10</sup>	% of national pop.
Caithness and Sutherland Peatlands	1,064	0.2	4.7
Lewis Peatlands	1,978	0.4	8.8
Muirkirk and North Lowther Uplands	175	<0.1	0.8
North Pennine Moors	1,400	0.3	6.2
North York Moors	526	0.1	2.3
Pettigoe Plateau (NI)	12	<0.1	3.0 (Ire)
South Pennine Moors <sup>11</sup>	752	0.2	3.3
<b>TOTAL</b>	<b>5,907</b>	<b>1.2%</b>	<b>26.1%</b> <b>3.0% (Ire)</b>

4.1.7 A study undertaken by Whitfield and Thomas for Scottish Natural Heritage in 2006<sup>12</sup> centred on the use of moorland fringe fields by golden plover in east Sutherland around the Caithness and Sutherland Peatlands SPA, Scotland. They found golden plover moving up to 6km from the SPA boundary to feed (range 1–5,994m, mean 1,922 ± 1,387m). In the pre-breeding period and during incubation, adult birds flew an average of 2.7km to feed on fields (range 0.4–10.7km) with strong fidelity within and across years to the same field and parts of a field.

4.1.8 The use of moorland fringe habitats in other locations is also reviewed by Whitfield and Thomas (2006). They refer to two studies in northern England, (Whittingham *et al.*, 2000<sup>13</sup>; Pearce-Higgins & Yalden, 2003<sup>14</sup>).

<sup>10</sup> Numbers breeding in Europe (Iceland, Scandinavia, and the Baltic States, northern Russia and northern/upland parts of Britain and Ireland).


<sup>11</sup> The figures quoted for the South Pennine Moors relate to both Phases 1 and 2 of the classification.

<sup>12</sup> Whitfield, D. P. & Thomas, C. J. (2006). *Analysis of a survey of golden plover around the Caithness and Sutherland Peatlands Special Protection Area*. Scottish Natural Heritage Commissioned Report No. 181 (ROAME No. F01LB205/5).

<sup>13</sup> Whittingham, M.J., Percival, S.M. & Brown, A.F. (2000). Time budgets and foraging of breeding goldenplover *Pluvialis apricaria*. *Journal of Applied Ecology*, **37**, 632–646.

<sup>14</sup> Pearce-Higgins, J.W. & Yalden, D.W. (2003). Variation in the use of pasture by breeding European golden plovers *Pluvialis apricaria* in relation to prey availability. *Ibis*, **145**, 365–381.

# South Pennine Moors Breeding Bird Survey Registrations (2005)

-  Common Sandpiper
-  Curlew
-  Dunlin
-  Golden Plover
-  Lapwing
-  Merlin
-  Peregrine
-  Redshank
-  Ring Ouzel
-  Short-eared Owl
-  Snipe
-  Twite
-  Wheatear
-  Whinchat
-  SPA
-  CBMDC Outline
-  CBMDC Settlements



Contains data from West Yorkshire Ecology 2012  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



ENVIRONMENTAL  
CONSULTING  
Unit 5 Westergate  
Business Centre  
Brighton  
BN2 4QN

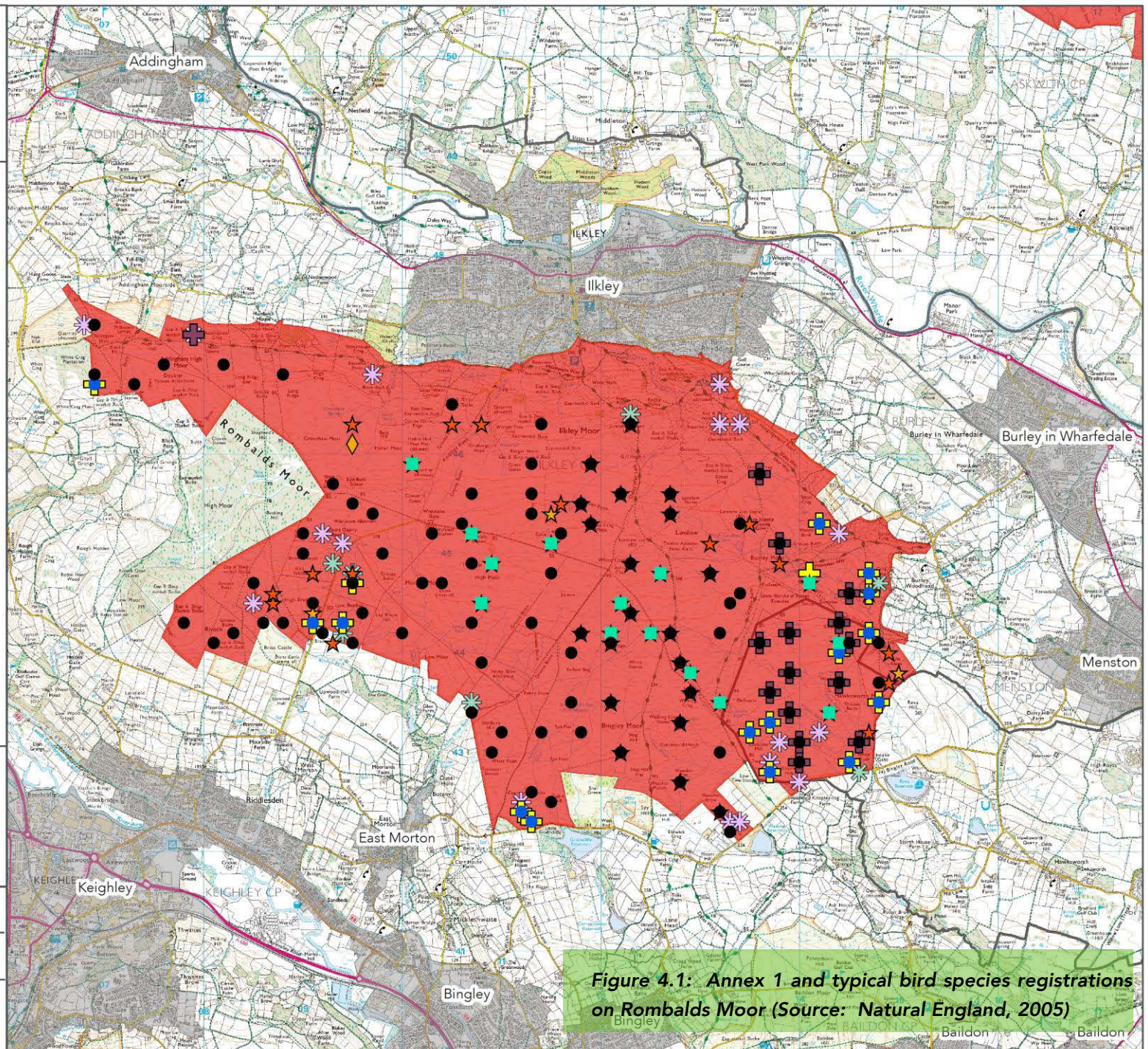
Scale  
1:50,838

Date  
Nov2012

Created by  
SS

Reviewed by  
NP

Drawing number  
UE-0112\_Bradford\_SPABird  
distrib\_1a\_121115



**Figure 4.1: Annex 1 and typical bird species registrations on Rombalds Moor (Source: Natural England, 2005)**

# South Pennine Moors Breeding Bird Survey Registrations (2005)

- ◆ Common Sandpiper
- Curlew
- ★ Dunlin
- Golden Plover
- Lapwing
- ▼ Merlin
- ▲ Peregrine
- ★ Redshank
- + Ring Ouzel
- ◆ Short-eared Owl
- ★ Snipe
- + Twite
- ✱ Wheatear
- ✱ Whinchat
- SPA
- CBMDC Outline
- CBMDC Settlements



Contains data from West Yorkshire Ecology 2012  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1:82,222	<b>Date</b> Nov2012
<b>Created by</b> SS	<b>Reviewed by</b> NP

**Drawing number**  
 UE-0112\_Bradford\_SPAbird  
 distrib\_2a\_121115

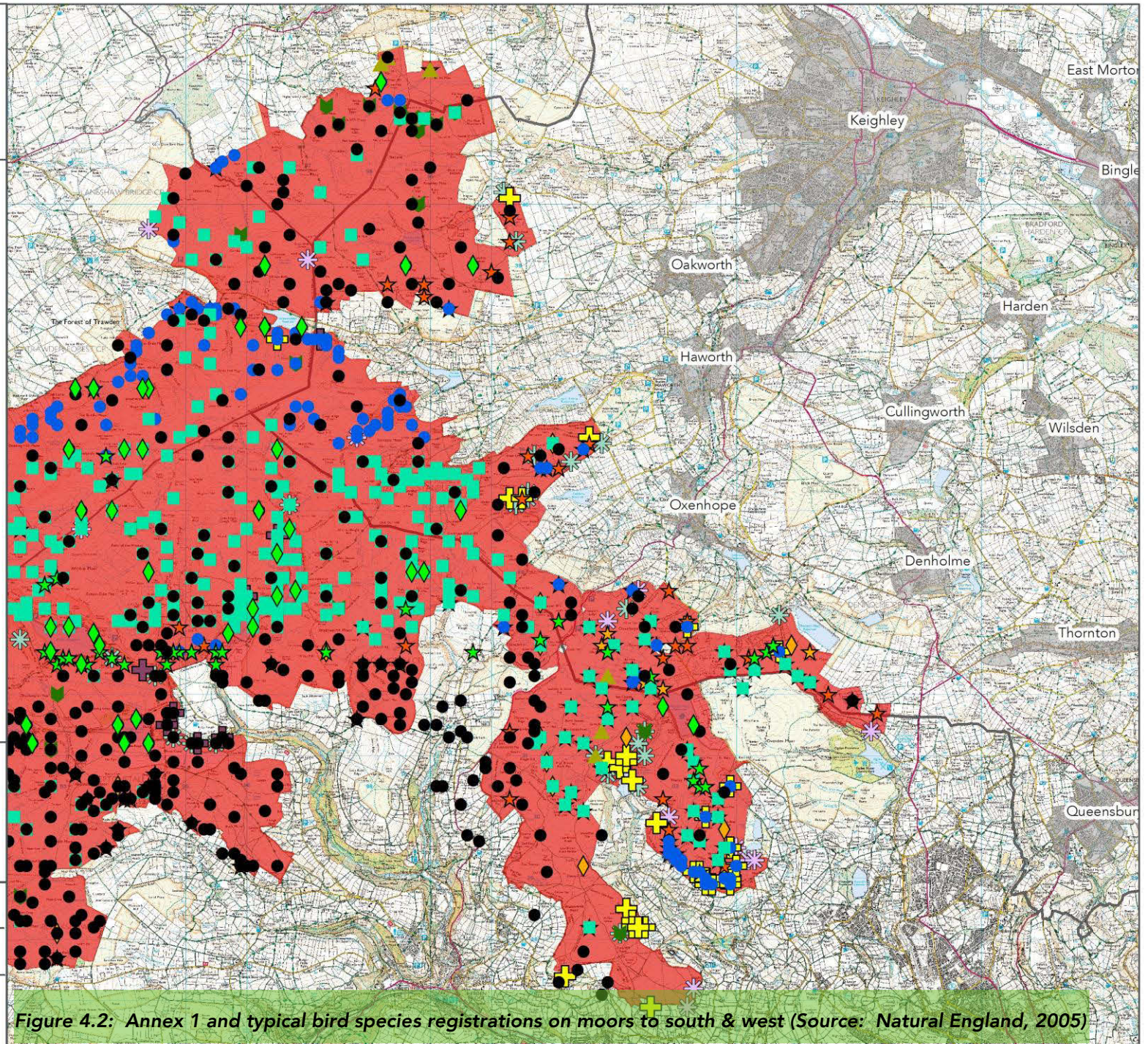


Figure 4.2: Annex 1 and typical bird species registrations on moors to south & west (Source: Natural England, 2005)

- 4.1.9 Both studies found females used fields during the day, and males at night, but it was apparent that field choice could differ between males and females, notably in the South Pennines study when males used fields closer to breeding sites than their mates (Pearce-Higgins & Yalden, 2003). Distances travelled to fields from nests was similar to east Sutherland, with mean distances of 2.1–2.7km in North Pennines (range 1.2–3.7km: Whittingham *et al.*, 2000) and 6.6–7.2km (max. 8.2km: females) or 2.4–2.7km (max. 4.2km: males) in South Pennines (Pearce-Higgins & Yalden, 2003).
- 4.1.10 Both studies also indicated that use of fields for feeding was greater than in east Sutherland. For example, whereas field use virtually stopped when chicks hatched in Sutherland, parents continued to feed in fields to some degree in northern England during this phase of the breeding cycle, especially in the South Pennines. Field size was an influential factor in north Pennines (larger fields selected) but not in south Pennines, and sward height was important in south Pennines (shorter swards selected) but not in north Pennines. Evidence suggested that earthworms (north Pennines) and tipulid larvae (south Pennines) were influential in determining plovers' choice of fields.

### **Merlin**

- 4.1.11 The Merlin is a small dashing Falcon that feeds mostly on small birds such as Meadow Pipit *Anthus pratensis* and Skylark *Alauda arvensis*. Merlin breed on heather moorland across the uplands of Britain. They traditionally build their nest on the ground in the cover of heather but are now more frequently using tree nest sites. Ground nesting is a peculiar feature of British nesting Merlin and may only be possible where mammalian predators are controlled on moors managed for Grouse shooting (Gibbons *et al.*, 1993).
- 4.1.12 In Europe there are an estimated 10,166–16,612 pairs, with the largest numbers occurring in Sweden, Norway and Finland – each of which holds more than 2,000 pairs. The Great Britain population was estimated at 1,128 pairs in 2008<sup>15</sup>. In the breeding season, the UK's SPA suite for Merlin supports, on average, 426 pairs. This amounts to about a third of the British breeding population.
- 4.1.13 The British breeding population was thought to have declined from the 1950s until the early 1990s, initially as a result of organochlorine and other pesticide contamination, and more recently through habitat loss (Gibbons *et al.*, 1993). The first national Merlin survey in 1983–84 returned a population estimate of 550–650 breeding pairs for Britain (Bibby & Natrass, 1986). A second national Merlin survey in 1993–94 estimated the British population as 1,291 breeding pairs (95% CI: 1108–1500; Rebecca & Bainbridge, 1998), providing evidence that the population had increased since 1983–84. This increase may be partly due to increased tree nesting and use of woodland edge nest sites<sup>16</sup>. As a result the Merlin has moved from being Red listed in 2001 to Amber listed in Birds of Conservation Concern 3 (2009)<sup>17</sup>.

---

<sup>15</sup> Ewing, S.R., Rebecca, G.W., Heavisides, A., Court, I., Lindley, P., Ruddock, M., CoHen, S. & Eaton, M.A. (2011) Breeding status of the Merlin *Falco columbarius* in the UK in 2008. *Bird Study* **58**: 379–389

<sup>16</sup> Little, B., Davison, M. & Jardine, D. (1995) Merlins *Falco columbarius* in Kielder Forest: influences of habitat on breeding performance. *Forest Ecology and Management* **79**: 147–152.

- 4.1.14 Information on the population of Merlin in England, and the South Pennine Moors in particular, has been extracted from Ewing *et al.* (2008). This suggests significant regional declines in the three main upland areas of England between the 1993-94 survey and 2008, with a 47% decline in the South Pennine Moors and North York Moors and a 67% decline in Northumbria. The figures extracted are reproduced in Table 4.2. These declines may be due to equivalent declines in the main prey species of Merlin in these uplands with declines in the numbers of Meadow Pipit, Skylark and Wheatear *Oenanthe oenanthe* all recorded over this same time period. Ewing *et al.* (2008) suggest that changes in Grouse moor management with increased levels of moor burning may also be significant.
- 4.1.15 The 2005 South Pennine Moors breeding bird survey recorded 11 registrations for Merlin within 5km of settlement boundaries within the Bradford area. These were concentrated in two areas, one south west Steeton and a second (single registration) south of Oxenhope.

**Table 4.2: Changes in Merlin population within northern England from Ewing *et al.* (2008)**

Site name	Breeding pairs 1993-94	Breeding pairs 2008	% change
South Pennine Moors	55	29	-47
North York Moors	36	19	-47
Northumbria	39	12	-67

- 4.1.16 Information on use of supporting habitat by Merlin is very limited and, while they will hunt several kilometres from the nest, they are generally thought to confine their activity to the moorland within the SPA, or to a tight buffer around its margins, where its primary prey species (meadow pipit) is abundant (Murison, unpubl.). More information is available on effects of recreational disturbance although even this is rather inconclusive. The following extracts from Newton *et al.* (1981)<sup>18</sup> are of interest.

*“Of the 16 sites which were used after 1970, 14 are remote from footpaths, and therefore relatively undisturbed. This may indicate that, as the Merlin has become scarcer, it has avoided the most disturbed areas. Newton et al (1978) noted that two of their five 'lost' sites had suffered from disturbance.*

*“The negotiation of access agreements between moorland owners and the Peak Park Planning Board has not produced a negative correlation between access areas and Merlins. However, there was a negative correlation between latter-day Merlin sites and nearby footpaths, which might suggest a sensitivity to disturbance. Since the enormous increase in outdoor recreation in the Peak District occurred mainly during the 1970s, it is unlikely to have accounted for the sharp decline in Merlins during the 1950s. It could, perhaps, delay or prevent recolonisation in future, but given the tendencies of walkers to follow well-known footpaths and to walk (where possible) along ridges rather than in*

Rebecca, G.W. (2011) Spatial and habitat-related influences on the breeding performance of Merlins in Britain. *British Birds* **104**: 202–216.

<sup>17</sup> [http://www.rspb.org.uk/Images/BoCC\\_tcm9-217852.pdf](http://www.rspb.org.uk/Images/BoCC_tcm9-217852.pdf)

<sup>18</sup> Dr I. Newton, J. E. Robinson & Dr D. W. Yalden (1981): Decline of the Merlin in the Peak District, *Bird Study*, **28**:3, 225-234.

*cloughs, there should be sufficient undisturbed sites for numbers of Merlins to breed successfully."*

- 4.1.17 References to feeding stress the importance of small passerines (Meadow Pipit and Skylark) which suggests that they will hunt in any habitat near to the open moorland that supports high densities of these birds. This could include in-by-land within close proximity to the moorland fringe.
- 4.1.18 During winter, Merlin move to the coast or lower altitude habitat where there are concentrations of wintering passerines. There is no clear geographical relationship with the upland breeding habitats and no obvious link between the Pennine moorland fringe and wintering Merlin habitat.

### **Short-eared Owl**

- 4.1.19 Although not forming part of the Article 4.1 qualification for the South Pennine Moors Phase 2 SPA on the original citation, Short-eared Owl was found to be present in qualifying numbers during the JNCC SPA Review published in 2001. David Glue describes the habitat requirements for breeding Short-eared Owls in Gibbons (1993) as follows; *"The primary requirements for successful nesting by Short-eared Owls are an extensive tract of open ground, a substantial population of small mammal prey, and freedom from persistent disturbance by ground predators including man."* Apart from a few isolated populations in the south east, the English distribution of Short-eared Owl is centred on the upland moors, from north Staffordshire northwards to the Scottish border.
- 4.1.20 The nest is normally concealed in tall heather and coarse grass and, following hatching, is normally only visited by adults after dark. In addition, populations can change dramatically following good field vole years when prey abundance is high. Populations can also be temporarily enhanced following the creation of forestry plantations which provide high numbers of voles in the early stages of tree establishment, but this declines as the canopy closes. These factors make census of numbers particularly difficult and the last national population estimate of 1988-91 gives a wide range of between 1,000-3,500 pairs. There is concern that the population is declining in the UK, and the 2009 report of Rare Breeding Birds in the UK (Holling et al., 2010) added this species to its list as it had estimated that numbers had dropped below 1,500 pairs. Despite this, it is still included on the Amber list of the Birds of Conservation Concern (BoCC 3).
- 4.1.21 During the breeding season, the UK's SPA suite for Short-eared Owl supports, on average about 131 pairs. This amounts to about 13% of the British breeding population and about 1% of the international population; see Table 4.3.
- 4.1.22 The 2005 South Pennine Moors breeding bird survey recorded 11 registrations for Short-eared Owl within 5km of settlement boundaries within the Bradford area. One registration was from the west of Rombalds Moor with the remaining 10 registrations to the south and west of Oxenhope and Haworth.

4.1.23 Relatively few references exist in research to date in relation to the use by Short-eared Owls of supporting habitat associated with upland moorlands. Lawton Roberts & Bowman (1986)<sup>19</sup> provide evidence of prey preferences which in moorland tends to be dominated by pigmy shrews reflecting the relative abundance of these small mammals in this habitat. They also state;

*“Borrero (1962) stated that Short-eared Owls normally hunt within a few hundred metres of the nest. In contrast, we rarely saw one hunting closer than 500 m to a nest and— though our observations were casual and scattered— we felt that the birds were wandering widely in search of food. None was seen to hunt over the adjacent agricultural land.*

*“In our Calluna dominated study area the Pigmy Shrew, probably the most numerous small mammal, is also the most frequent prey of the breeding Short-eared Owls.”*

4.1.24 Murison (unpubl.) discusses an average foraging distance of 1.5-4.5km from the nest. However, this may be restricted to within moorland habitats and the number of observations was too low to draw conclusions regarding foraging habitat preferences.

**Table 4.3: Distribution of Short-eared Owls within SPA in Britain (JNCC, 2001)**

Site name	Site total	% of biogeographic pop.	% of national pop.
Caithness and Sutherland Peatlands	30	0.2	3.00
Forest of Clunie	20	0.1	2.00
Muirkirk and North Lowther Uplands	30	0.2	3.00
Orkney Mainland Moors	20	0.1	2.00
Skomer and Skokholm	6	<0.1	0.60
South Pennine Moors	25	0.2	2.50
<b>TOTAL</b>	<b>131</b>	<b>1.0%</b>	<b>13.1%</b>

### **Peregrine Falcon**

4.1.25 Peregrine Falcon is a qualifying species for the North Pennine Moors SPA and was found to be present in qualifying numbers within the South Pennine Moors Phase 2 SPA following the JNCC Review published in 2001. Since the well documented declines in Peregrine populations caused by organochlorine pesticide poisoning in the 1950s and 60s, the population has recovered strongly throughout Britain. This has involved both increases in breeding density and occupation of new or long deserted breeding haunts. This increase has resulted in a greater range of nest sites being used; in addition the traditional rocky cliff or crag nest sites, birds have

<sup>19</sup> John Lawton Roberts & Neil Bowman (1986): Diet and ecology of Short-eared Owls *Asio flammeus* breeding on heather moor, *Bird Study*, 33:1, 12-17.



exploited 'walk-in' nest sites on tiny crags as well as genuine ground nest sites and widespread exploitation of ledges on tall buildings in urban areas.

- 4.1.26 Peregrines occur widely throughout Europe, although they are generally highly dispersed and nest at low densities. As elsewhere in the species' global range, breeding distribution is determined by the availability of suitable nest sites (usually cliffs, or other habitats to which the Peregrine has adapted locally). The European population is estimated at 5,633–6,075 pairs. This represents approximately one-fifth of the world population (Hagemeijer & Blair, 1997).
- 4.1.27 The number of UK breeding pairs has been censused every ten years since 1961 by BTO/JNCC/RSPB/Raptor Study Groups, and has been estimated as follows: 1961 - 385 pairs; 1971 - 489 pairs; 1981 - 728 pairs; 1991 - 1,283 pairs (Ratcliffe 1993<sup>20</sup>). The National Peregrine Survey 2002<sup>21</sup> found 1,437 breeding pairs in the UK and Isle of Man, a further 12% increase overall since 1991 but with declines in north and west Scotland, North Wales and Northern Ireland (Banks et al. 2003<sup>22</sup>).
- 4.1.28 The Rare Breeding Birds Panel<sup>23</sup> report for 2009 recorded 833–1,046 pairs, with 34 occupied territories in Yorkshire, 9 in Greater Manchester and 29 in Lancashire and North Merseyside. This conceals increases in all regions of England (by 11%) and in Wales (19%), which are offset by a decline in the reporting rate in Scotland and Northern Ireland. Low site occupation and productivity was reported from study areas where much of the land is managed as grouse moor.
- 4.1.29 The 2005 South Pennine Moors breeding bird survey recorded six registrations for Peregrine Falcon within 5km of settlement boundaries within the Bradford area. These were concentrated in two areas, one south-west of Oxenhope and a second south west of Steeton.

### **Hen Harrier**

- 4.1.30 Hen Harrier is a qualifying species for the North Pennine Moors SPA. Like other moorland raptors, the Hen Harrier is a ground nesting bird, constructing its nest in areas of mature heather and tall grass. Although a few birds remain in the vicinity of the moors during the winter most birds migrate to the coastal marshes especially within the East Anglia estuaries, the Dee estuary, Greater Thames estuary and Solent area. In these regions, Hen Harriers hunt especially over salt-marshes taking small passerines, small mammals and waders.
- 4.1.31 The national population of breeding Hen Harriers was estimated by Sim *et al.* in 1998 at 570 pairs (500-640) rising to 806 (732-889) territorial pairs in 2004 (Sim *et al.*, 2007). The Rare Breeding Bird Panel (Holling & RBBP, 2011) recorded 646 territorial pairs in 2010.
- 4.1.32 Hen Harriers have been included on the Red list of Birds of Conservation Concern 3. This reflects the substantial declines over the last two centuries. The UK population was unchanged

---

<sup>20</sup> Ratcliffe, D.A. (1993) *The Peregrine Falcon*. Second Edition. T. & A.D. Poyser, London

<sup>21</sup> Banks, A.N., Crick, H.Q.P., Coombes, R., Benn, S., Ratcliffe, D.A. & Humphreys, E.M. (2010) The breeding status of Peregrine Falcons *Falco peregrinus* in the UK and Isle of Man in 2002. *Bird Study* **57**: 421–436

<sup>22</sup> Banks, A.N., Coombes, R.H. & Crick, H.Q.P. (2003) *The Peregrine Falcon breeding population of the UK & Isle of Mann in 2002*. Research Report 330. BTO, Thetford.

<sup>23</sup> Holling, M. & the Rare Breeding Birds Panel (2011) Rare breeding birds in the United Kingdom in 2009. *British Birds* **104**: 476–537

between surveys in 1988-89 and 1998, with declines in Orkney and England but increases in Northern Ireland and the Isle of Man. A 41% increase was recorded in the UK and Isle of Man during 1998-2004, possibly due to increased use of non-moorland habitats, but with decreases in the Southern Uplands, east Highlands and England, all being areas with many managed Grouse moors. The latest survey, in 2010, reveals a decline of almost 20% since the 2004 survey in these areas (Holling & RBBP, 2011)<sup>24</sup>. Hen Harriers are now almost extinct as a breeding bird in England with only four pairs successfully raising young within the Forest of Bowland, Lancashire in 2011.

- 4.1.33 Hen Harrier is a species for which the North Pennine Moors SPA has been classified, however, there are currently no breeding birds in this part of England. Efforts to restore this species to the SPA and potentially the South Pennine Moors SPA should not be compromised by policies in the Bradford Core Strategy.
- 4.1.34 Hen Harriers, like Merlin, are known to feed extensively on small passerine birds such as Meadow Pipit and Skylark. In winter, they migrate from the uplands to lowland coastal and farmland habitats where these and other prey species congregate. The recently published Conservation Framework (Fielding *et al.* 2011) for Hen Harrier in the UK provides further information on its prey. This re-enforces the conclusions of other studies that there is a need to conserve habitats supporting the moorland nest sites at a landscape scale.
- 4.1.35 Hen Harrier have not bred within the vicinity of Bradford for many years but are a feature of the North Pennine Moors SPA. In byelands could provide important hunting habitat for Hen Harrier (as well as Merlin) but limited information is available on the distribution of potential prey species within these habitats associated with the Pennine Moors SPAs.

#### **South Pennine Moors Internationally Important Assemblage of Birds**

- 4.1.36 The species listed as components of the Internationally Important Assemblage of Birds within the South Pennine Moors (Phase 2) SPA citation are listed in section 3. They include Short-eared Owl (*Asio flammeus*) and eleven other species which can be sub-divided into the following two groups:
- ▶ **Breeding waders:** Common Sandpiper (*Actitis hypoleucos*), Dunlin (*Calidris alpina schinzii*), Common Snipe (*Gallinago gallinago*), Curlew (*Numenius arquata*), Golden Plover (*Pluvialis apricaria*), Lapwing (*Vanellus vanellus*) and Redshank (*Tringa totanus*); and
  - ▶ **Breeding passerines:** Twite (*Carduelis flavirostris*), Northern Wheatear (*Oenanthe oenanthe*), Whinchat (*Saxicola rubetra*) and Ring Ouzel (*Turdus torquatus*).

#### **Breeding waders**

- 4.1.37 Seven species of breeding wading bird have been identified within the internationally important assemblage of birds for which the South Pennine Moors was classified under Article 4.2 of the Birds Directive. Breeding Dunlin are characteristic of moorland and upland habitats and this is reflected in the species' breeding distribution in the UK. Concentrations are found in the Flow Country of Caithness and Sutherland, and peat moors in the Orkneys, Shetland, Grampians,

<sup>24</sup> <http://blx1.bto.org/birdtrends/species.jsp?&s=Henha>

Pennines and Outer Hebrides (Gibbons *et al.*, 1993). Dunlin breeding in Britain and Ireland are of the temperate population of *C. a. schinzii* which also occurs in the Baltic region. The UK breeding population of Dunlin is estimated to be 9,150 pairs (Stone *et al.* 1997, based on Reed 1985), which represents 83% of the biogeographic population. No information is available concerning population change at a national level, although there have been documented declines in some regions of Britain where forestry has been implicated in displacing breeding Dunlin from peatlands. The population of Dunlin that breed in Britain *C. a. schinzii* are migratory and winter on the coast of west Africa. In the breeding season, the UK's SPA suite for Dunlin supports, on average, 6,812 pairs. This amounts to about 74% of the British breeding population. The suite contains about 62% of the international population. The latest estimate of the Dunlin population within the South Pennine Moors SPA is 62 pairs. The 2005 South Pennine Moors breeding bird survey recorded 15 registrations for Dunlin within 5km of settlement boundaries within the Bradford area. These were concentrated in an area to the west and south-west of Oxenhope. Figures for Dunlin populations currently nesting in the North Pennine Moors SPA are not available.

4.1.38 Breeding Curlew populations within the North Pennine Moors SPA meet selection criteria for this species but numbers in the South Pennine Moors are insufficient to cross the selection threshold of 1% of the international (biogeographic) population. In Europe, Curlew have an essentially northern temperate distribution, occurring in greatest numbers in Scandinavia, the Low Countries (especially The Netherlands) and in Britain and Ireland (Hagemeyer & Blair, 1997). Their distribution becomes thinner and more localised in the south of Europe (France, southern Germany and Hungary). The Curlew is a widespread breeding species throughout much of Britain, but is absent from most parts of south-east England, and is sporadic in south-west England, north-west Scotland and parts of Ireland. It is most common in the North Pennines, the Southern Uplands of Scotland, parts of the east Highlands, Caithness, Orkney and Shetland. Despite its recent expansion into lowland agricultural habitats, the species is still more abundant in uplands and northern regions where there are extensive areas of moorland and rough grazing. Variation in breeding densities show that nesting Curlews prefer low intensity agricultural habitats (Gibbons *et al.*, 1993). In the UK, there has been no further expansion of the breeding range in the last 20 years and the distribution has not altered since 1968-72 (Sharrock, 1976). Population declines have been recorded in Northern Ireland and the North Staffordshire Moors (Grant, 1998) but not in recent extensive re-surveys of farmland habitats in Scotland and northern England (O'Brien, unpubl. data). Declines are likely to be associated with recent agricultural improvements, such as land drainage and re-seeding of moorlands, though increases in nest and chick predation rates are also implicated in causing declines (Grant *et al.*, 1999). The North Pennine Moors SPA is reported to support 3,930 pairs of nesting Curlew or 3.3% of the international (biogeographic) population and 11.9% of the national population<sup>25</sup>. The 2005 South Pennine Moors breeding bird survey recorded 946 registrations for Curlew.

4.1.39 Common Sandpiper, Snipe, Lapwing and Redshank are all ground nesting waders, each selecting slightly different habitat types in which to construct their nest ranging from wet marshy grassland to blanket bog and mire. The young of these birds are nidifugous, that is they leave the nest shortly after hatching to feed themselves under the protection of their parents. They

remain unable to fly for several weeks after hatching and need to be able to walk from the nest site to nearby feeding habitat. This may contrast with the nest habitat type and include pond, lake and river banks, marshy grassland and rush pasture. This supporting habitat may not be within the designated SPA boundary. Conservation of this group of birds is therefore dependent upon the maintenance of both nesting habitat and the correct supporting habitat for feeding.

- 4.1.40 The breeding strategy of wading birds contrasts with passerine or song birds whose young remain in the nest for several weeks after hatching and are fed by their parents (i.e. are nidicolous).

#### ***Breeding passerines***

- 4.1.41 The four species of migratory passerines that contribute to the important breeding bird assemblage include Twite, Northern Wheatear, Whinchat and Ring Ouzel. These four birds have very different breeding requirements associated with the heathland, acid grassland and scrub habitats found within the SPA. As with the breeding waders, supporting habitat outside of the SPA boundary is important for breeding Twite.
- 4.1.42 A comprehensive study of breeding ecology of Twite was commissioned by English Nature in 1994<sup>26</sup> focusing on twite nesting on the South Pennines in West Yorkshire. Nests were located in areas of bracken and heather moorland but the birds travelled up to c.2.6km from the nest site to feed on fields rich in unripened dandelion seeds and sorrel seeds. The research showed a strong selection for fields with high densities of these plants, and the birds abandoned fields with high dandelion density for fields with high sorrel density after the dandelions lost their seeds. Densities of these preferred food species were found to be highest in unimproved meadows and lowest in improved pastures and reseeded grasslands. Twite populations have declined nationally and within the South Pennines. It is a Red listed species in Birds of Conservation Concern<sup>27</sup>.
- 4.1.43 Wheatear nest in areas of short sheep- or rabbit-grazed grassland where there is an abundance of grass root caterpillars. They build their nest under rocks, in mountain screes or holes in stone walls. Numbers of Wheatear have declined in the UK and it is an Amber listed species within Birds of Conservation Concern.
- 4.1.44 By contrast, Whinchat are a species of low scrub, with low gorse scrub being the preferred nesting habitat. Birds feed in areas of short grass and in particular roadside verges. Whinchat numbers have declined in the UK and it is an Amber listed species within Birds of Conservation Concern.
- 4.1.45 The Ring Ouzel is a species of rock outcrops and steep sided valleys. In the south Pennines, heather and bracken abundance are important for nesting cover whilst presence of nearby

---

<sup>26</sup> McGhie, H.A., Brown, A.F., Reed, S. and Bates, S.M. (1994). *Aspects of the Breeding Ecology of Twite in the South Pennines*. English Nature Research Reports No. 118.

<sup>27</sup> Mark A. Eaton, Andy F. Brown, David G. Noble, Andy J. Musgrove, Richard D. Hearn, Nicholas J. Aebischer, David W. Gibbons, Andy Evans and Richard D. Gregory. (2009). *Birds of Conservation Concern 3 The population status of birds in the United Kingdom, Channel Islands and Isle of Man*. British Birds 102. 296–341

pasture for feeding is of overriding importance. Numbers of nesting Ring Ouzel have declined significantly and it is a Red listed species within Birds of Conservation Concern.

- 4.1.46 Wheatear, Whinchat and Ring Ouzel nesting within the SPA are unlikely to be travelling from the SPA to utilise supporting habitat outside of the SPA boundary during the breeding season.

## **4.2 Habitats of South Pennine Moors SAC**

- 4.2.1 The following paragraphs are adapted from the JNCC site characterisation of the South Pennine Moors SAC<sup>28</sup>.

### **European dry heaths**

- 4.2.2 The site is representative of upland dry heath at the southern end of the Pennine range, the habitat's most south-easterly upland location in the UK. Dry heath covers extensive areas, occupies the lower slopes of the moors on mineral soils or where peat is thin, and occurs in transitions to acid grassland, wet heath and blanket bogs.

- 4.2.3 The upland heath of the South Pennines is strongly dominated by heather *Calluna vulgaris*. Its main NVC types are H9 *Calluna vulgaris* – *Deschampsia flexuosa* heath and H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath. More rarely H8 *Calluna vulgaris* – *Ulex gallii* heath and H10 *Calluna vulgaris* – *Erica cinerea* heath are found. On the higher, more exposed ground H18 *Vaccinium myrtillus* – *Deschampsia flexuosa* heath becomes more prominent. In the cloughs, or valleys, which extend into the heather moorlands, a greater mix of dwarf shrubs can be found together with more lichens and mosses. The moors support a rich invertebrate fauna, especially moths, and important bird assemblages.

### **Blanket bogs (\*priority feature\*)**

- 4.2.4 This site represents blanket bog in the south Pennines, the most south-easterly occurrence of the habitat in Europe. The bog vegetation communities are botanically poor. Hare's-tail cottongrass *Eriophorum vaginatum* is often overwhelmingly dominant and the usual bog-building *Sphagnum* mosses are scarce. Where the blanket peats are slightly drier, heather *Calluna vulgaris*, crowberry *Empetrum nigrum* and bilberry *Vaccinium myrtillus* become more prominent. The uncommon cloudberry *Rubus chamaemorus* is locally abundant in bog vegetation. Bog pools provide diversity and are often characterised by common cottongrass *E. angustifolium*. Substantial areas of the bog surface are eroding, and there are extensive areas of bare peat. In some areas erosion may be a natural process reflecting the great age (9000 years) of the south Pennine peats.

- 4.2.5 Blanket bog and dry heath often form intimate mosaics of vegetation in the South Pennine Moors and have been mapped as mosaics within the most recently produced vegetation survey of the SAC (West Yorkshire Ecology, 2009). This makes it difficult to calculate the area of each of these two Annex 1 habitats in the vicinity of Bradford, however, an estimation is given in Table 4.4.

---

<sup>28</sup> <http://jncc.defra.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030280>

- 4.2.6 An area of 1,783 hectares of blanket bog has been identified from the South Pennines SAC that falls within 5km of the settlements in the Bradford area. A total of 1,361 hectares of H9 dry heath and 149 hectares of H12 dry heath were also mapped within this area; see Figure 4.3 and Figure 4.4.

**Table 4.4: Area of Annex I habitats within the South Pennine Moors SAC (West Yorkshire Ecology, 2009)**

Habitat	Area (ha)
H9 Dry heath	2,161
H12 Dry heath	418
Undefined Blanket bog	6,855
M19 Blanket bog	299
M20 Blanket bog	4,758

**Old sessile oak woods with Ilex and Blechnum in the British Isles**

- 4.2.7 Around the fringes of the upland heath and bog of the south Pennines are blocks of old sessile oak woods, usually on slopes. These tend to be dryer than those further north and west, such that the bryophyte communities are less developed (although this lowered diversity may in some instances have been exaggerated by the effects of 19<sup>th</sup> century air pollution). Other components of the ground flora such as grasses, dwarf shrubs and ferns are common. Small areas of alder woodland along stream-sides add to the overall richness of the woods.
- 4.2.8 The extent and location of this woodland habitat type in the vicinity of the Bradford area was not included in the 2009 vegetation survey of the South Pennine Moors. However, reference to the Ancient Woodland Inventory shows that the nearest area of ancient woodland within either of the two SAC is Guisecliff Wood (North Pennine Moors SAC) near Glasshouses, over 15km to the north of the Bradford district boundary, and is not likely to be affected by policies within the Core Strategy.
- 4.2.9 In addition to the Annex 1 habitats for which this SAC was originally selected, it also supports two additional habitats that are present as qualifying features. These are Northern Atlantic wet heath and Transition mires and quaking bogs.

**Northern Atlantic wet heaths with Erica tetralix**

- 4.2.10 Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath *Erica tetralix*, heather *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses.

# South Pennine Moors SAC Annex 1 Habitats (2005)

-  Blanket Bog: Spp. poor, Molinia & dry
-  European Dry Heath: H12 Calluna vulgaris-Vaccinium myrtillus
-  European Dry Heath: H9 Calluna vulgaris-Deschampsia flexuosa
-  Blanket Bog: M19 Calluna vulgaris-Eriophorum vaginatum
-  Blanket Bog: M20 Eriophorum vaginatum blanket mire
-  Transition Mire: M4 Carex rostrata-Sphagnum recurvum
-  Molinia Wet Heath (not Ax.1 habitat - mostly degraded and M25)
-  N Atlantic Wet Heath: M16/M15 Erica tetralix
-  SAC
-  County Boundaries
-  Local Authority Boundaries
-  CBMDC Outline
-  CBMDC Settlements

0 0.6 1.2  
Kilometers



Contains data from West Yorkshire Ecology 2012  
Contains data from Natural England 2012  
© Crown copyright and database right [2012]  
Ordnance Survey 0100019304



Unit 5 Westergate  
Business Centre  
Brighton  
BN2 4QN

Scale  
1:50,838

Date  
Nov2012

Created by  
SS

Reviewed by  
NP

Drawing number  
UE-0112\_Bradford\_SACchab  
distrib\_1a\_121115

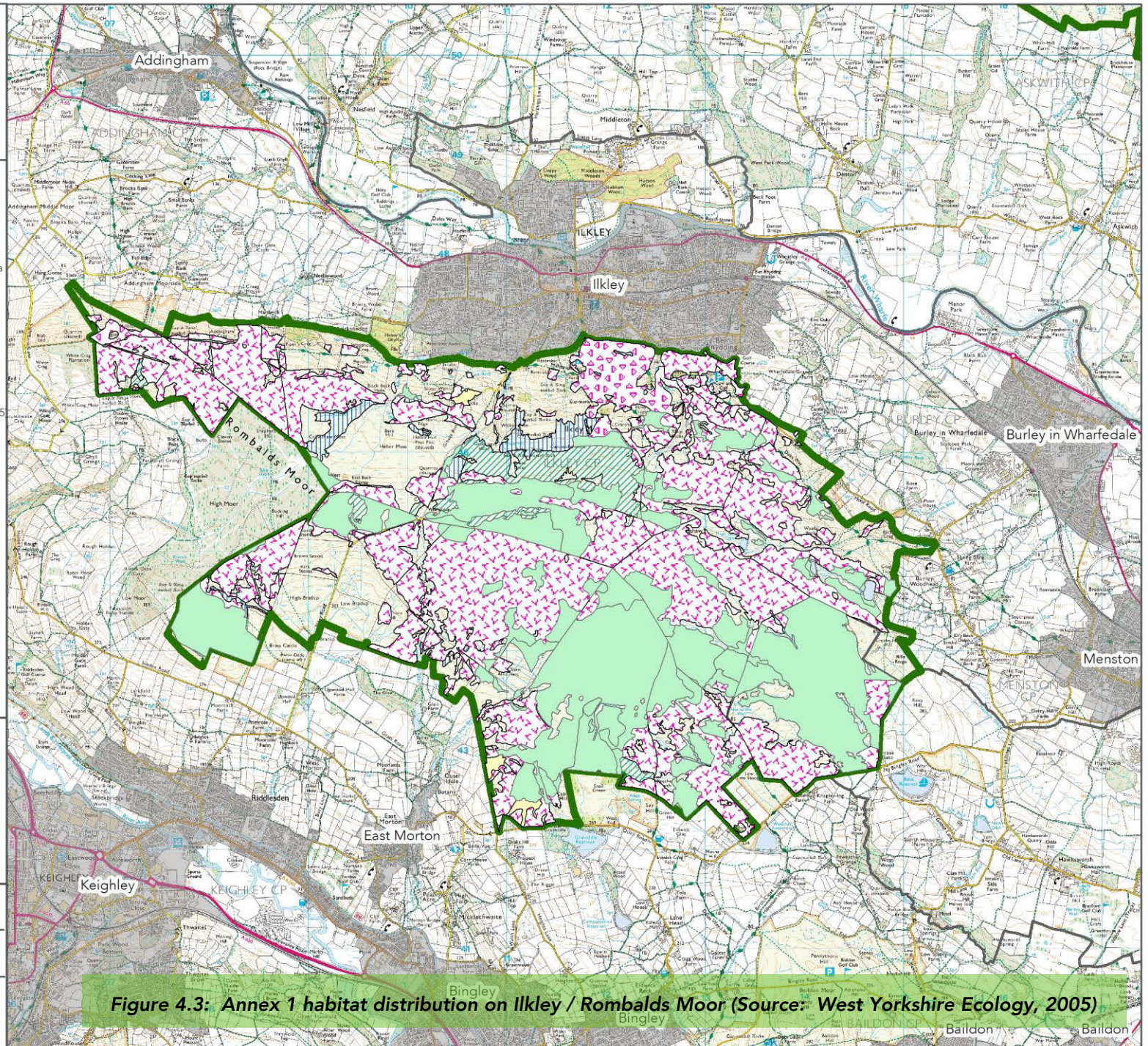


Figure 4.3: Annex 1 habitat distribution on Ilkley / Rombalds Moor (Source: West Yorkshire Ecology, 2005)

# South Pennine Moors SAC Annex 1 Habitats (2005)

-  Blanket Bog: Spp. poor, Molinia & dry
-  European Dry Heath: H12 Calluna vulgaris-Vaccinium myrtillus
-  European Dry Heath: H9 Calluna vulgaris-Deschampsia flexuosa
-  Blanket Bog: M19 Calluna vulgaris-Eriophorum vaginatum
-  Blanket Bog: M20 Eriophorum vaginatum blanket mire
-  Transition Mire: M4 Carex rostrata-Sphagnum recurvum
-  Molinia Wet Heath (not Ax.1 habitat - mostly degraded and M25)
-  N Atlantic Wet Heath: M16/M15 Erica tetralix
-  SAC
-  County Boundaries
-  Local Authority Boundaries
-  CBMDC Outline
-  CBMDC Settlements

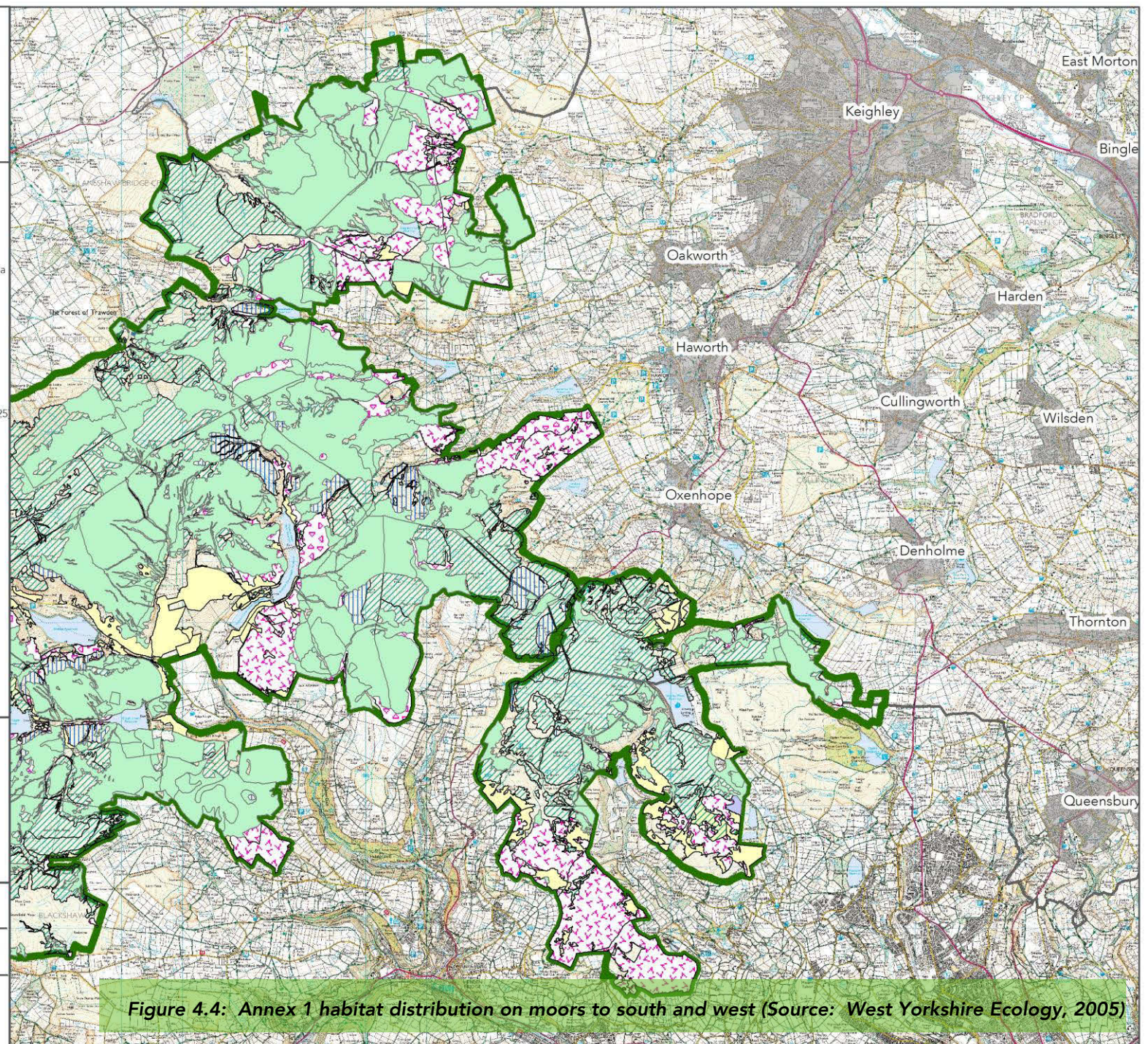


Contains data from West Yorkshire Ecology 2012  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



**ENVIRONMENTAL  
CONSULTING**  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1:82,222	<b>Date</b> Nov2012
<b>Created by</b> SS	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0112_Bradford_SACab distrib_2a_121115	



**Figure 4.4: Annex 1 habitat distribution on moors to south and west (Source: West Yorkshire Ecology, 2005)**



- 4.2.11 The Pennine Moors contains small areas of typical M16 *Erica tetralix* – *Sphagnum compactum* wet heath. This is characteristic of drier climates in the south and east, and is usually dominated by mixtures of *E. tetralix*, *Calluna* and *Molinia*. The bog-moss *Sphagnum compactum* is typically abundant, while on Orkney and at high altitude in the eastern Scottish Highlands, *Cladonia* lichens are abundant. In the south, species with a mainly southern distribution in Britain, such as marsh gentian *Gentiana pneumonanthe*, brown beak-sedge *Rhynchospora fusca* and meadow thistle *Cirsium dissectum*, enrich wet heaths. At high altitude in northern Scotland, forms of the community rich in northern and montane species occur and often also have an abundance of *Cladonia* lichens.
- 4.2.12 Only 5.04 hectares of true wet heath (M15/M16) were mapped as occurring within the South Pennines SAC during the 2009 South Pennine Moors vegetation survey. However, a much larger area of 2,915 hectares was mapped as purple moor-grass (*Molinia caerulea*) dominated blanket bog and wet heath. This degraded moorland vegetation does not conform to the Habitats Directive Annex I definition of Northern Atlantic Wet Heath. A note relating to these areas of purple moor-grass dominated vegetation states:

*“Many examples of Molinia blanket bog have probably been placed in the M25 community solely on the basis of dominance by Molinia, and it is possible that a large proportion of these could be better described as wet heath that has been degraded by grazing and / or burning in the past.”*

#### **Transition mires and quaking bogs**

- 4.2.13 The term ‘transition mire’ relates to vegetation that in floristic composition and general ecological characteristics is transitional between acid bog and Alkaline fens, in which the surface conditions range from markedly acidic to slightly base-rich. The vegetation normally has intimate mixtures of species considered to be acidophile and others thought of as calciphile or basophile. In some cases the mire occupies a physically transitional location between bog and fen vegetation, as for example on the marginal lagg of raised bog or associated with certain valley and basin mires. In other cases these intermediate properties may reflect the actual process of succession, as peat accumulates in groundwater-fed fen or open water to produce rainwater-fed bog isolated from groundwater influence. Many of these systems are very unstable underfoot and can therefore also be described as ‘quaking bogs’.
- 4.2.14 Transition mires and quaking bogs can occur in a variety of situations, related to different geomorphological processes: in flood plain mires, valley bogs, basin mires and the lagg zone of raised bogs, and as regeneration surfaces within mires that have been cut-over for peat or areas of mineral soil influence within Blanket bogs (e.g. ladder fens).
- 4.2.15 In the South Pennine Moors SAC, Transition mire habitat occurs as examples of M4 *Carex rostrata* – *Sphagnum recurvum* mire. The SAC was not originally selected for this habitat type but its presence was subsequently identified as a qualifying feature. A total of 5.75 hectares of M4 Transition mire has been recorded from the South Pennines SAC. The nearest examples of this habitat occur some distance from the proposed development within Bradford occurring over 8km to the west of Haworth.

### **4.3 North Pennine Moors SAC**

- 4.3.1 This SAC was selected for its representation of a total of six Annex 1 habitat types. A further seven habitat types were subsequently identified as being present as qualifying features within the SAC (see Chapter 3), many of which are upland habitats associated with calcareous and other rocky outcrops and heavy metal contaminated soils found further north in the Pennines. These are not considered likely to be affected by proposals within the Bradford Core Strategy.
- 4.3.2 Four of the Annex 1 habitat types are the same as those within the South Pennine Moors SAC; Blanket bog, Dry heath, Northern Atlantic wet heath and Old sessile oak woodland. It has not been possible to obtain detailed information on the distribution of these Annex 1 habitats within the North Pennine Moors SAC. Their distribution in the vicinity of Bradford district has instead been obtained by reference to the NBN Gateway; see Figure 4.5.
- 4.3.3 Information on the distribution of Old sessile oak woodland has been inferred the Natural England ancient woodland inventory. The extent and location of this woodland habitat type shows that the nearest area of ancient woodland within either of the two SAC is Guisecliff Wood (North Pennine Moors SAC) near Glasshouses, over 15km to the north of the Bradford district boundary, and is not likely to be affected by policies within the Core Strategy.

### **4.4 Condition (Conservation) Status**

- 4.4.1 Assessing the impact of a plan or project on a European site requires an understanding of the current condition of that site. Sites that are already under environmental stress are less likely to be able to withstand increased pressure than those that are less stressed. Such stressed sites may therefore be closer to a tipping point where additional pressure changes them from favourable to unfavourable condition and consequent adverse effect on site integrity.
- 4.4.2 It is very difficult to predict the capacity of sites to absorb additional pressure without pushing them beyond this theoretical tipping point. As a consequence, it is important to take a precautionary approach to such assessment and only countenance a conclusion of no adverse effect where there is strong evidence to show that the condition (conservation status) of a site will not be reduced.
- 4.4.3 Natural England undertakes periodic condition monitoring of SSSIs which is published on the Natural England website. Figure 4.6 shows a summary of the condition of SSSI units in the South Pennines. It shows that most of the area is either in unfavourable but recovering condition (i.e. under suitable management) or in unfavourable condition with no change.

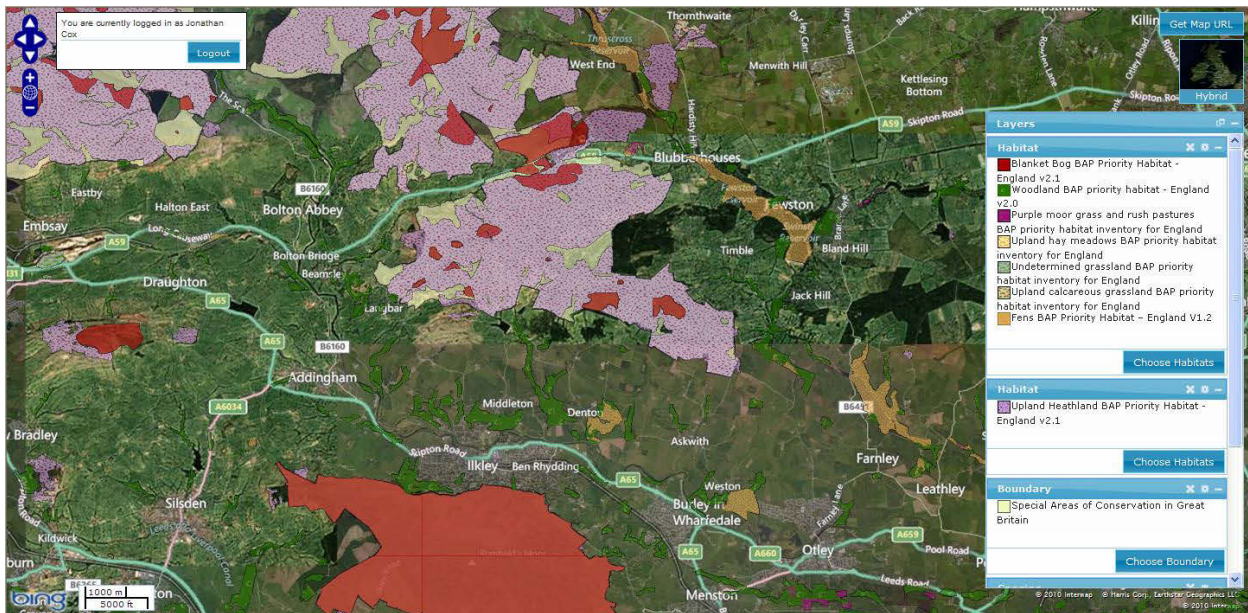


Figure 4.5: Habitat extents in North Pennine Moors SAC (Source: NBN Gateway)

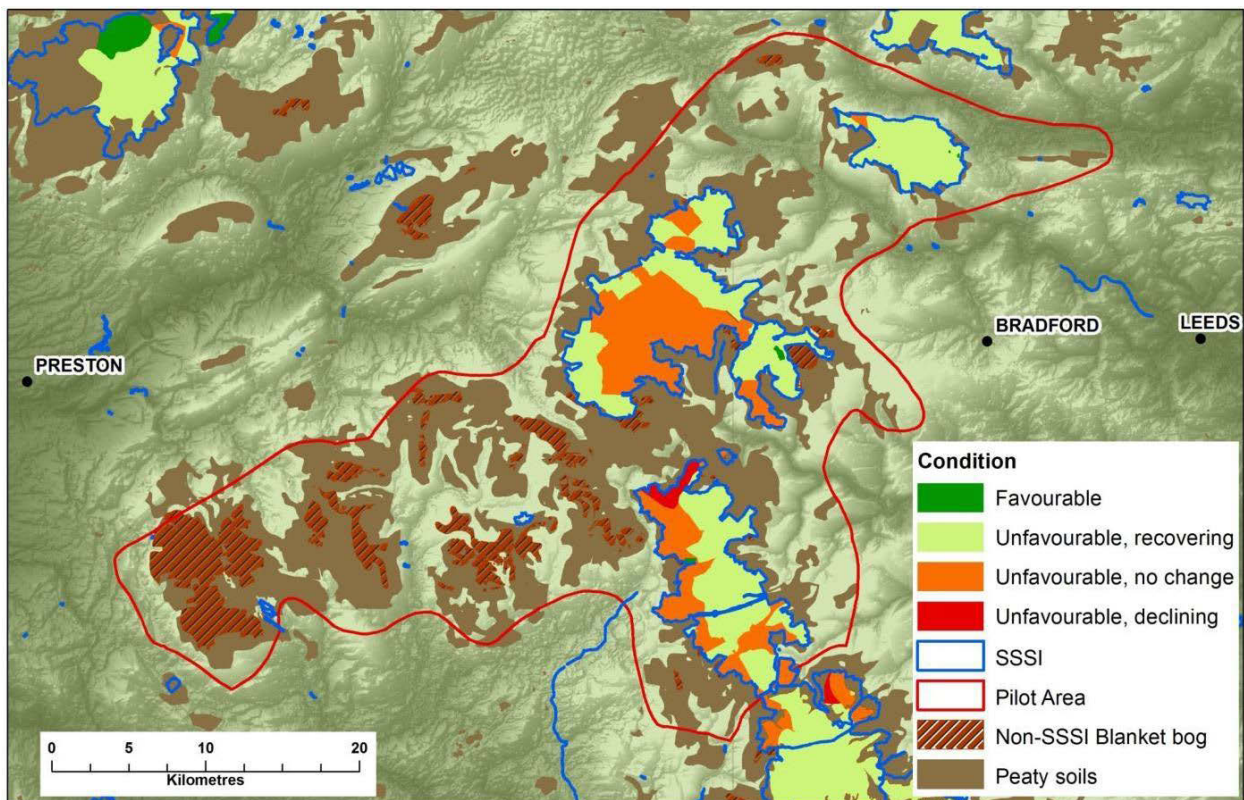


Figure 4.6: SSSI condition status in the South Pennines Moors SAC close to Bradford<sup>29</sup>

<sup>29</sup> Source: [http://www.naturalengland.org.uk/Images/delivering-natures-services2\\_tcm6-17171.pdf](http://www.naturalengland.org.uk/Images/delivering-natures-services2_tcm6-17171.pdf)

*This page is intentionally blank.*

## 5 Identifying Impact Pathways

### 5.1 Introduction

5.1.1 The HRA screening assessment (Environ, 2012) identified a range of likely significant effects on the North and South Pennine Moorlands that could result from the Core Strategy for Bradford district. This list has been reviewed and rationalised, with new impact categories added as part of the Appropriate Assessment procedure. A revised screening matrix is presented in Appendix I, while the following sections provide information on how the identified impact pathways could affect the moors.

### 5.2 Loss of Supporting Habitat

**The revised screening assessment identifies a risk of significant effects resulting from the following proposed policies:**

- **BD1: City of Bradford including Shipley and Lower Baildon Sub Area**
- **AD1: Airedale Sub Area**
- **WD1: Wharfedale Sub Area**
- **PN1: South Pennine Towns and Villages Sub Area**
- **EC3: Employment Land Requirement**
- **HO3: Distribution of Housing Requirement**
- **EN9: New Minerals Extraction Sites**

5.2.1 The populations of birds for which the two SPA were classified breed within the SPA boundary but often feed on habitats outside of the SPA. These off-site habitats are vital to the conservation of the SPA bird populations and their conservation is of paramount importance to the maintenance of favourable conservation status (condition) of the SPA. Off-site habitats are particularly important for Golden Plover during the breeding season as young birds are often taken from their moorland nest sites to feed on meadows adjacent to the moorland. These meadows, sometimes referred to as in-bye land are rich in invertebrate food, in particular crane fly larvae and earthworms. Chicks may be moved up to 2km or more to feed in such meadows (Byrkjedal & Thompson, 1998).

5.2.2 Curlew and Lapwing also frequently utilise wet meadows to feed both during the breeding season and in periods of migration when flocks of birds congregate in in-bye fields. Curlew and Lapwing form part of the internationally important breeding bird assemblage within the South Pennine Moors Phase 2 SPA. Hence the conservation of these off-site in-bye meadows is important to the maintenance of favourable condition (conservation status) of the South Pennine Moors Phase 2 SPA. Other breeding wading birds in the assemblage such as Redshank and Snipe may also utilise in-bye land for feeding and in some instances for breeding.

5.2.3 The in-bye meadows are also important for nesting Twite. These small finches have undergone significant national declines in recent years and are red list species (Birds of Conservation

Concern 3). They are a bird of the moorland-farmland interface, nesting under rocky crags or in patches of bracken, heather or bilberry in areas of mature heathland within the dry heaths habitat. However, the Twite only eats seeds, even when it is feeding its young. Without a good supply of seed sources close to its moorland nest, it will not survive. It searches for seeds on roadside verges, patches of waste ground and particularly hay meadows, within 2.5km of its nesting site<sup>30</sup>. Twite is also a contributing species to the internationally important assemblage of regularly occurring migrant birds for which the South Pennine Moors Phase 2 SPA has been classified.

5.2.4 Two surveys were carried out during 2013 to provide baseline information in relation to the use made by SPA species of land considered to have potential for future development (i.e. sites included in the Strategic Housing Land Availability Assessment, henceforth referred to as SHLAA sites), and to start to identify important areas of in-bye land that provide off-site habitat for qualifying SPA species:

- ▶ Habitat surveys were carried out for meadows within 2.5km of the South Pennine Moors Phase 2 SPA and 1km of settlement boundaries to identify the extent and coverage of potentially good quality supporting habitats for SPA bird species; and
- ▶ Breeding bird surveys were undertaken by West Yorkshire Ecology between April and the beginning of July 2013 for target areas within 2.5km of the South Pennine Moors Phase 2 SPA. The target areas focused on sites published in the SHLAA update of May 2013, both within settlements and up to 1km from settlement boundaries, using transect routes and vantage points. The survey was intended to allow a precautionary assessment of the current land supply and to provide baseline information in relation to assessing potential areas for future development.

### **Habitat survey results**

5.2.5 Surveys were targeted within defined zones around the SPA boundary based upon established patterns of use by the target bird species, and areas around settlements with the potential for development. A 2.5km buffer around the SPA has been established as the main area within which supporting habitat is utilised. A 1km buffer around existing settlements was identified as the likely maximum extent of urban expansion. Within and beyond this 1km zone, more specific areas of search were identified from the Council's SHLAA.

5.2.6 The field survey targeted land which is either (a) listed in the SHLAA and lies within 2.5km of the SPA, or (b) is located both within 2.5km of the SPA and within 1km of a settlement. The total area of land falling both within 2.5km of the SPA and within 1km of settlements is 11,411ha. This area was significantly reduced during the desk-study phase which utilised aerial photography analysis to exclude arable, woodland and brownfield sites. Appendix II illustrates the final coverage of the habitat survey, which extends to a total of 1,504 survey polygons covering an area of 2,592.5ha. In many instances, these were individual fields, although in places, groups of fields were combined where they had similar habitat characteristics. A description of each of the recorded habitat types is given in the survey report (UEEC, 2014).

---

<sup>30</sup> <http://www.watershedlandscape.co.uk/care/the-pennine-twite/>

- 5.2.7 Data was gathered at a field unit scale and included categorical field variables such as management regime, grazer and grazing intensity, and continuous field variables which included percentage cover of the various habitat types within the meadow, or abundance of seed-bearing wildflowers.
- 5.2.8 Table 5.1 shows the dominant habitat of surveyed meadows (dominant habitat being classified as any one habitat type which has coverage of 75% or more). The majority were dominated by habitats of relatively low ecological value with 65.8% of the area being given over to improved or species poor semi-improved grassland. These were considered to have low potential value in supporting SPA birds or birds typical of SAC habitats.

**Table 5.1: Predominant habitat types within surveyed meadows**

Habitat Type	No. of polygons	% of area	Area (Ha)
Amenity Grassland	49	1.0	27.2
Improved Grassland	294	20.0	516.0
Species poor semi-improved grassland	680	45.8	1186.6
Species rich semi-improved grassland	55	7.8	201.4
Unimproved grassland	9	0.7	17.2
Rough grassland	28	1.1	28.9
Enclosed acid grassland	17	1.3	34.0
Dry dwarf shrub heath	2	0.3	8.4
Dry heath/acid grassland mosaic	11	1.6	41.4
Rush pasture	3	0.5	13.7
Other (mixed habitats and woodland)	110	3.4	89.2
<b>Total</b>	<b>1258</b>	<b>83.5</b>	<b>2164.0</b>
Meadows without dominant (>75%) habitat	246	16.5	428.5
<b>Grand Total</b>	<b>1504</b>	<b>100</b>	<b>2592.5</b>

- 5.2.9 Three grassland types were identified that were considered more likely to provide a foraging resource for SPA qualifying bird species, and are collectively referred to here as 'supporting habitats'. These were; species rich semi-improved grassland, unimproved grassland and rush pasture. These supporting habitat types were dominant in only 9.0% of the surveyed area.
- 5.2.10 The map series presented in Appendix III illustrates the distribution of these habitats at all coverage densities (i.e. including meadows where the habitat types were not dominant (<75% coverage)), together with breeding birds records from the 2013 survey and sites from the SHLAA update published May 2013.

### **Breeding bird survey results**

- 5.2.11 The breeding bird survey outputs relate to a single year's survey work and included daytime surveys only. Due to pressure to complete survey work during a single season, with limited resources, bird survey work, based around SHLAA sites, needed to be carried out in advance of work to identify high quality supporting habitat. The habitat survey work was carried out to a wider brief i.e. that of identifying the extent and coverage of potentially good quality supporting habitat for SPA bird species.

#### ***Golden Plover***

- 5.2.12 The bird survey made 48 records of Golden Plover; these can be referred to as registrations and include one or more birds seen and heard. Of these, 16 registrations were of birds within the SPA boundary. Of the remaining 32 registrations from outside of the SPA, 9 were within 2.5km of Ilkley Moor and the remaining 23 within 2.5km of the SPA boundary to the south west of the District.
- 5.2.13 Habitat type was recorded by the bird survey for only two registrations, as species poor semi-improved grassland. Eight of the registrations were from fields included within the habitat survey. These were from fields recorded mostly as mixtures of semi-improved grassland (species poor and species rich) and tussocky rush pasture. All these fields were grazed with sheep and one with a mix of sheep and cattle.

#### ***Merlin***

- 5.2.14 The bird survey made seven records of Merlin. All of these were associated with Ilkley Moor, with one record from within the SPA and the remaining six from birds outside of the SPA boundary. Only one record was from fields covered by the habitat survey. This was a horse grazed field to the east of Ilkley Moor containing areas of unimproved acid grassland and wet rush pasture.

#### ***Short-eared Owl***

- 5.2.15 Only three records of Short-eared Owl were made in the bird survey. All three records were from a bird seen within the SPA to the western end of Ilkley Moor. It is assumed that this was the same bird recorded hunting over the moor at three closely related locations during the first survey round.

#### ***Dunlin***

- 5.2.16 Two records of Dunlin were made during the survey. These were both outside of the SPA boundary and associated with the moors to the south west of the District. One record was from the shores of Leeshaw Reservoir and the second from an improved grass field (included in the habitat survey) to the north west of Queensbury.



### *Curlew*

- 5.2.17 Curlew were the most numerous species recorded in the 2013 bird survey with a total of 1,856 records, however, a number of these records were of birds over-flying the surveyor. These birds may not have any functional habitat relationship with the location of the record and have been removed from the data set leaving a total of 1,788 records. Of these, 193 records were made of birds within the South Pennine Moors Phase 2 SPA boundary. The remaining 1,595 records were of birds outside of the SPA. Most of these were within 2.5 km of the SPA boundary (1,446 records) with only 149 records outside of the 2.5 km buffer.
- 5.2.18 A total of 317 Curlew registrations were made from fields included within the habitat survey. Analysis of fields from which curlew were recorded shows most are from fields dominated by improved and semi-improved grasslands (fields with >75% cover) with 24% within fields of improved grassland, 42% within species poor semi-improved grassland, 9% within species rich semi-improved grassland. Rush pasture was also a feature of many of the fields from which Curlew were recorded, being present in 15% of fields. Cover values of rush pasture were generally <50%, with 10% of fields in which Curlew were recorded having less than 25% rush pasture cover.
- 5.2.19 In all, 761 records of Curlew were of birds within 1km of settlement boundaries.

### *Common Sandpiper, Lapwing, Redshank and Snipe*

- 5.2.20 During the breeding season, Lapwing, Redshank and Snipe show a strong preference for good quality rush pasture and meadow habitats in the moorland fringe. Some of these birds, particularly Lapwing, may be breeding outside of the SPA boundary but contribute to the larger SPA meta-population. Moorland fringe habitats used by breeding Lapwing are also likely to be of greatest potential value as off-site feeding habitat for other SPA bird species such as Golden Plover and Curlew.
- 5.2.21 The 20 records of Common Sandpiper from the 2013 survey were of birds associated with reservoirs and river banks. Most of these were on the western edge of the district with Ponden Reservoir near Haworth supporting probably 2 pairs. These birds are likely to be nesting in the locations from which they were recorded outside of the SPA boundary and are not therefore using these places as off-site supporting habitat. Common Sandpiper nesting outside of the SPA boundary have not been included in the assessment of impacts to off-site supporting habitat.
- 5.2.22 A total of 979 Lapwing records were made during the 2013 bird survey. A sift of this data was undertaken to remove records of birds simply over-flying recorders. This leaves a total of 967 records of Lapwing either foraging or undertaking breeding behaviour (for example displaying, alarm calls or nest sitting). Only 38 of these records were from within the SPA boundary (3.9%). However, most Lapwing records were from within 2.5 km of the SPA boundary (880 records or 91%). Almost half of all Lapwing records were also close to settlement boundaries (141 records or 14.6% within 500m of settlements).

- 5.2.23 The number of Lapwing records from fields recorded as part of the habitat survey was 221 (23%). Most of these fields consisted predominantly of species poor semi-improved grassland (36%), species rich semi-improved grassland (20%) or improved grassland (23%). Rush pasture was present within 19% of these fields, although in most cases rush coverage was less than 50%. The habitat composition of fields used by Lapwing was similar to that used by Curlew.
- 5.2.24 There were far fewer records of Redshank and Snipe from the 2013 survey. Table 5.2 summarises the distribution of these in relation to the SPA boundary, settlement boundary and habitat survey.

**Table 5.2: Distribution of redshank and snipe in relation to SPA, settlements and habitats**

Variable	Redshank		Snipe	
	Total	Percentage	Total	Percentage
<b>Total Records</b>	<b>30</b>	<b>100.00%</b>	<b>104</b>	<b>100.00%</b>
Within SPA	5	16.67%	21	20.19%
Within SPA 2.5km buffer	28	93.33%	104	100.00%
Within settlement 500m buffer	5	16.67%	2	1.92%
Within Semi & Unimproved meadows & Rush pastures	7	23.33%	13	12.50%
Within All meadows included in 2013 survey	10	33.33%	15	14.42%
Within SHLAA sites 400m buffer	6 <sup>31</sup>	20.00%	8 <sup>32</sup>	7.69%

**Distribution of SPA bird species**

- 5.2.25 Curlew and Lapwing were the most frequently recorded birds in the 2013 survey. Particular concentrations of records of these two species were found along the southern and western fringes of Ilkley and Rombalds Moor, with localised concentrations on the north eastern fringes of the Moor south and west of Burley in Wharfedale. On the moorland fringe to the west of the district, bird records are widely distributed across some extensive areas of rush pasture and semi-improved grassland. Records of curlew and lapwing were made all along the moorland fringe south and west of Denholme, the moorland fringes south and west of Oxenhope and to the west of Haworth, Oakworth and Laycock.
- 5.2.26 Golden Plover records in the vicinity of Ilkley and Rombalds Moor were very few and mostly limited to small groups of birds seen foraging to the south, west and east of the Moor. The highest concentration of records was of over 50 birds seen to the west of Baildon Moor near Eldwick together with up to 24 Lapwing. A total of 23 Golden Plover records were made from the west of the district. This included a particular concentration of records from the moorland and moorland fringe along Stairs Lane west of Oxenhope. Displaying birds were also recorded to the south of the Thornton Reservoir south of Denholme.
- 5.2.27 Records of birds of prey were few. There was a notable concentration of Merlin and Short-eared Owl records from the western end of Rombalds Moor near the fringes of the conifer plantation on this part of the moor. Further records of Merlin were also made on the moorland fringe feeding on Meadow Pipits over fields between the SPA and Silsden.

<sup>31</sup> Six records of redshank from two SHLAA sites (Denholme Road, Oxenhope and Perseverance Lane, Queensbury)

<sup>32</sup> Eight records of snipe from two SHLAA sites (Crag Farm, Menston and Ilkley Road, Riddlesden)

### ***Use of SHLAA sites by SPA birds***

- 5.2.28 As part of the process for preparing the Local Plan, the Council produced a Strategic Housing Land Availability Assessment (SHLAA). At a strategic level the SHLAA indicates the total capacity of deliverable or developable sites, both district wide and on an area by area basis, and is therefore important to the process of determining housing targets for the different settlements. Bradford's SHLAA update of May 2013 assessed a total of 986 sites, which extend over an area of 2,398 hectares (mean site size = 2.43 ha.) and these have broadly formed the basis for the assessment that has taken place in this HRA. It should be noted that some of these sites were classified as undevelopable, meaning that they did not contribute to the SHLAA trajectory.
- 5.2.29 Habitat surveys were undertaken for part or all of 194 SHLAA sites that fall within both 2.5km of the SAC/SPA and 500m of settlements. This includes four sites with >50% cover of species rich semi-improved grassland and four sites with up to 25% rush pasture. No unimproved grassland was recorded from within SHLAA sites.
- 5.2.30 A total of 72 records of SPA species were made during the 2013 breeding bird survey from 32 SHLAA sites covering an area of 337ha; see Table 5.3. The development of these sites could result in both direct and indirect negative effects as a result of planned developments. Such impacts include habitat loss (from development of any kind) or increased disturbance from nearby residential development.

**Table 5.3: SPA bird species recorded within SHLAA sites**

<b>Species</b>	<b>Number of bird records</b>
Curlew	54
Lapwing	18

- 5.2.31 The distribution of the three supporting habitat types and SPA birds was analysed in relation to SHLAA sites using a 400m buffer distance. The importance of this distance has been acknowledged in relation to lowland heathland SPAs in southern England and is supported by information presented in this HRA Report in relation to urban edge impacts and functional use of this land. The results of these analyses are described below and should be read with reference to the map series in Appendix III.
- 5.2.32 Three SHLAA sites were identified with records of Golden Plover within their 400m buffer, all of which were at Denholme. A single SHLAA site in Queensbury had a record of Dunlin within its 400m buffer, and a total of 111 SHLAA sites had records of Curlew within 400m.
- 5.2.33 A total of 53 SHLAA sites were identified with records of Lapwing, Redshank or Snipe from within 400m during the bird nesting season. This comprised 52 sites with Lapwing records, two sites with Redshank records and two with records of Snipe. Four sites had records of more than one wading bird species within 400m, two of which had records of Redshank and Lapwing (Denholme Road, Oxenhope and Perseverance Lane, Queensbury). A further two similar sites had records of Lapwing and Snipe (Ilkley Road, Riddlesden and Crag Top Farm, Burley Woodhead).

- 5.2.34 A total of ten SHLAA sites occur within 400m of the South Pennine Moors Phase 2 SPA and SAC boundary, mostly within Ilkley with one site at Crag Top Farm in Burley Woodhead.

***Settlement review of SHLAA sites***

- 5.2.35 Using the results of both the bird and meadow surveys, a map was generated for each of the main settlements within or partially within 2.5km of the SPA; see Appendix III. Mapped data includes the existing settlement boundary, SHLAA sites (buffered to 400m where SPA birds, supporting habitats or the SPA fall within this distance), bird records, and coverage of supporting habitats (rush pasture, species-rich semi-improved grassland and unimproved grassland). The results show a relatively wide distribution of bird records, especially for Curlew and Lapwing. In some locations there appears to be an association between higher bird density and features such as waterbodies, proximity to the SPA, or habitats of better quality. In other locations no such associations are apparent.
- 5.2.36 The existing datasets presented are considered to be sufficiently robust to inform the strategic level of decision-making being undertaken in the Core Strategy. Further data gathering and more detailed analysis of bird data and habitat variables are envisaged in order to be confident that habitats preferred by target species have been identified. This will inform work on the subsequent Allocations DPD.
- 5.2.37 The following sections discuss each settlement in turn drawing on data from the bird and habitat surveys of 2013. This analysis of the distribution of breeding birds during 2013 in relation to potential development locations around the settlements and information on supporting habitats was initially supplied to the Council in autumn 2013 to inform the consideration of potential revisions to the settlement distribution.
- 5.2.38 In further advice on its consultation response to the HRA Report dated February 2014, Natural England (pers. comm., 2014b) has advised that, in assessing potential impacts of housing distribution on the SPA breeding bird assemblage, the HRA should:
- (a) Consider the numbers of birds from the breeding bird assemblage that are present within functionally linked areas; and
  - (b) Identify those locations frequently visited by these birds and the numbers present compared against their populations.
- 5.2.39 It is noted that Natural England commissioned a new South Pennine Moors SSSI/SPA Phase 2 – Breeding Bird Survey in 2014. Once data from this survey becomes available, it will provide a higher degree of confidence that this advice can be fully applied in relation to population figures for breeding birds. In relation to future work, Natural England has broadly advised against removal of potential housing allocations on the basis of a single record from the breeding bird assemblage.

**Silsden**

- 5.2.40 The eastern side of the settlement of Silsden lies within 2.5km of the SAC/SPA, however, this is also an area identified for a significant expansion of the settlement within the current Replacement Unitary Development Plan (RUDP). Central and western parts of the settlement lie

outside the 2.5km zone. Large areas on the outskirts of Silsden are SHLAA sites, particularly on the north-east, south and south-west fringes of the settlement.

- 5.2.41 Areas of species-rich semi-improved grassland that coincide with SHLAA occur to the north-east of the town, and a small meadow north of Hainsworth Road to the south, with further species-rich semi-improved within 400m of sites to the south-west. Bird density appears to be relatively low within sites to the north of the town, being restricted to three records of Curlew, however several further Curlew were observed within 400m north of this site. A notable congregation of Curlew and the occasional Lapwing were observed within the non-trajectory SHLAA site to the south-west of the town, and also within the adjacent area of better quality habitat. The trajectory SHLAA site just north of here has fewer bird records but would seem to be constrained by the relatively high density of bird records and supporting habitats close by and within the site. SHLAA sites on the south west of the settlement have fewer records of SPA birds within the 400m buffer and would appear to be less constrained.

#### Keighley

- 5.2.42 The majority of Keighley lies outside the 2.5km zone around the SAC/SPA. This zone does, however, encroach on the northern edge of the settlement in particular around and to the north of Riddlesden. Some of the SHLAA sites in the north Keighley-Riddlesden area occur within the existing settlement boundary, but with some notable exceptions closer to the SPA to the north of Riddlesden and East Morton. Areas of better quality habitat that were recorded are limited, restricted to a few fragments of species-rich semi-improved grassland north of the canal, and some more extensive areas of rush pasture closer to the moors.
- 5.2.43 The majority of bird records are focused on the fields closest to the moor, with a few lower density clusters of Curlew and Lapwing associated with grazing pastures north of Riddlesden and East Morton. Some of these are either within or close to SHLAA sites. SHLAA sites that appear to have greatest conflict with bird and supporting habitat records are those to the north of the town closest to the SPA/SAC boundary. Sites that contain records of SPA breeding waders and supporting habitat occur at Riddlesden. However in all cases, the SHLAA sites in this area which correspond with bird recordings are sites which have already been classified within the SHLAA as undevelopable for other (non-SPA/SAC) reasons, and do not form part of the SHLAA trajectory for Keighley.

#### Bingley and East Morton

- 5.2.44 Only the northern parts of Bingley lie within 2.5km SAC/SPA. With some notable exceptions, SHLAA sites are mainly within the settlement boundaries or to the south east (which lies outside the 2.5km zone). There are however some significant potential extensions east of Eldwick towards Baildon Moor, around Micklethwaite, and a site south of East Morton which are within 2.5km of the SAC/SPA. Some significant patches of species-rich semi-improved grassland occur to the north of Eldwick and Bingley (but mostly do not correspond with SHLAA sites), often including and surrounded by more extensive coverage of rush pasture associated with streams and becks.

- 5.2.45 Bird records – mainly Curlew and Lapwing with one or two Golden Plover – are largely associated with Baildon Moor and the area of higher ground south of Graincliffe Reservoir, again well beyond the existing settlement boundaries and not corresponding with any SHLAA sites. An area between Walsh Lane and Heights Lane north of The Greenwood appears favoured by Lapwing. SHLAA sites to the north of Bingley towards East Morton have most conflict with bird and supporting habitat records.

#### *Menston and Burley*

- 5.2.46 The majority (all but the far east) of Menston lies within 2.5km of the SAC/SPA. All of Burley in Wharfedale lies within this zone. There are a number of large SHLAA sites around Menston, particularly to the north, north-west and south-west of Menston, and south, south-west and north-west of Burley in Wharfedale. A further significant SHLAA is located adjacent to the SPA at Burley Woodhead although this lies within the Green Belt and is completely detached from the two villages; it is therefore not part of the SHLAA trajectory for either settlement.
- 5.2.47 Much of the area to the west of these two settlements was also noted as species-rich semi-improved grassland and/or rush pasture, and wet meadows associated with water bodies, although none of this habitat corresponds with a SHLAA site within the SHLAA trajectory. There are some concentrations of bird activity in these areas, particularly around Reevadale and Burley Woodhead. Bird density is also higher in the meadows north of the disused railway and south of A660 east of Burley. SHLAA sites with records of SPA breeding waders within 400m occur all around the settlement but with particular concentrations to the west and north of the settlement.

#### *Ilkley*

- 5.2.48 The southern boundary of Ilkley immediately adjoins the SPA/SAC boundary, and a significant part of the settlement and adjoining area lies within 400m of the designation. The whole of the settlement and potential extensions to the settlement to the west, north and east lie within 2.5km of the SAC/SPA. A series of species-rich semi-improved grasslands were recorded running east from Stead towards Burley. There is a reasonably high abundance of mainly Curlew in this area as well, with even higher densities of Curlew and Lapwing to the west of Stead towards to the SPA. However, the only SHLAA site in these areas is not within the SHLAA trajectory for Ilkley.
- 5.2.49 Another conglomeration of Lapwing and Curlew occurred on a large SHLAA site south of Five Oaks House, east of Ilkley, although the habitats here were generally poor quality improved grazing pasture. It should be noted that this site does not form part of the SHLAA trajectory.
- 5.2.50 Many of the other SHLAA around Ilkley are either within the settlement boundary or tucked into the fringes, and without notable habitats or high abundance of bird records. A series of small SHLAA sites within the southern side of the town are within 400m of the SPA boundary. To the east of the town are a number of SHLAA sites with records of SPA breeding waders and supporting habitats within 400m of the site boundaries. To the west of the town are SHLAA sites with records of Curlew and supporting habitat within 400m of its boundaries.

### Addingham

- 5.2.51 The majority of Addingham (all but the land beyond the settlement to the north-west) lies within 2.5km of the SAC/SPA. Records of Curlew and Lapwing around Addingham tend to be focused on higher ground to the south and west of the town, whereas many of the SHLAA sites are adjacent to the existing settlement boundary north of the A65. An extensive area of species-rich semi-improved grassland along Lippersley Lane and Addingham Middle Moor is attracting a greater abundance and diversity of birds including Curlew, Lapwing and Golden Plover. However this area lies well beyond the existing settlement boundary and does not contain any SHLAA sites. These supporting areas are around the area of marsh known as Brown Bank Marsh, a Site of Ecological or Geological Importance (SEGI). There are instances of Curlew records within 400m of SHLAA sites around the southern outskirts of Addingham. Two SHLAA sites on the north of the settlement have records of SPA breeding waders and supporting habitat within 400m of the sites.

### Oakworth

- 5.2.52 Only the western half of Oakworth lies within 2.5km of the SAC/SPA. An area of species-rich semi-improved grassland and rush pasture west of Oakworth supports a reasonable abundance of birds but this is predominantly to the west of the SHLAA site boundaries. Other than this, SHLAA sites in this area do not appear to coincide with either good quality habitats or areas of particular bird density. SHLAA sites on the western side of the settlement have the most potential conflict with birds and supporting habitats, in particular where foraging Curlew, Lapwing and areas of species rich semi-improved grassland all occur within 400m of the sites.

### Haworth

- 5.2.53 The central, western and southern sections of the settlement and its surrounds lie within 2.5km of the SAC/SPA. Some sections of good quality habitat occur around Haworth, notably unimproved grassland along the River Worth, and acid grassland and heathland mosaic at Penistone Hill. Several sections of species rich unimproved grassland and rush pasture occur along the Worth Valley to the west of the town, however, there seems to be little in the way of bird association with these areas, the birds tending instead to prefer habitats further west closer to the SPA. A grouping of Curlew and Lapwing was recorded around Old Oxenhope Farm. The northern part of this grouping is within a SHLAA site, but does not form part of the SHLAA trajectory. Although supporting habitat occurs widely around the settlement it is only the SHLAA sites on the southern side of the settlement that appear to conflict with records of SPA bird species, and not all of these are within the SHLAA trajectory. A number of sites have records of Curlew, Lapwing and areas of rush pasture within 400m of the site boundaries.

### Oxenhope

- 5.2.54 The whole of Oxenhope and its surrounds lies within 2.5km of the SAC/SPA. Very few areas of notable habitat were recorded around Oxenhope, and a similarly low abundance of bird records, with far higher numbers being recorded away from the town to the west and south in closer proximity with the SPA. Birds visiting the shores of the Leeming Reservoir include Lapwing, Redshank and Curlew. SHLAA sites on the northern edge of the settlement also have

records of Curlew foraging within 400m of the site boundary, although the larger of these two sites is not part of the SHLAA trajectory.

### Denholme

- 5.2.55 All but the area to the north-east of the village lies within 2.5km of the SAC/SPA. There are some larger SHLAA sites to the west and south of Denholme, however, habitats were generally not noteworthy and very few birds were recorded in 2013. A grouping of Curlew and Lapwing occurred around Lower Shay Farm to the west, with further groupings closer to the reservoir and SAC/SPA to the south, however, these lie well to the west of the settlement and to the west of the SHLAA sites. There are a number of records of foraging Curlew, Lapwing and areas of rush pasture to the west and south of the settlement which are within 400m of certain SHLAA sites.

### Thornton and Queensbury

- 5.2.56 Only the far western edge of Thornton lies within 2.5km of the SAC/SPA. There are a number of SHLAA sites within the existing settlement boundary towards the western end of Thornton, and one small SHLAA site which would extend the settlement. However, notable habitats are restricted to a few pockets of rush pasture and the abundance of bird records was low. SPA breeding waders were recorded within 400m of several SHLAA sites, with records of low numbers of Curlew and Lapwing foraging in rush pastures to the west of the settlement. Further potential conflicts with SPA breeding waders occur to the south of Thornton around Queensbury. One site has records of Curlew, Lapwing and Redshank within 400m of the site boundary. A number of sites also have records of foraging Curlew and areas of rush pasture within 400m of the site boundary.

### **Potential for In Combination effects**

- 5.2.57 Developments within surrounding districts (e.g. Craven, Harrogate, Leeds, Calderdale, Burnley and Pendle) are at this stage considered unlikely to adversely affect birds using supporting habitats within Bradford district. However, developments within these districts could result in direct or indirect effects on birds using supporting habitats within those districts.
- 5.2.58 Where bird records and/or areas of supporting habitat are identified close to adjoining authority boundaries, this issue may need to be kept under review, as plan-making work progresses, and be the subject of future liaison with the authority concerned.

## **5.3 Increased Water Demand**

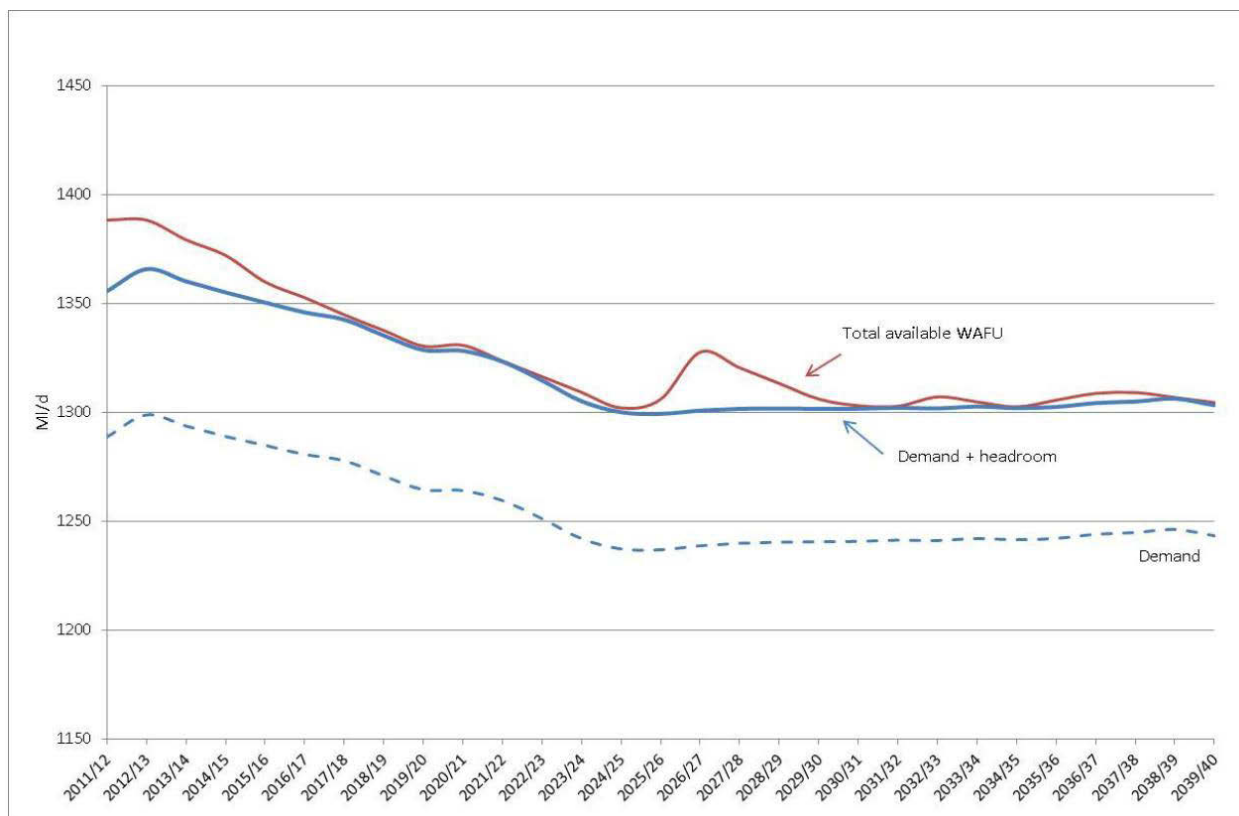
- 5.3.1 In relation to water demand, the earlier screening assessment stated the following (Environ, 2012):

*“Changes in groundwater levels and water quality from new housing and economic development: The risk of a likely significant effect (LSE) is uncertain. On the basis of the precautionary principle, an LSE is identified because the Core Strategy directs development close to the boundaries of the SPA, particularly at Rombalds Moor, and it is*



*not known whether there are any issues relating to water supply and the delivery of the Core Strategy. Measures to manage flood risk associated with development in the District and whether they could affect the hydrology of the site are also unknown.”*

- 5.3.2 Yorkshire Water has recently published its Final Water Resources Management Plan (WRMP) (August 2014) for the period 2015/16 to 2039/40. Bradford district falls entirely within the company's 'Grid Surface Water Zone'. The Final WRMP concludes that the baseline supply-demand balance for the Grid SWZ dry year annual average scenario shows a substantial deficit which increases over the planning period as the forecast supply cannot meet the forecast demand. The deficit is the result of a continuing decline in water available for supply, due to the impacts of climate change and Sustainability Reductions (which are implemented to protect the integrity of European sites). Climate change is forecast to create a year on year incremental reduction in supply. A 2.0MI/d Sustainability Reduction is applied in 2013/14 and a 0.7MI/d sustainable reduction applied in 2017/18. The Grid SWZ supply-demand deficit starts in 2018/19, when demand, including target headroom, is 2.67MI/d greater than supply. By 2027/28 supply is below demand and no headroom is available. The deficit continues increasing to 108.65MI/d by 2039/40.
- 5.3.3 The preferred solution to the Grid SWZ dry year annual average deficit over the 25 year period provides a balance of demand reduction options (including reduction of leakage and processing losses, and increased customer water efficiency) and options to increase supply (including use of an existing river abstraction licence, and three groundwater scheme). A total of 47.96MI/d demand reduction will be achieved by delivering 14 demand side schemes over the 25 years. Four supply side options will be delivered providing 61.95MI/d additional resource. The first will be in year 11 when Yorkshire Water will implement its largest resource solution, the "D20 Ouse Raw Water Transfer", to provide 40MI/d. In year 17 it will abstract an additional 2MI/d from an existing borehole in North Yorkshire. In year 18 the company will implement the "East Yorkshire Groundwater Option 1" scheme to provide 6.55MI/d. The final resource solution will provide a yield of 5.36MI/d in year 21 that will increase to 13.4MI/d by year 23.
- 5.3.4 Based on the preferred solution, the final planning scenario supply-demand balance results in a surplus in Grid SWZ throughout the plan period; see Figure 5.1.
- 5.3.5 An HRA was also prepared to assess the potential for likely significant effects of the WRMP options on sites designated under the Habitats Directive, Birds Directive and the international Ramsar Convention. The findings were discussed with Natural England and the Environment Agency. The HRA screening assessment of the preferred solution concluded that, with mitigation taken into account, the preferred plan is not likely to have significant effects on the integrity of any of these designated sites based on current information and designations.
- 5.3.6 Concerns were raised during consultation on the Draft WRMP as to the potential impact of additional abstraction pressure on the dissolved oxygen concentrations in the Lower Ouse during low flow conditions in the summer months which may lead to adverse effects on designated migratory fish species and on the Humber Estuary European Marine Site (EMS). One scheme (Ouse raw water transfer) has the potential to impact on flows in the Lower Ouse and this was assessed as part of the HRA process.



**Figure 5.1: Grid SWZ preferred solution supply demand balance (Source: Yorkshire Water (August 2014) p.161)**

5.3.7 The Ouse raw water transfer scheme involves additional abstraction of 40 MI/d, but this remains within the existing maximum abstraction licence conditions. The Environment Agency has previously reviewed the impact of the abstraction at maximum licence volumes and concluded that this would not have a likely significant effect on the Humber Estuary EMS and migratory fish species. The HRA also concluded that the additional abstraction of 40 MI/d would not lead to likely significant effects on fish migration or on the Humber Estuary. This conclusion is based on previous investigations which showed that the dissolved oxygen risks occur in the summer months (June to September) which do not overlap with the key fish migration periods (October to May). Extensive water quality modelling work carried out during recent years also demonstrates that the scale of flow change arising from the additional 40MI/d abstraction would have a negligible effect on dissolved oxygen concentrations. Environment Agency modelling has shown that dissolved oxygen concentrations are not sensitive to changes in abstraction rates of this magnitude.

**Potential for In Combination effects**

5.3.8 Cumulative assessment of the WRMP with other water company WRMPs, drought plans and other relevant programmes and plans has also concluded that there would be no likely significant effect on any designated sites.

5.3.9 It can be concluded that the residential development target of the Bradford district Publication Draft Core Strategy is not likely to affect the North or South Pennine Moors SAC/SPA through increased water demand.

## 5.4 Impacts on Water Quality

5.4.1 In relation to water demand, the earlier screening assessment stated the following (Environ, 2012):

*“Changes in groundwater levels and water quality from new housing and economic development: The risk of a likely significant effect (LSE) is uncertain. On the basis of the precautionary principle, an LSE is identified because the Core Strategy directs development close to the boundaries of the SPA, particularly at Rombalds Moor, and it is not known whether there are any issues relating to water supply and the delivery of the Core Strategy. Measures to manage flood risk associated with development in the District and whether they could affect the hydrology of the site are also unknown”*

5.4.2 There is no further elaboration on how water quality on the moorlands could be significantly affected as a result of new housing and economic development in Bradford district. However, waste water from new developments must be collected, conveyed and treated prior to discharge to the environment, and can result in impacts to water quality and ecological receptors. The following information regarding waste water treatment infrastructure and discharge flows relevant to Bradford district was gathered from conversations with Environment Agency (pers. comm., 2012b). The main waste water treatment works (WWTW) serving settlements in the district are listed in Table 5.4.

5.4.3 All of these WWTWs discharge to the Rivers Aire, Wharfe or Calder, either directly or via tributaries. The River Clader joins the Aire at Castleford, with the Aire flowing on to meet the River Ouse at Goole, while the Wharfe joins the Ouse at Cawood; the Ouse eventually joins the Humber Estuary.

**Table 5.4: Main waste water treatment works serving settlements in Bradford district**

WWTW	Settlement	Discharges to
Esholt	Bradford City Centre	R. Aire
Dowley Gap	Bingley	R. Aire
Marley	Keighley	R. Aire
Oxenhope	Oxenhope	Bridgehouse Beck > R. Worth > R. Aire
Ben Rhydding	Ilkley	R. Wharfe
Ash Holme	Burley in Wharfedale	R. Wharfe
Denholme	Denholme	Denholme Beck > Harden Beck > R. Aire
Mitchell Laithes (Dewsbury)	South east Bradford	R. Calder

### **Potential for In Combination effects**

- 5.4.4 The Humber Estuary, which drains over a fifth of the area of England, is an SAC, SPA and Ramsar site and all discharges to it were assessed as part of the Environment Agency's Review of Consents under the Habitats Directive. It was assumed for the purposes of the RoC that all discharges were operating to their licensed limit. The assessment could not conclude with certainty that there would be no adverse effect on the integrity of the site's features as a result of dissolved oxygen sag due to organic loading (from sewage discharges as well as other sources)<sup>33</sup>. Low dissolved oxygen can impact on a number of estuary features; effects can include changes to the types and numbers of plant, animal and fish species present. The Environment Agency modelled all regulated consents that affect oxygen sag and concluded that they are responsible for approximately 40% of the total impact. In response it made changes to two discharge permits, including significant improvements in the Selby area to reduce major surcharges to the River Ouse.
- 5.4.5 It is concluded that development under the Bradford district Core Strategy is unlikely to affect any European site as a result of impacts on water quality.

## **5.5 Increased Emissions to Air**

**The revised screening assessment identifies a risk of significant effects resulting from the following proposed policies:**

- **BD1: City of Bradford including Shipley and Lower Baildon Sub Area**
- **AD1: Airedale Sub Area**
- **WD1: Wharfedale Sub Area**
- **PN1: South Pennine Towns and Villages Sub Area**
- **EC3: Employment Land Requirement**
- **HO3: Distribution of Housing Requirement**
- **WM2: Waste Management Sites**

- 5.5.1 Atmospheric pollution is a widespread issue, with background air quality heavily influenced by large point-source emitters including transboundary sources. During the 1800s the industrial revolution led to extensive use of steam-powered machines, and an increase in the number of factories in northern Britain including around Manchester, the Peak District and South Pennines. Nitrous and sulphurous oxides released from chimney stacks in South and West Yorkshire and Greater Manchester were deposited on the moors. Deposition of sulphurous oxides degraded or destroyed large areas of peat-forming *Sphagnum* moss, while nitrous oxide emissions (which remain high today) result in nutrient enrichment, benefitting, nitrophilous grasses so that they out-compete the mosses and other moorland vegetation.
- 5.5.2 Local pollutant sources can affect designated sites, particularly in relation to protected habitats within the SAC, from industrial emissions, from waste processing facilities which involve thermal treatment, and from road traffic emissions. The Core Strategy identifies broad criteria for identifying and selecting sites for the management of waste processing (Waste Management

<sup>33</sup> Other types of impact were considered, including entrainment and impingement of Lamprey, toxic contamination from current and past industry, and freshwater flows over mud flats, but none of these is linked to Core Strategy development in Bradford.

Policy WM2), and policies in the Economy Section (Policy EC3) also set parameters for identifying employment allocations, but the Core Strategy does not specifically allocate sites for waste processing or other large point-source emitters. However, through its spatial distribution of development and sustainable transport measures, the Core Strategy will affect the way in which locally emitted pollutants reach each site. The main pollutant effects of interest are acid deposition and eutrophication by nitrogen deposition. The following brief descriptions draw on information presented through the Air Pollution Information System<sup>34</sup> (APIS).












- 5.5.3 Acid deposition: caused by oxides of nitrogen (NO<sub>x</sub>) (or sulphur dioxide) reacting with rain/cloudwater to form nitric (or sulphuric) acid, and is caused primarily by energy generation, as well as road traffic and industrial combustion. Both wet and dry acid deposition have been implicated in the damage and destruction of vegetation (heather, mosses, liverworts and lichens are particularly susceptible to cell membrane damage due to excessive pollutant levels) and in the degradation of soils and watercourses (including acidification & reduced microbial activity).
- 5.5.4 Eutrophication by nitrogen deposition: consists of the input of nitrogen from NO<sub>x</sub> (and sometimes ammonia) emissions by deposition, and is caused primarily by road traffic, as well as energy generation, industrial combustion and agricultural practices. Nitrogen deposition can cause direct damage to heather, mosses, liverworts and lichens, as well as other plant species, because of their sensitivity to additional atmospheric nitrogen inputs, whilst deposition can also lead to long term compositional changes in vegetation and reduced diversity. For example a marked decline in heather and an increased dominance of grasses have been observed throughout the Netherlands and also in the East Anglian Brecklands (see for example Bobbink et al (1993) and Pitcairn et al (1991)). Furthermore, while plants are able to detoxify and assimilate low exposure to atmospheric concentrations of NO<sub>x</sub>, high levels of uptake can lead to detrimental impacts including:
- ▶ Inhibition of pigment biosynthesis, leading to reduced rates of photosynthesis;
  - ▶ Water soaking as NO<sub>2</sub> molecules attach to lipids in membranes, causing plasmolysis (removal of water) and eventually necrosis;
  - ▶ Inhibition of lipid biosynthesis, leading to reduced rates of regeneration and growth;
  - ▶ Injury to mitochondria and plastids, essential to internal processing of energy & proteins;
  - ▶ Decrease in stomatal conductance of air and water vapour; and
  - ▶ Inhibition of carbon fixation (at least under low light levels).
- 5.5.5 Critical loads and levels can be used both as a benchmark for air quality management, and assessing the impacts of actions that lead to new pollutant emissions. Nilsson and Grennfelt (1988) define the concept of critical loads and levels as “a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge”. Critical loads concern the quantity of pollutants deposited from the air to the ground (for example nitrogen deposition and acid deposition), whilst critical levels concern the gaseous concentration of a pollutant in the air (for example nitrogen oxides).

---

<sup>34</sup> Online at: <http://www.apis.ac.uk/index.html> [Accessed 17/10/12]

- 5.5.6 Appendix IV presents data available through APIS on background critical load/level exceedances for these key pollutants types. A selection of grid references within European sites on or close to the road network connecting to Bradford district were chosen to interrogate APIS (Figure 5.2) because beyond 200m effects from road sources diminish to the equivalent of background levels (Laxen & Wilson (2002), DfT (2005)). For each grid reference, the actual and critical load/level was obtained for acid deposition, nutrient deposition and NO<sub>x</sub> in relation to a representative qualifying habitat type, or closest available match thereto, within European sites of interest (North and South Pennine Moors SAC). Cells shaded in red indicate an exceedance, whereas those shaded in amber indicate that the background load/level is more than 70% the critical load/level i.e. it is approaching exceedance.
- 5.5.7 As can be seen, for every location queried, the nitrogen deposition load is already exceeded, often by a high margin; Wadsworth Moor (GR3) and Thornton Moor (GR4), which are dissected by the A6033 Hebden Bridge Road currently have a modelled nitrogen loading of 552% of the critical load for bog habitats. All locations except Round Hill (Grid Reference 1 and Embsay Moor (GR2) are also currently exceeded for acid deposition (from a combination of sulphur and nitrogen inputs). None of the locations are exceeded for atmospheric concentrations of nitrogen, although Rishworth/Moss Moor (GR6) is approaching exceedance; this site is sandwiched between the A672 Oldham Road and M62 (J23-J22).
- 5.5.8 The Design Manual for Roads and Bridges (DMRB; Highways Agency, 2007) provides guidance on assessing the impact that road projects may have on local air quality. Specific provision is made in relation to sites designated under the Habitats Directive. In this instance the assessment is in relation to existing, as opposed to new roads, however the guidance clarifies that *'where appropriate, the advice may be applied to existing roads'*. DMRB provides a scoping assessment for local air quality and initially requires the identification of roads which are likely to be affected by the proposals. The criteria for defining an affected road are:
- ▶ Road alignment will change by 5 metres or more; or
  - ▶ Daily traffic flows will change by 1,000 annual average daily traffic (AADT) or more; or
  - ▶ Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
  - ▶ Daily average speed will change by 10km/hr or more; or
  - ▶ Peak hour speed will change by 20km/hr or more.
- 5.5.9 The scoping assessment then requires that nature conservation sites (e.g. SAC/SPA/Ramsar) within 200m of the road and their characteristics be identified. The guidance states that if none of the roads in the network meet the traffic/alignment criteria (that is, they are not affected roads) or there are no relevant designated sites near the affected roads, then the impact of the scheme can be considered neutral in terms of local air quality and no further work is needed.
- 5.5.10 In selecting its preferred spatial development option for the Core Strategy, the Council commissioned an extensive transport study to examine impacts to all modes of travel (Steer Davies Gleave, 2010), based on a multi-modal model of the district's transport network. For all options considered the model produces trip rate forecasts by origin and destination, across all modes, according to 15 sectors of the district.

# Bradford Core Strategy HRA APIS Grid References

-  APIS Grid Refs
-  A Road
-  B Road
-  Motorway
-  Railway
-  SAC
-  Ramsar
-  SPA
-  CBMDC Outline
-  CBMDC Settlements
-  CBMDC 20km Buffer

Contains data from Natural England 2012



© Crown copyright and database right [2012]



<b>Scale</b> 1: 227,385	<b>Date</b> Oct2012
<b>Created by</b> SS	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0112_Bradford_Transp _2_20121024	

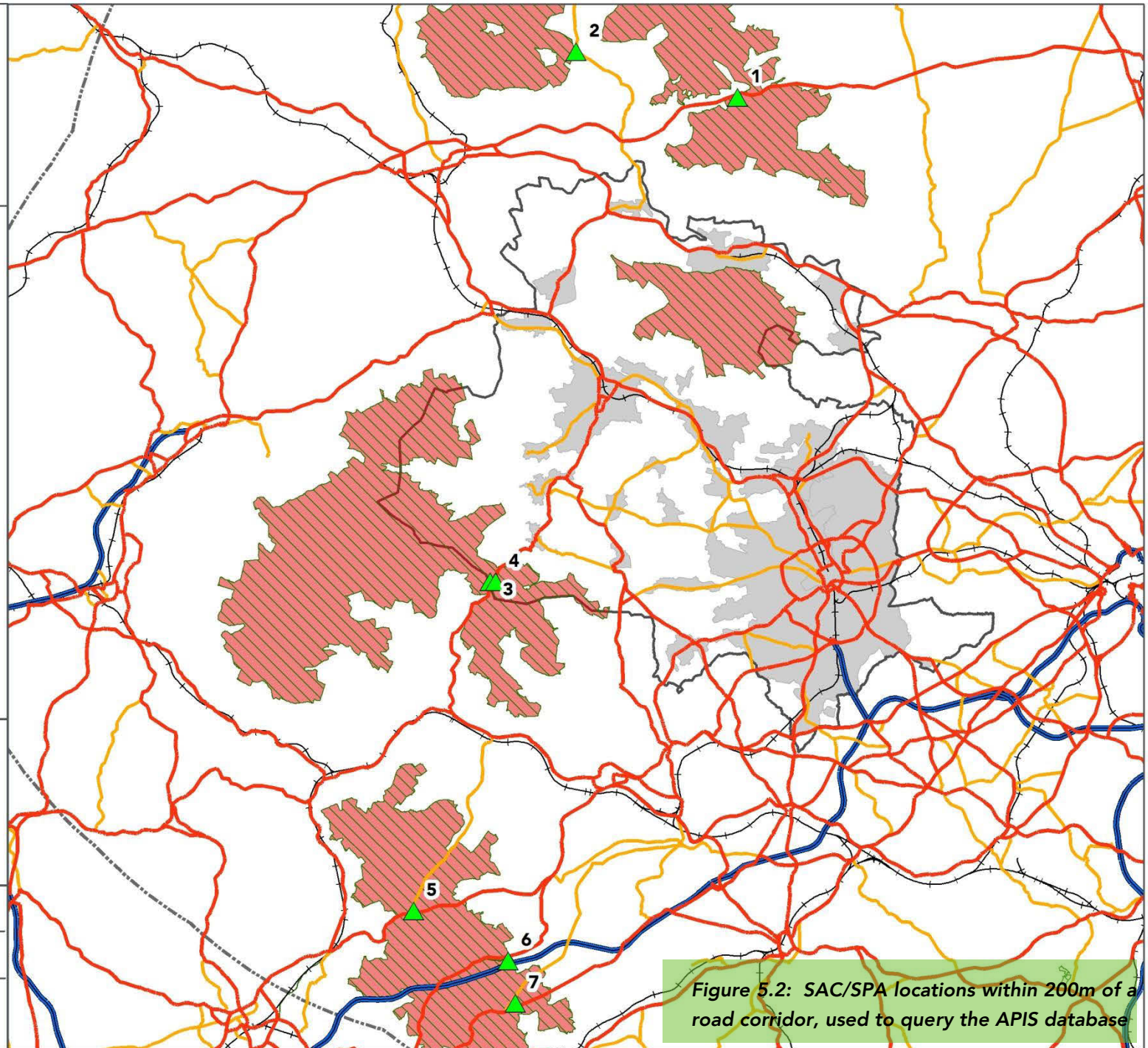
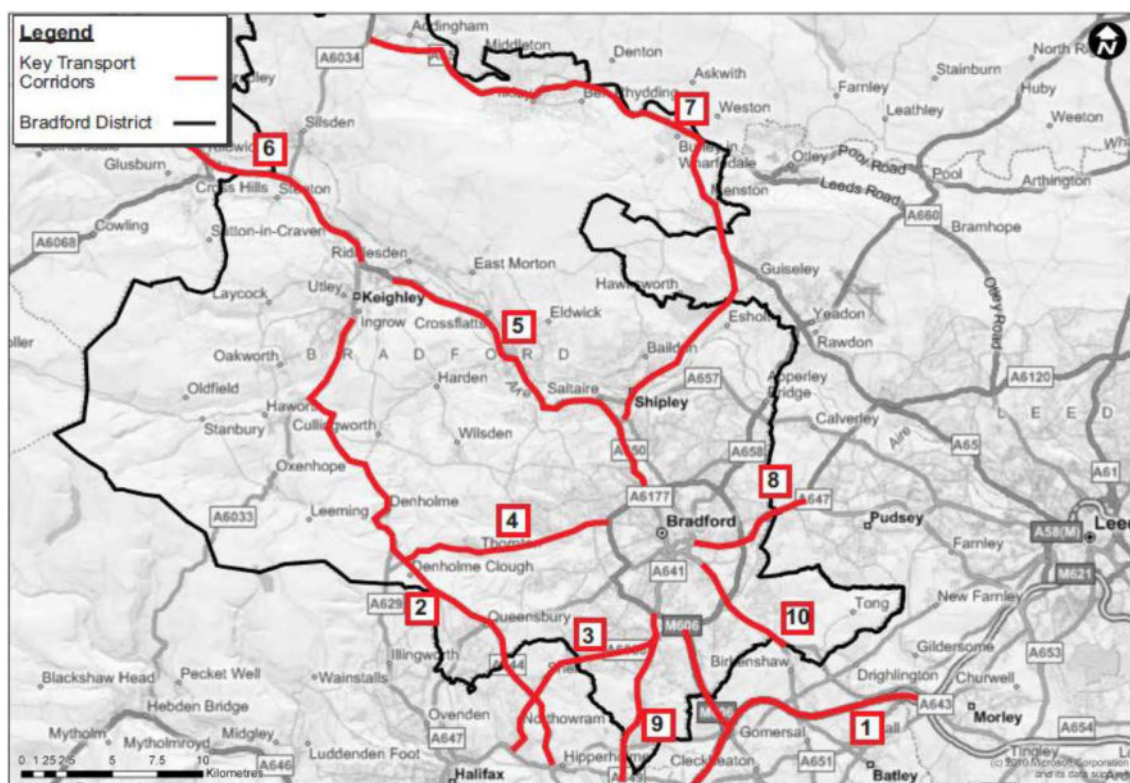


Figure 5.2: SAC/SPA locations within 200m of a road corridor, used to query the APIS database

5.5.11 However, the model did not produce traffic flow outputs in AADT format suitable for use with DMRB guidance. The study identifies ten key transport corridors in the district that can be expected to carry increased transport demand, as listed below and shown in Figure 5.3:

- ▶ 1: M606/M62;
- ▶ 2: A629/A644 (Keighley to Queensbury);
- ▶ 3: A6036/Little Horton Lane (route between Calderdale and Bradford – through Northowram/Shelf);
- ▶ 4: B6145 (Thornton Road);
- ▶ 5: A650 (Airedale corridor between Keighley and Bradford);
- ▶ 6: A629 (route between Craven and Bradford – through Silsden/Steeton area);
- ▶ 7: A65/A6038 (Wharfedale corridor between Addingham and Bradford);
- ▶ 8: A647 (route between Leeds and Bradford ring-roads);
- ▶ 9: A641 (route between Calderdale (Brighouse) and Bradford); and
- ▶ 10: A650 (Tong Street).



**Figure 5.3: Transport corridors with increased demand in the preferred option (Source: Steer Davies Gleave, 2010)**

5.5.12 Comparing Figure 5.3 with Figure 5.2, it can be seen that none of the study’s “key transport corridors” coincides with any of the locations on the road network falling within 200m of the North or South Pennine Moors SAC/SPA, although several of them are heading in the direction of trans-Pennine routes in the Rishworth and Moss Moor areas. This makes it difficult to draw



any firm conclusions regarding the potential impact of development-related traffic growth on the SAC/SPA.

- 5.5.13 It is recommended that more detailed testing and traffic modelling is undertaken during the pre-allocations testing stage which will precede development of the Allocations DPD. Consideration will also need to be given to the impacts of new development and increases in visitor numbers on pressure points in the local road network, where this skirts and traverses the SPA/SAC, particularly in relation to Rombalds Moor.

#### **Potential for In Combination effects**

- 5.5.14 Traffic growth resulting from Bradford Core Strategy developments could act in combination with both background traffic growth, and traffic increases resulting specifically from planned developments in neighbouring authority areas (e.g. Calderdale and Craven).
- 5.5.15 However, insufficient data currently exists to fully assess the likelihood of a significant atmospheric pollution effect on the North or South Pennine Moors SAC/SPA, either alone or in combination, resulting from traffic growth associated with new development proposed by the Core Strategy.

### **5.6 Wind Turbines (Collision Mortality Risk and Displacement)**

**The revised screening assessment identifies a risk of significant effects resulting from the following proposed policies:**

- **EN6: Energy**

- 5.6.1 Proposed policy EN6 encourages the development of energy efficiency, and low carbon and renewable sources of energy, which is to be welcomed in the context of climate change. The supporting text to EN6 acknowledges that the presence of the South Pennine Moors Phase 2 SPA places a 'strategic constraint' on potential new wind generation capacity.
- 5.6.2 The risk of impacts to bird populations from wind turbine development is well-documented in scientific literature. For example, wind turbines can negatively affect birds through the risk of collision mortality, habitat loss, displacement from otherwise supporting habitats, and disorientation from flight paths (see for example Langston and Pullan, 2003). Displacement leads to the reduction in birds' use of an area for feeding or roosting, or absence in entirety, effectively rendering the loss of habitats to birds. Research shows that such negative effects, as associated with wind turbines, have been observed at a distance of up to 800m (including zero); 600m is the maximum reliably recorded distance at which such effects would take place (Drewitt and Langston, 2006). However, there is inconclusive evidence in relation to the precise mechanisms of impacts, the general applicability of findings between species or sites, and the relative importance of disturbance, displacement and collision mortality risk in effects on bird populations and distribution.
- 5.6.3 Pearce-Higgins *et al.* (2009) compared twelve operational wind farms in unenclosed upland locations (moorland, rough grassland or blanket bog) to investigate whether there is reduced occurrence of breeding birds close to wind farm infrastructure including turbines, access tracks

and overhead transmission cables. Seven of the twelve species (Buzzard *Buteo buteo*, Hen Harrier, Golden Plover, Snipe, Curlew, Wheatear and Meadow Pipit) studied had significantly lower occurrence close to the turbines, after accounting for habitat variation. They also found sound evidence of reduced flight activity in raptors close to turbines. They concluded that there could be a reduction in breeding bird densities of up to c.50% within up to 500m of wind farms. But in a later study, Douglas, Bellamy & Pearce-Higgins (2011) found that Golden Plover showed an increase in numbers from 0.8 pairs per km<sup>2</sup> to 1.4 pairs per km<sup>2</sup> over two years close to an operational 17-turbine wind farm site. Of note was an increase from 4 to 9 plover territories within 500m of turbines, with even greater increases in numbers noted on the control site. These findings potentially underline the importance of prey abundance and habitat suitability in population numbers.

- 5.6.4 Furthermore, recent studies have suggested that impacts during construction may have greater detrimental impacts than those during wind farm operation (Pearce-Higgins *et al.*, 2012). Another multi-site, multi-species investigation, this study found that Red Grouse, Snipe and Curlew densities all declined on wind farms during construction, whereas Skylark and Stonechat population densities increased. Red Grouse populations recovered post-construction but, although Snipe and Curlew densities did not, there was little evidence for consistent post-construction decline in any of the species studied. They considered that high levels of activity and disturbance are likely to cause birds to vacate territories close to turbines during construction and that, depending on their subsequent breeding success, they may not return to breed in subsequent years.
- 5.6.5 Data were supplied by the Council and West Yorkshire Ecology on the distribution of wind turbine proposals within the district up to 31 March 2012; see Figure 5.4. This shows that a reasonably high proportion of proposals in close proximity to the SPA are unsuccessful in gaining planning consent. Guidelines have been prepared by West Yorkshire Ecology (2013) applicable to all wind turbine proposals which do not require Environmental Impact Assessment (EIA) and where ornithological interest has not been identified within the scope set by the Local Planning Authority of the EIA.
- 5.6.6 The guidelines focus on sites within 1km of the South Pennine Moors Special Protection Area, Sites of Special Scientific Interest notified for ornithological interest and any other sites with records of notable bird species. The paper provides provisional guidance for defining a proportionate level of ornithological survey and assessment information required for small wind development applications. Developers and wind power companies are encouraged to use the guidance to steer development away from locations which may have an adverse impact on the SPAs/SSSIs and where the cost of bird survey work may seem to be prohibitively expensive, with a higher risk of failure to gain planning approval.
- 5.6.7 A Zone of Adverse Impact for the purposes of this broad assessment is defined as 100m for small turbines up to 20m hub height, or 600m for turbines with a hub height of 20m and over, unless data searches indicate that other larger zones are necessary. The Zone of Adverse Impact resulting from the proposed development may be reduced where evidence from surveys demonstrates that there are already high background levels of disturbance which reduces the value of habitat for notable species. These assumptions are based on discussions with Natural England over previous planning applications.

# Bradford Core Strategy HRA: Wind Turbine Proposals (at 31/3/12)

Turbine Planning Data at 31/3/12

- + Appeal allowed
  - + Appeal dismissed
  - + Appeal in Progress
  - + Application withdrawn
  - + Dismissed
  - + Granted
  - + Not progressed
  - + Pending
  - + Refused
- SAC
  - SPA
  - County Boundaries
  - Local Authority Boundaries
  - CBMDC Outline
  - Settlements



Contains data from West Yorkshire Ecology 2012  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 121,088	<b>Date</b> Nov2013
<b>Created by</b> NP	<b>Reviewed by</b> NP

**Drawing number**  
 UE-0112\_Bradford\_Turbine  
 \_Data\_2\_131114

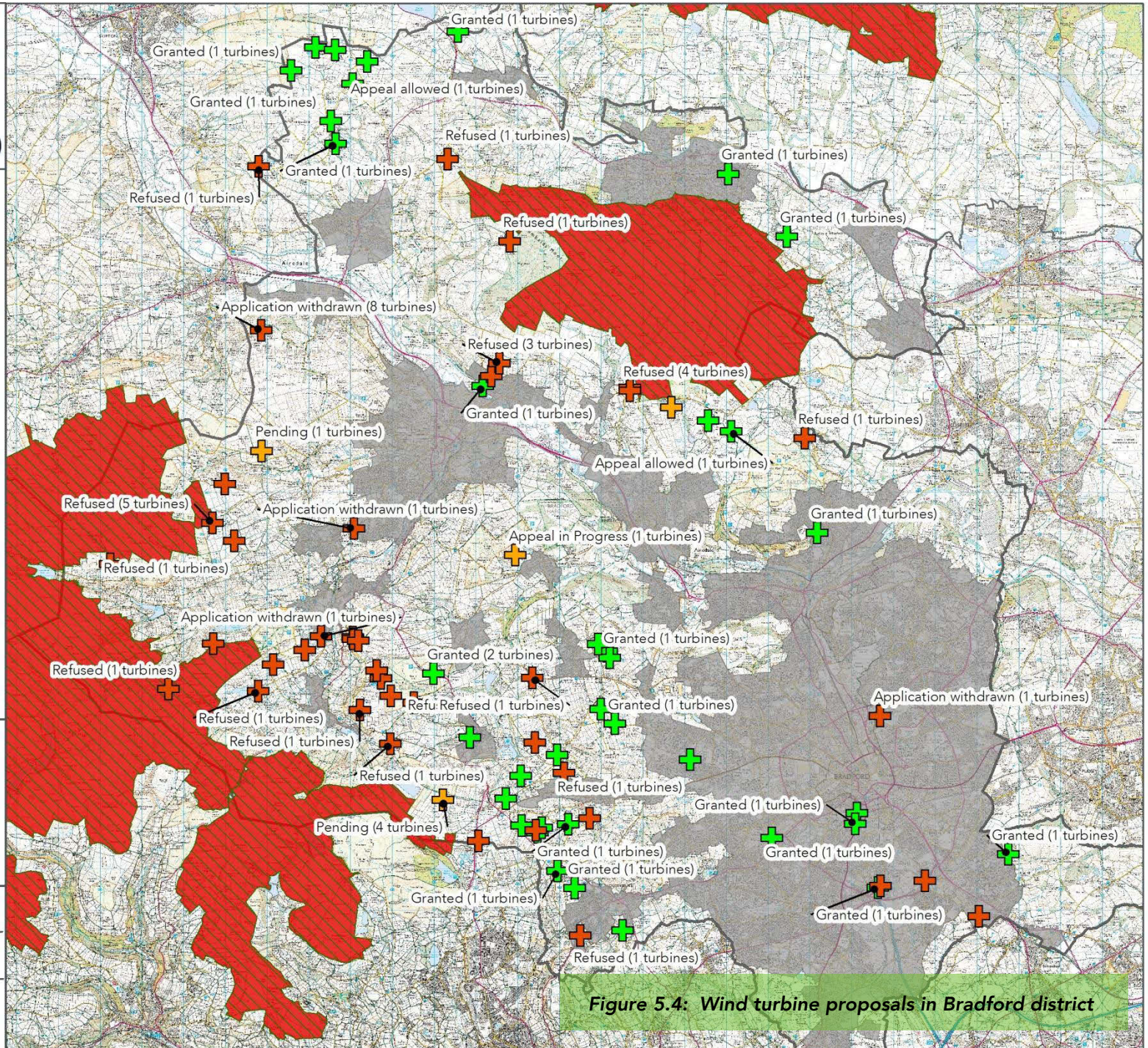


Figure 5.4: Wind turbine proposals in Bradford district

- 5.6.8 The Publication Draft Core Strategy does not allocate land for wind generation, but it does identify the SAC/SPA as a strategic constraint on potential new wind generation capacity. In this context it is concluded that development under the Bradford district Core Strategy is unlikely to affect any European site as a result of collision mortality risk or displacement, especially where the West Yorkshire Ecology (2013) guidelines are being applied.

#### **Potential for In Combination effects**

- 5.6.9 Given the absence of impacts from the Bradford Core Strategy in relation to wind turbine developments, there are unlikely to be adverse effects in combination with other plans and projects.

### **5.7 Recreational Impacts**

**The revised screening assessment identifies a risk of significant effects resulting from the following proposed policies:**

- **BD1: City of Bradford including Shipley and Lower Baildon Sub Area**
- **AD1: Airedale Sub Area**
- **WD1: Wharfedale Sub Area**
- **PN1: South Pennine Towns and Villages Sub Area**
- **TR4: Transport and tourism**
- **HO3: Distribution of Housing Requirement**

#### **Visitor activity**

- 5.7.1 Research into the effects of urban development on southern lowland heathlands has identified a number of pressures that threaten their habitat condition, arising from a range of factors that have been reviewed by a number of studies. Visitors surveys have revealed how much the open, remote and natural features of these lowland heathland are appreciated by the local population and make them attractive for a range of recreational uses, particularly walking and dog walking although horse riding, cycling, jogging, picnicking and bird watching are also identified as regular activities (see for example Clarke *et al.*, 2006, Liley *et al.*, 2006, Pincombe & Smallbone, 2009a&b). These trends are reflected in surveys of visitors to the South Pennine Moors SPA/SAC undertaken in Bradford district and outlined later in this report.

- 5.7.2 The range of recreational activities undertaken places the habitats and the breeding birds they support under pressure. This can arise from: disturbance to nesting birds leading to chilling or predation of eggs or young; displacement of birds from areas with high levels of disturbance; trampling and erosion of moorland vegetation and soils; increased risk of accidental or intentional fire; and nutrient enrichment and eutrophication of heathland soils from dog fouling (see for example Langston *et al.*, 2007, Liley & Clarke, 2003, Murison, 2002, Murison *et al.*, 2007, and Underhill-Day, 2005). Rombalds and Ilkley Moors, an isolated patch of SAC/SPA in the north of district, appears particularly vulnerable to this range of impacts, given its size<sup>35</sup> and relative proximity to urban areas on all sides.

<sup>35</sup> The Rombalds and Ilkley Moors part of the SAC/SPA is 2,528ha in size.

- 5.7.3 The Pennine Moors are subject to a wide range of recreational effects. These are reviewed in the 1998 *South Pennine Moors Integrated Management Strategy and Conservation Action Programme* and include; walking (with & without dogs), horse-riding, cycling/mountain biking, hang gliding (particularly at breeding sites or seasons), rock climbing, model aircraft flying, orienteering, large walking events, fell running, off-road driving (including 4x4 & scrambling), Grouse shooting and angling. The Strategy considered that *“these activities may have significant localised impacts, and have the potential to have wider conservation implications. Plans to extend or develop recreational activities in the area must be accompanied by appropriate assessment and monitoring.”*
- 5.7.4 In 2014 Natural England published a report entitled *Monitor of Engagement with the Natural Environment [MENE] Survey (2009-12): Visit taking in the South Pennines* (Burt et al., 2014) which was commissioned on behalf of the South Pennines Local Nature Partnership. It analysed data from the 2009-12 period with particular reference to the South Pennines and the surrounding South Pennines Catchment Area.
- 5.7.5 The survey revealed that 82% of visitors to the South Pennines lived within a distance of 10 miles and that a significantly higher proportion of visits (4x) to the South Pennines were to mountain or moorland, when compared with all England outdoor visits. Overall, 50% of visits included walking with a dog, but when limited to people who live within the South Pennines (as opposed to the Catchment Area and beyond), this figure rose to 68%. More than half (59%) of the same population of South Pennine residents visited the area at least weekly, with 25% visiting several times a week – 3% higher than the all England figure.

#### ***Review of visitor survey data (2000)***

- 5.7.6 In relation to the Bradford district, data was provided by the Countryside and Rights and Way division of Bradford Council from a survey of four sites carried out in late spring / early summer 2000. Two of the sites give access onto moorland which is part of the South Pennines Phase 2 SPA: Cow and Calf (Ilkley Moor) and Penistone Hill (Haworth Moor). Just over half (51%) of visitors to the two sites travelled less than 10 miles (c.16km), with 31% travelling less than 5 miles (c.8km), and an overwhelming majority of visits were made by car (75%). The proportion walking to their chosen site was 13%, with 5% arriving by bus and 4% travelling by train.
- 5.7.7 Over three-quarters of visitors (82%) had been to their site previously, with 20% making frequent visits, 12.5% visiting regularly, 48% occasionally, and 19% not having visited in the previous twelve months. The sites are popular with adults of all ages, with those over 50yrs making up 34.5% of respondents; people aged 31-50yrs formed 40% of respondents, 19-30yr olds made up 23.5% of the sample, with children (<18yrs) representing 1.5%.

#### ***General patterns of visitor activity (survey data 2013)***

- 5.7.8 Further surveys of visitor activity were undertaken by the Council during July/August 2013 in response to the recommendations of an earlier version of this report. A total of 807 interviews were conducted with 1,636 people (1,378 adults and 258 children), focused on a range of access points to the South Pennine Moors SAC/SPA (both Rombalds Moor to the north of the district,

and Haworth Moor to the south-west) as well as Harden Moor to provide comparator data (see Figure 5.9). This section reports the findings of initial analyses of this data.

5.7.9 Overall, 58% of visitors said they visit the site on at least a weekly basis, with nearly a third (29%) visiting daily. This reflects the finding reported on a South Pennine-wide basis in the MENE analysis outlined in 5.7.4 above. Access points to Haworth Moor had the lowest percentage of weekly visits (45%), while at Rombalds Moor 58% of visitors were weekly. Whilst nearly 20% of people stated a preference for visiting their site during the summer, over three-quarter of respondents stated no preference indicating that they would visit with the same frequency throughout the year.

5.7.10 The majority of visitors (73%) travelled to site by car, a trend which was particularly strong at Harden Moor, but a much higher proportion of visitors at Rombalds Moor arrived by foot reflecting its easy accessibility from Ilkley and other settlements; see Table 5.5.

**Table 5.5: Mode of travel to site (%)**

Mode	All sites	Harden Moor	Rombalds Moor		Haworth Moor
			Airedale	Wharfedale	
Car	73	97	44	69	79
Bus	1	-	-	2	1.5
Cycle	4	-	7	2	2.5
Horse	-	-	-	-	0.5
Walk	21	3	46	26	15
Train	1	-	3	1	1.5

5.7.11 Approximately half (49%) of all groups interviewed had taken at least one dog with them; 28% had more than one dog. Of those who took dogs, 77% let all of their dogs off the lead, 9% let some of their dogs off, and 14% kept all dogs on the lead during their visit. At Harden Moor just 10% of groups were not accompanied by a dog, a figure which increased substantially at Haworth Moor (60%) and Rombalds Moor (58%).

**Impacts on raptors**

5.7.12 The impacts of recreational access on birds of prey are difficult to assess. These birds exist at low densities and will select nest sites in secluded locations away from human disturbance. There is likely to be a critical threshold level of disturbance above which they will be unable to utilise an area of moorland for nesting. Ground nesting birds of prey such as Merlin and Short-eared Owl are likely to be particularly vulnerable to such disturbance.

**Impacts on wading birds**

5.7.13 Research into the effects of walkers on nesting Golden Plover is of particular interest (e.g. Finney *et al*, 2005). They investigated effects of recreational disturbance on Golden Plovers in the Peak District National Park. A population of birds was studied at Snake Summit on the

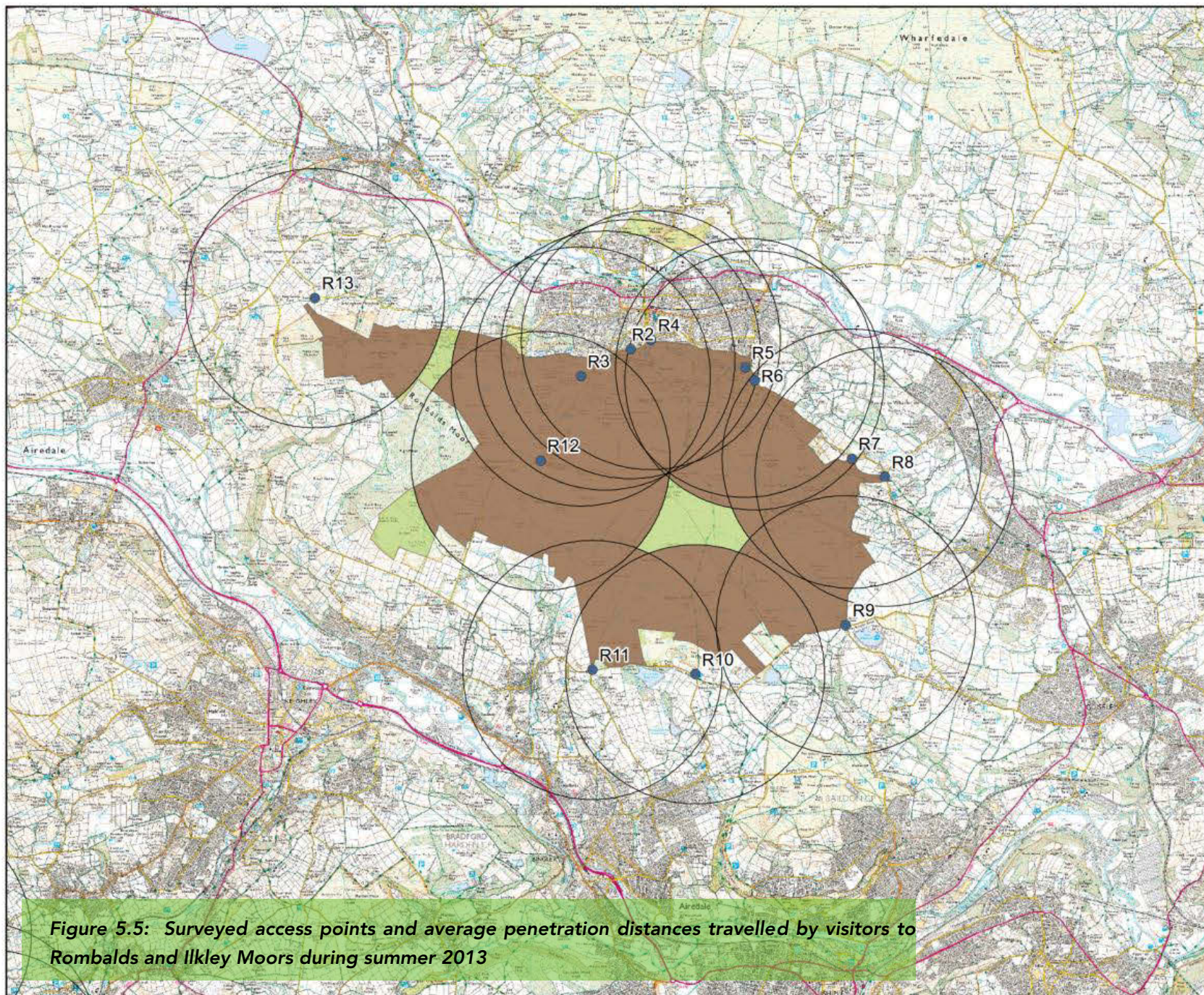
route of the Pennine Way. Surveys of breeding Golden Plovers were carried out during the years 1986–1988 and 1996–1998. The Pennine Way was resurfaced with flagstones between these two survey periods. The study found that recreational disturbance along the Pennine Way, equating to approximately 60 visitors per weekend day, resulted in Golden Plovers avoiding a zone 200m wide either side of the unsurfaced path, and that this was likely to result in a reduction in breeding density within the study site as a whole. They concluded that:

*“The results from this study suggest that an increase in recreational activity could have an adverse impact on breeding Golden Plovers, and potentially other upland waders, by reducing the availability of suitable chick-rearing habitat, but that this is most likely to occur in extreme situations, where there is very high visitor pressure.”*

- 5.7.14 Whilst this study was carried out in a different context to the South Pennine Moors in Bradford district, its findings indicate that on well-used unsurfaced access routes across the Pennine Moors there is likely to be an avoidance by breeding Golden Plover and potentially other waders. The width of this disturbance zone can be as much as 400m (200m either side of the path). This effect was studied in relation to Golden Plover, the most numerous species for which the South Pennine Moors Phase 2 SPA has been selected. However, it is also likely to affect other ground nesting birds, such as Dunlin and Curlew, in similar ways.

#### ***Interpreting the available evidence in relation to the South Pennine Moors***

- 5.7.15 An approach to assessing potential impact of recreational access is to consider the distance that walkers and dog walkers penetrate into a site from an access point i.e. the average straight line distance between the point of access and the furthest part of the SPA visited during their walk. Access points are often car parks but in sub-urban locations may be the start of a footpath or bridleway. Visitor surveys were undertaken within Bradford’s South Pennine sites to establish how far visitors penetrate into the site, broadly in line with the methods of similar surveys undertaken at a number of lowland heathland sites in Dorset, the Thames Basin, Wealden Heaths and Ashdown Forest. Combining the data for Dorset and Thames Basin Heaths, approximately half of visitors penetrate into a site by up to around 700m (Liley *et al.*, 2006). Other surveys show penetration distances for walkers and dog-walkers on Ashdown Forest of 867m and 872m respectively, and Wealden Heaths of 920m and 784m respectively (mean of the latter four distances = 860m).
- 5.7.16 Similar analysis was undertaken using walked route data collected during the Bradford South Pennines visitor survey of summer 2013. This shows that the average penetration distance recorded by visitors to the moorlands to the south and west of Haworth was 1,856m, while the average penetration distance at Rombalds and Ilkley Moors was recorded as 1,951m. Figure 5.5 and Figure 5.6 illustrate the extent of these penetration distances as buffers around each of the access points included in the survey, and demonstrate that a significant area of the SPA may be subject to the effects of recreation by the average visitor, especially within Rombalds and Ilkley Moors. These buffer zones cover an area of 2,336ha on Rombalds/Ilkley Moor and 2,035ha within the moorlands south and west of Haworth. It is interesting to note that the possible ‘gap’ in disturbance suggested by Figure 5.5 actually includes one of the more heavily walked routes from access point R10 towards Ilkley along which upwards of 40 people were recorded during the course of the survey.



- Access Point
- Average Penetration Buffer
- SPA covered by buffers
- SPA

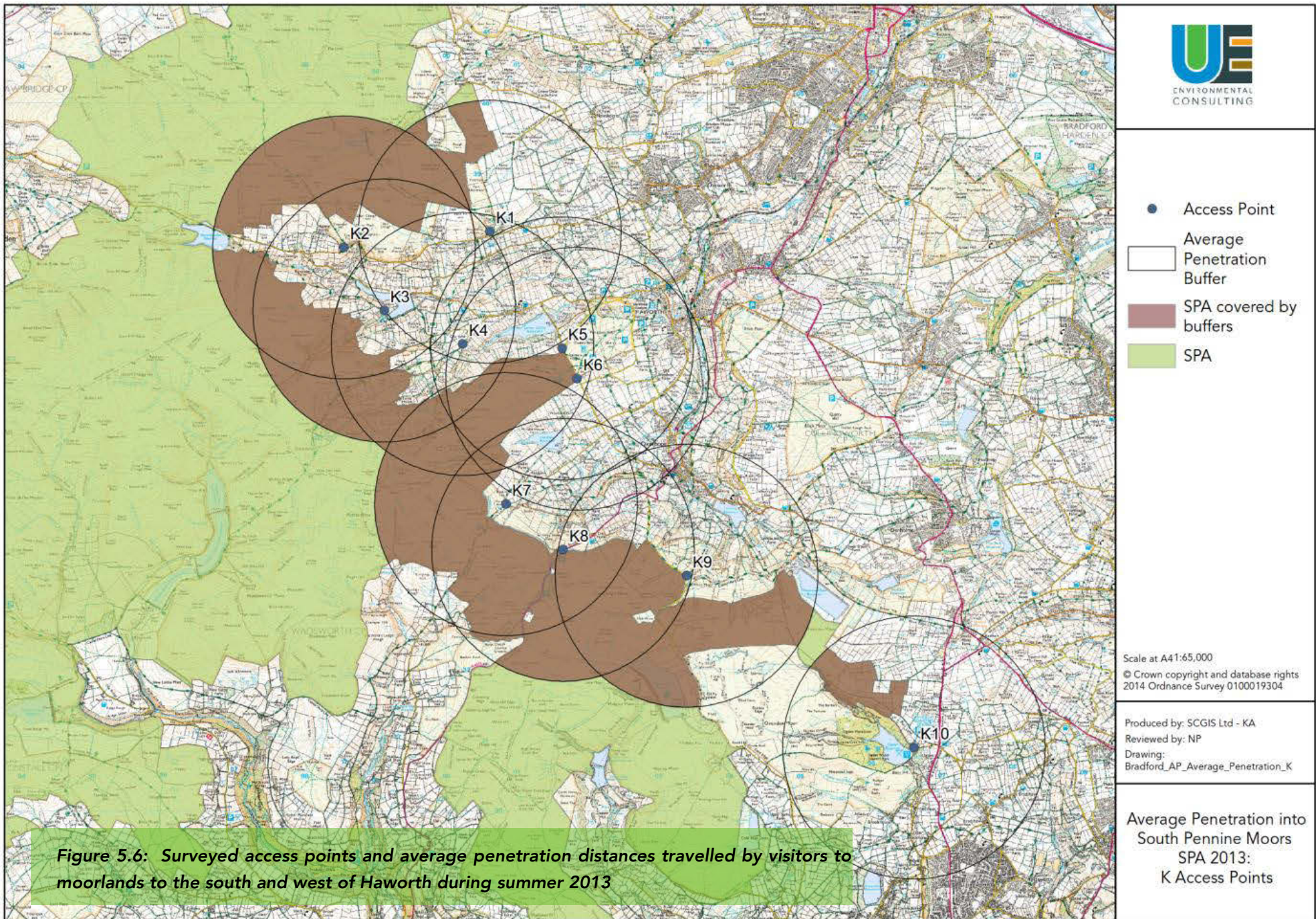
Scale at A41:75,000  
 © Crown copyright and database rights  
 2014 Ordnance Survey 0100019304

Produced by: SCGIS Ltd - KA  
 Reviewed by: NP  
 Drawing:  
 Bradford\_AP\_Average\_Penetration\_R

Average Penetration into  
 South Pennine Moors  
 SPA 2013:  
 R Access Points

**Figure 5.5: Surveyed access points and average penetration distances travelled by visitors to Rombalds and Ilkley Moors during summer 2013**





### **Effects of dogs**

- 5.7.17 An important impact of urban development is that arising from the increased use of accessible land by walkers with dogs. These are generally included within the wider mix of recreational and urban pressures considered above, but a more detailed understanding of the mechanisms by which they impact on lowland heathland wildlife is helpful in predicting potential impacts on the moorland habitats and bird populations in the vicinity of Bradford.
- 5.7.18 Dogs have been recorded preying on ground nesting birds and studies have shown a variety of bird species being flushed from their nest by dogs. Studies have also shown birds to be wari-er of dogs and people with dogs than people alone, with birds flushing (flying away) more readily, more frequently and at greater distances, and staying longer off the nest when disturbed (Murison, 2002). Other studies have shown dog fouling to cause changes in heathland vegetation with a reduction in heather and increase in grass abundance due to the effects of nutrient enrichment (eutrophication). Dogs also chase and worry livestock. As a consequence, conservation grazing schemes can be affected due to graziers not being prepared to graze sites with open access to dog walkers (Underhill-Day, 2005).
- 5.7.19 Data from 2013 visitor surveys at Bradford district SPA/SAC sites shows that 49% of respondents had at least one dog with them, 77% of whom let them off the lead when on the site. The high proportion of visitors accompanied by dogs, a high proportion of whom were let off the lead, combined with the information presented in Figure 5.5 and Figure 5.6, indicates potential for significant zones of disturbance around access points.

### **Trampling and erosion**

- 5.7.20 A comprehensive review of the effects of trampling and erosion on moorland heath and blanket bog was undertaken as part of the implementation of the CRoW Act (Anderson ed., 2001). The following review has been extracted from this report, the main findings of which were:
- ▶ Off-path use can be as high as 30% where adjacent vegetation is amenable to walking;
  - ▶ Paths can have very substantial trampling widths in popular areas;
  - ▶ Path networks and density can increase significantly with increasing use;
  - ▶ People walk extensively in the uplands;
  - ▶ Lichen-rich and *Sphagna*-rich communities are destroyed after c.50-80 passages;
  - ▶ Wet vegetation on peat is very sensitive;
  - ▶ Acid grassland and young heather less vulnerable;
  - ▶ Heather in montane situations more sensitive than at lower altitudes;
  - ▶ Crowberry and *Vaccinium* species are sensitive to trampling; and
  - ▶ Vegetation recovery may not be to pre-existing communities.
- 5.7.21 The work by Anderson (1990), which involved counting visitors on and off paths in large areas of open access (or *de facto* access) moorland in the Peak District, showed that across all the


vegetation types, on average, 23.4% of people were off the path. This was accentuated beside small rivers and on blanket bog. In the Peak District this habitat is mostly M19 *Eriophorum vaginatum* mire with minimal *Sphagnum* cover, or eroding, dissected blanket mire with cottongrass, crowberry and bilberry, and in this respect it is similar to much of the vegetation within the two SAC adjacent to the Bradford area.

- 5.7.22 There is a long tradition of fell or hill walking involving direction finding and off-path use, especially in the South Pennines. Even where there are primary footpath routes like the Pennine Way, the intensity of use has resulted in eroding, boggy ground which pedestrians avoid as far as possible, resulting in an extension of the path widths. Research has shown that similar effects arise from use of such areas by mountain bikers. South Pennine Moors sites within Bradford, notably Rombalds Moor, have seen a significant increase in mountain biking in recent years.
- 5.7.23 In addition to extensive off-path use, path networks have increased in extent and density, and have deteriorated in condition, with a proliferation of routes developing (Bayfield & Aitken, 1992). Research has also shown how, if the path surface becomes difficult to walk on due to erosion, a new path forms alongside, thus increasing the impact width. Bayfield (1985) notes that path width can continue increasing for some time: at least 12 years on Stac Polly, 14 years on the Cairngorms, and longer on the Pennine Way in the Peak District.
- 5.7.24 In many upland areas, unlike some lowland sites, a significant proportion of visitors typically walk more than two miles probably in areas where repeat visits and a general familiarity is greater, as in the South Pennines near the large conurbations where weekend rather than holiday visitors predominate. For example, the Peak Park Joint Planning Board Recreation Survey (1988) found that on average 22% of 18.5 million visitors walked more than two miles (more in winter, and fewer in summer).
- 5.7.25 A review of the relative sensitivity of plant species to trampling was undertaken by Anderson (1990) in the Peak District moorlands. The relative sensitivity of species and their associated Annex 1 habitat types within the South and North Pennines SAC are shown in Table 5.6. The Review concludes with a summary table of impacts of public access to moorland habitats, including direct as well as indirect impacts; see Table 5.7 (from Anderson, 2001).

#### **South Pennine Moors zone of visitor influence**

- 5.7.26 Visitor surveys were undertaken by the Council during July and August 2013 at a range of access points to the South Pennine Moors SAC/SPA within its administrative area; see Figure 5.9. Post code data collected during the surveys were analysed to explore whether an approximate visitor catchment area could be established for this part of the moors.

**Table 5.6: Relative sensitivity of moorland plants to trampling pressure (Anderson, 1990)**

Less sensitive	Species name	Notes	SAC/SPA Presence
	Common bent/crested dog's-tail grasses	As in some in-bye land	Not major component of SAC Annex 1 habitats
	Wavy hair-grass/sheep's fescue	On mineral soils	Often minor component of SAC dry heath habitat
	Heather	Young	Major component of Annex 1 dry heath and blanket bog habitats
	Mat-grass	Usually on drier, thin peats or peaty mineral soils	Often component of heavily grazed dry heath habitat
	Purple moor-grass	Usually on wetter flushed peaty soils.	Major component of wetter heath and blanket bog habitats
	Bracken	Young plants	Can be invasive on drier heath and acid grassland habitats
	Heather	Old – old plants are brittle and easily broken.	Major component of Annex 1 dry heath and blanket bog habitats. Important for nesting SPA birds
	Crowberry/bilberry	On peat	Major component of Annex 1 dry heath and blanket bog habitats
	Cotton-grass spp.	Cotton-grass mire on peat	Major component of Annex 1 blanket bog habitats
	Sphagna	Flushes, mire on peat.	Major component of blanket bogs and transition mire habitats
More sensitive			








**Table 5.7: Summary of potential significance of access impacts on mountain and moor**

Habitats	Direct Impacts		Indirect Impacts	
	Trampling	Disturbance	Fire	Management
Dry dwarf-shrub heath	XX		XXX	
Wet dwarf-shrub heath	XXX		XX	
Blanket mire	XXX		XXX	
Mountain	XXX		X	
Acid grassland	XX		XX	
Calcareous grassland	XX			XX
Flushes/springs	XXX			
Rock ledges	XX			
Screes	XX			
Breeding birds		XXX	XXX	XX
Wintering birds (Raptor roosts)		X		
Invertebrates	XX		XX	X
Deer		XX		
Earth heritage	X?			

Key (degree of negative effects): Least X XX XXX Most

The assessment assumes a moderate to high level of use to have the above impacts.

# Bradford Core Strategy HRA: Visitor Survey Access Points

-  Surveved Access Points
-  SAC
-  SPA
-  County Boundaries
-  Local Authority Boundaries
-  CBMDC Outline
-  Settlements

0 0.9 1.8  
Kilometers



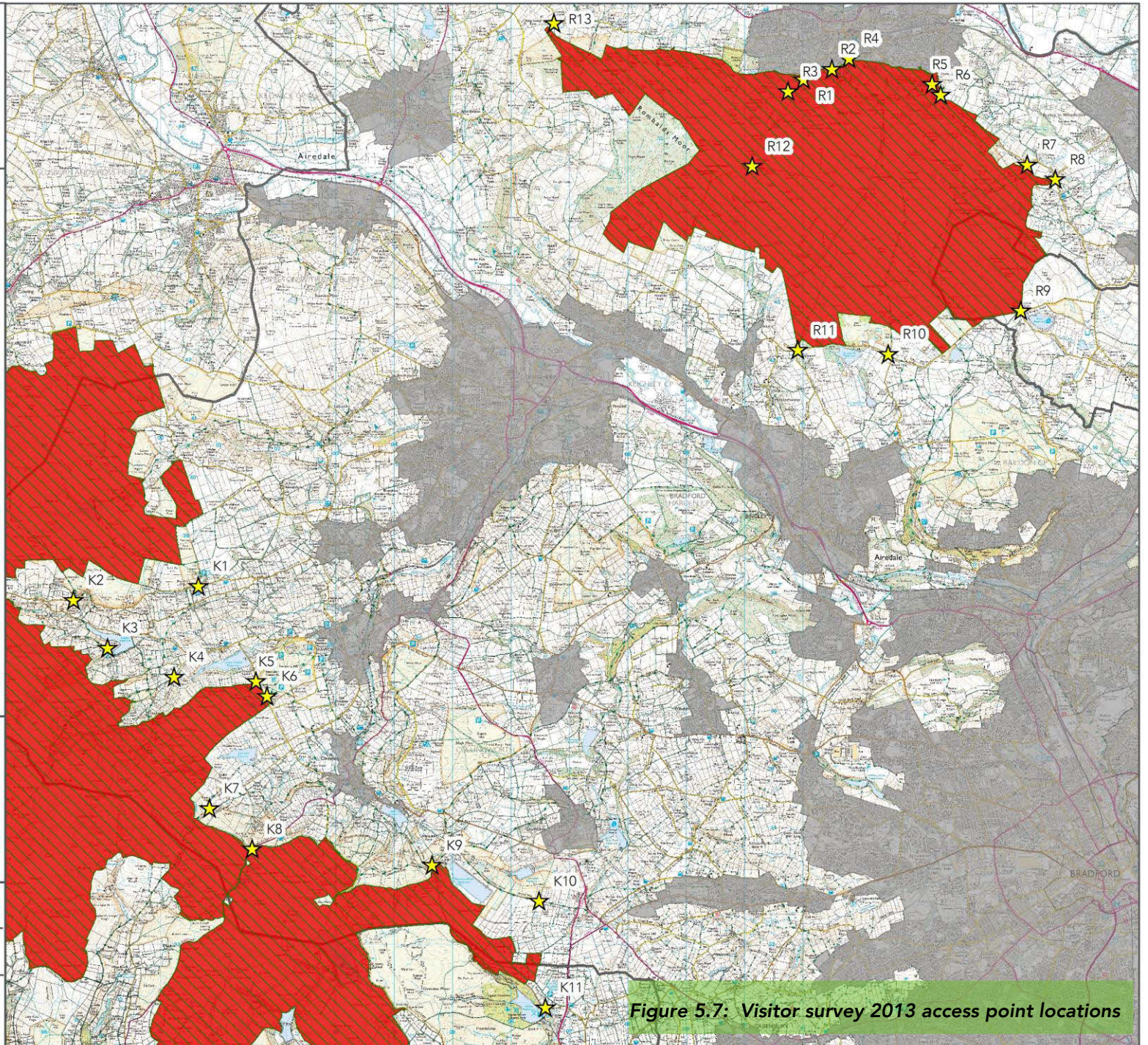
Contains data from West Yorkshire Ecology 2012  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2014]  
 Ordnance Survey 0100019304



ENVIRONMENTAL  
CONSULTING  
Unit 5 Westergate  
Business Centre  
Brighton  
BN2 4QN

<b>Scale</b> 1: 86,303	<b>Date</b> Oct2014
<b>Created by</b> NP	<b>Reviewed by</b> NP

**Drawing number**  
UE-0112\_VS\_Access  
\_Points\_2\_141002

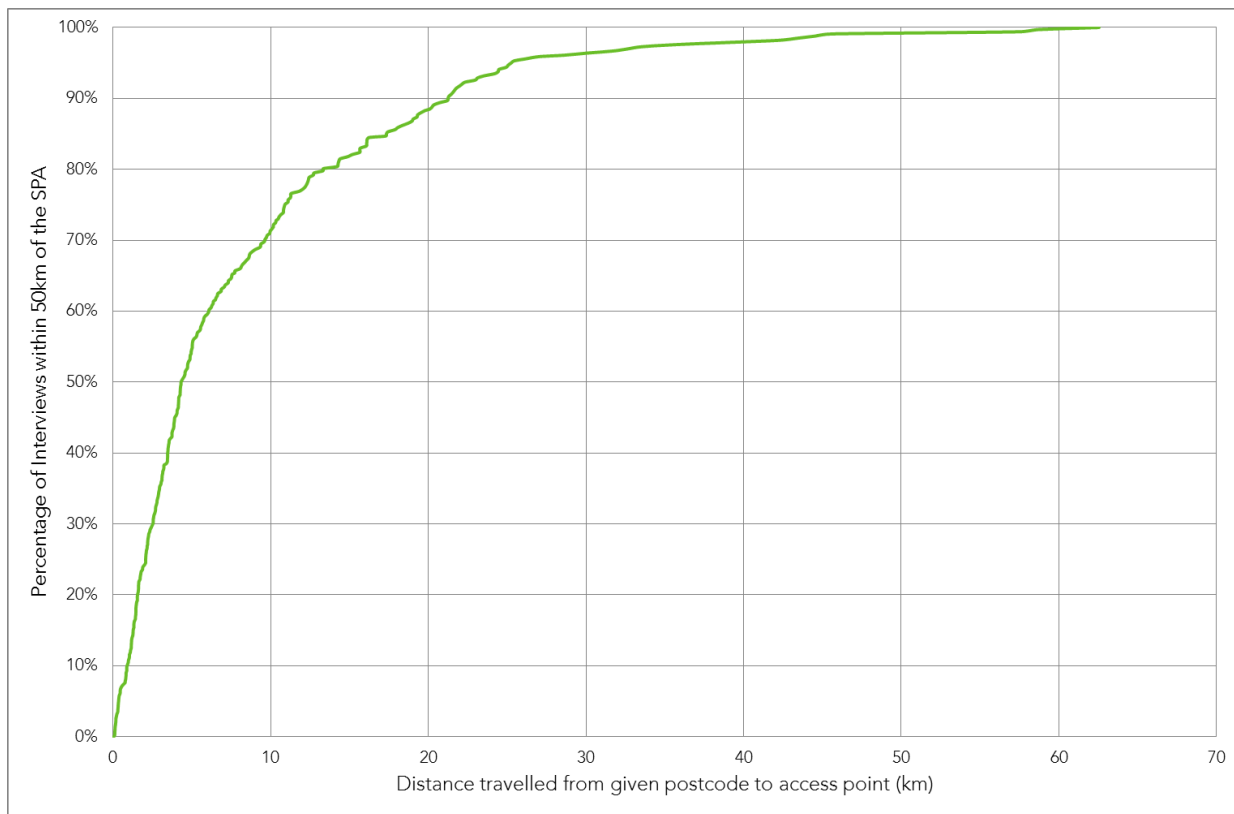


**Figure 5.7: Visitor survey 2013 access point locations**

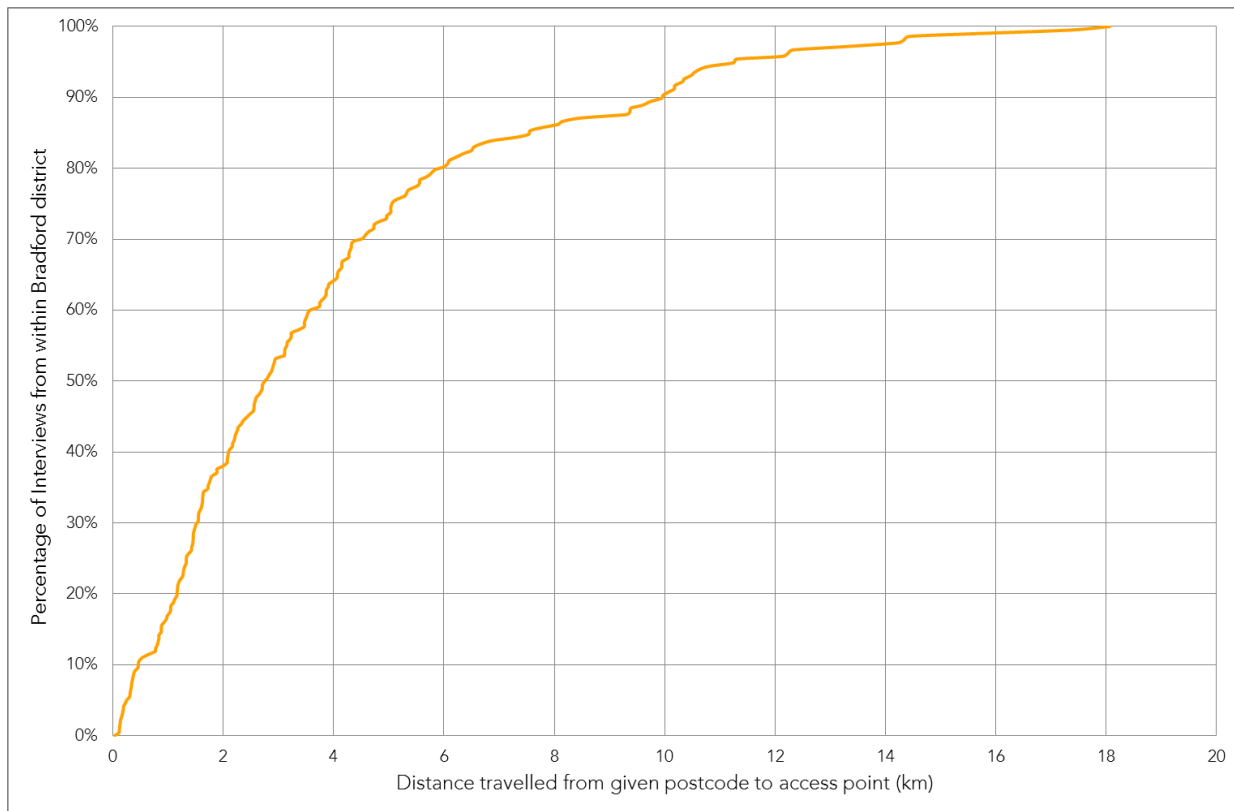
- 5.7.28 A Microsoft Access database was provided by the Council which contained the postcode data collected from each questionnaire respondent, together with location (access point) at which they were interviewed and responses to each of the questions included in the survey. The first step in the analysis was to clean the postcode dataset, i.e. to insert a space to six digit postcodes and convert to upper case to enable the data to be imported to ArcGIS 9.3, and remove invalid or incomplete postcode records<sup>36</sup>. The next step was to attempt to geo-reference the postcodes using Ordnance Survey CodePoint data.
- 5.7.29 After removing all records with invalid or incomplete postcodes, 427 were successfully matched to OS CodePoint data (version 2014.2.0 (April 2014)) supplied by the Council. Three of these did not provide an access point location, and 54 were interviewed at access points on Harden Moor which is outside of the SAC/SPA and included in the survey to provide comparator data. The remaining 370 records originated from a very broad geographic area, with the furthest record travelling from a postcode 411km from the point of access to the moors. In order to avoid unnecessarily distorting the analysis it was decided to exclude all outliers beyond 50km, which resulted in a total visitor survey dataset of 343 records (out of 807 interview respondents in total, or 42.5%).
- 5.7.30 The distance between postcode of origin and point of access to the SAC/SPA was then calculated within GIS for each record. Finally, these 343 records of distance travelled to the SAC/SPA were used to generate a cumulative distribution curve; see Figure 5.8. Natural England advises that the 75<sup>th</sup> percentile should be used as the upper threshold for determining a zone of influence for assessing recreational impacts on European sites, as this figure has been successfully defended at Examination in Public in relation to other sites. Using this threshold for the subset of 343 records travelling from within 50km results in a zone of influence extending to approximately 10.5km from the SAC/SPA boundary.
- 5.7.31 The analysis was repeated to examine how far residents within Bradford district travel to reach the SAC/SPA. In this case 219 interview respondents gave a full valid postcode from within the district (not including those who were interviewed on Harden Moor). The resulting cumulative distribution curve is shown at Figure 5.9 which shows that 75% of Bradford residents travelled from within approximately 5km to reach the South Pennine Moors SAC/SPA in summer 2013. The curve continues to climb to the 85<sup>th</sup> percentile where it levels off. This coincides with the 7km mark. Taking an approximately average figure in relation to the 75<sup>th</sup> percentile for all visitors (10km) and Bradford residents (5km) also results in a figure of around 7km. Accordingly this figure has been chosen as the extent of the zone of influence in relation to recreational impacts.

---

<sup>36</sup> Of the 807 records, 342 contained invalid or incomplete postcodes. In these cases the postcode was: missing (35); or comprised just the first two characters of the postcode e.g. BD (4); or contained the district postcode e.g. BD1 (299); or contained reference to the visitor's home country (4).



**Figure 5.8: Cumulative distribution of distances travelled (all visitors) to South Pennine Moors SAC/SPA in summer 2013, excluding outliers >50km**



**Figure 5.9: Cumulative distribution of distances travelled (by Bradford residents) to South Pennine Moors SAC/SPA in summer 2013**

### **Analysing visitor numbers**

- 5.7.32 This section considers the proportion of people living within Bradford settlements who were recorded visiting the SAC/SPA during summer 2013, to derive estimates of total current visitor numbers. Figures quoted therefore only include visits from Bradford residents and not from those living outside the district. Overall visitor numbers are likely to be considerably higher than the figures discussed below.
- 5.7.33 Visitor survey records were linked to the settlement from which they originated. These were subsequently sorted into those records which were interviewed at the northern<sup>37</sup> part of the SAC/SPA, and those interviewed at the southern<sup>38</sup> part of the SAC/SPA in Bradford district, to establish whether visiting rates differed in relation to each of the main moorland blocks.
- 5.7.34 The proportion of the population<sup>39</sup> in each settlement which visits each moorland block was calculated as a daily rate by dividing the number of visitors recorded during the survey by the number of hours of survey, then multiplying by 12 daylight hours. The proportion of people visiting each access point was established by dividing the number of visitors by the number of access points surveyed, then multiplying by the number of available accesses to each moorland block (data supplied by the Council). Having estimated the proportion of daily visitors to each access point from each settlement, the data were then summed to estimate overall visitor numbers to each of the main moorland blocks.
- 5.7.35 A summary of estimated annual visit rates to each moorland block is presented in Table 5.8, broken down by settlement, together with the proportions which were recorded as arriving by car or visiting for the primary purpose of walking the dog. The results suggest that the northern part of the SAC/SPA at Rombalds and Ilkley Moors is much more frequently visited than the moors to the south and west of Haworth. This is perhaps not surprising given the extent of urban area in relative close proximity to Rombalds/Ilkley Moors.
- 5.7.36 The annual number of Bradford district residents visiting the northern SAC/SPA is estimated to be in the region of 131,954. At the southern part of the SAC/SPA, the number of Bradford district residents estimated to visit is in the region of 69,480. The estimated annual visit rates presented in Table 5.8 clearly indicate the significantly higher number of visits made by those living in settlements closest to the SAC/SPA, particularly in Wharfedale.
- 5.7.37 Summing these figures for north and south to give overall Bradford district visits to the SAC/SPA, the current annual estimated figure is in the region of 201,434. This can be expected to increase in the context of the Core Strategy Publication Draft housing distribution.

---

<sup>37</sup> Northern SPA: Rombalds and Ilkley Moors.

<sup>38</sup> Southern SPA: moorlands to the south and west of Haworth, or "Haworth Moor"

<sup>39</sup> Current settlement populations were estimated using the ONS 2013 release of Census 2011 population data at postcode level, aggregated to settlement level.



**Table 5.8: Estimated annual visit rates to each moorland block**

<b>Number of visitors to northern SPA (Rombalds and Ilkley Moors)</b>			
<b>Settlement</b>	<b>Current visitors</b>	<b>% car</b>	<b>% dog</b>
Oxenhope	0.00	-	-
Haworth	0.00	-	-
Harden	0.00	-	-
Cullingworth	1306.47	100.00	0.00
Denholme	0.00	-	-
Wilsden	0.00	-	-
Thornton	0.00	-	-
Cottingley	0.00	-	-
Bingley	5879.12	80.00	60.00
East Morton	653.24	100.00	100.00
Silsden	1306.47	50.00	0.00
Steeton	653.24	100.00	0.00
Addingham	4572.65	100.00	75.00
Burley in Wharfedale	20250.30	76.47	52.94
Baildon	2612.94	50.00	50.00
Ilkley	66630.03	69.35	66.13
Menston	5225.88	100.00	50.00
Bradford South East	1306.47	100.00	0.00
Oakworth	0.00	-	-
Canal Road Corridor	0.00	-	-
Bradford North West	1306.47	100.00	0.00
Shipley	1306.47	100.00	100.00
Bradford City Centre	0.00	-	-
Bradford North East	13717.95	75.00	25.00
Keighley	3919.41	75.00	25.00
Queensbury	0.00	-	-
Bradford South West	1306.47	100.00	0.00
<b>Sub-totals</b>	<b>131,954</b>	<b>-</b>	<b>-</b>

<b>Number of visitors to southern SPA (south and west of Haworth)</b>			
<b>Settlement</b>	<b>Current visitors</b>	<b>% car</b>	<b>% dog</b>
Oxenhope	1793.05	50.00	50.00
Haworth	15689.15	94.12	52.94
Harden	0.00	-	-
Cullingworth	0.00	-	-
Denholme	448.26	100.00	100.00
Wilsden	896.52	100.00	0.00
Thornton	5379.14	100.00	50.00
Cottingley	2241.31	100.00	50.00
Bingley	1793.05	100.00	0.00
East Morton	1793.05	100.00	50.00
Silsden	0.00	-	-
Steeton	0.00	-	-
Addingham	0.00	-	-
Burley in Wharfedale	896.52	100.00	0.00
Baildon	896.52	0.00	0.00
Ilkley	0.00	-	-
Menston	0.00	-	-
Bradford South East	0.00	-	-
Oakworth	7172.18	87.50	37.50
Canal Road Corridor	0.00	-	-
Bradford North West	0.00	-	-
Shipley	1793.05	100.00	0.00
Bradford City Centre	0.00	-	-
Bradford North East	0.00	-	-
Keighley	8068.70	80.00	30.00
Queensbury	8068.70	100.00	75.00
Bradford South West	12551.32	100.00	46.15
<b>Sub-totals</b>	<b>69,480</b>	<b>-</b>	<b>-</b>

### **Summary of key findings from Bradford South Pennines visitor survey 2013**

5.7.38 A number of key factors in relation to recreational impacts are listed below:

- ▶ It is estimated that 201,434 annual visits to the SAC/SPA are made by Bradford residents, and this can be expected to increase in future in the context of the Core Strategy Publication Draft housing distribution.
- ▶ The higher number of visits made to the northern part of the SAC/SPA and the higher number of visits made by those living close to the site, particularly in Wharfedale.
- ▶ The high proportion of visits made accompanied by dogs and the high proportion of dogs that are let off the lead.
- ▶ The relatively extensive network of tracks, paths, access points, car parks and local roads providing ease of access to areas of the South Pennine Moors within Bradford District.
- ▶ The potential for high levels of disturbance to bird species and vegetation within corridors around paths, tracks and zones in the vicinity of access points and car parks, particularly in relation to Rombalds Moor.

### **Potential for In Combination effects**

5.7.39 Other plans and projects which may act in combination with the Core Strategy to exacerbate recreational impacts to the SAC/SPA include proposed residential developments in neighbouring authority areas (e.g. Craven, Harrogate, Leeds, Calderdale, Burnley and Pendle) resulting in a net gain in dwellings within a zone of influence around the SAC/SPA. The zone of influence may differ in other authority areas in relation to residential population density and accessibility to/within the SAC/SPA.

5.7.40 In particular, the Screening Assessment of Leeds Core Strategy identified potential for in-combination effects in relation to increases or changes in recreational pressure due to the location of dwellings in relation to the South Pennine Moors. Bradford's Core Strategy and future Allocations DPD were identified as having the greatest potential for in-combination impacts in relation to this factor. The Leeds District housing requirement is to deliver 70,000 new dwellings between 2012 and 2028, and distributes the housing requirement between housing market areas rather than individual settlements.

## **5.8 Urban Edge Effects**

**The revised screening assessment identifies a risk of significant effects resulting from the following proposed policies:**

- **BD1: City of Bradford including Shipley and Lower Baildon Sub Area**
- **AD1: Airedale Sub Area**
- **WD1: Wharfedale Sub Area**
- **HO3: Distribution of Housing Requirement**

**Introducing urban edge effects**

5.8.1 In addition to recreational pressure, urban edge moorlands are also subject to a number of additional pressures from people’s use and abuse of these areas of land. This includes: fly tipping; dumping of garden waste and resultant introduction of invasive/alien plants; traffic causing air pollution and rat running along minor roads and tracks; off-road vehicles leading to track erosion; disturbance to (conservation) grazing livestock; increased incidence of wildfire; and predation from domestic pets and urban scavengers.

**Evidence of edge effects in general**

5.8.2 A review of the existing pressures on the lowland heathlands around Whitehill and Bordon in East Hampshire was undertaken using data gathered from a focus group workshop and from meetings with the major landowners (Cox & Pincombe, 2011). The results of this review are summarised in Table 5.9. Note that the data, although collected in 2011, do not relate to a defined period.

**Table 5.9: Urban and recreational pressures on lowland heathlands near Whitehill and Bordon, Hampshire (2011), and South Pennine Moors (2012)**

Impact type	Incidence	
	Whitehill-Bordon	South Pennines
Camping	9	-
Disturbance of wildlife	28	1
Disturbance to livestock	5	-
Dog fouling	21	-
Impact caused by animal (e.g. horse, dog)	10	-
Fly-tipping	72	3
Garden waste / invasive species	10	2
Litter	5	-
Mixed impacts	11	-
Off-road vehicles	32	21
Pollution	10	-
Rat-running / illegal parking	4	3
Theft or poaching	11	2
Unlawful digging / building	2	-
Vandalism (e.g. of visitor mgt infrastructure)	1	-
Wildfire or arson	83	2
<b>TOTAL</b>	<b>314</b>	<b>35</b>

5.8.3 The results of the focus group workshop fit closely with the findings of other studies undertaken by Liley et al., (2006) and Underhill-Day (2005). The range of effects that people and the proximity of urban development have on the conservation of lowland heathland sites have

become known as 'urban pressures' and present the greatest single impact of development on the conservation of these often fragmented and vulnerable areas of habitat.

- 5.8.4 It can be predicted that a similar range of impacts is likely to arise from urban development near to the upland moorland habitats found in the vicinity of the Bradford, particularly those moorland blocks that are isolated and fragmented (E.G. Rombalds/Ilkley Moors). Indeed, analysis of 2012 incident reports collected by the South Pennines Moorwatch website<sup>40</sup> (run by Pennine Prospects) reveals a range of reported activities, which aligns closely with those reported elsewhere; see Table 5.9.

### **Fire**

- 5.8.5 The effects of fire on lowland heathland have been reviewed by Underhill-Day (2005), who highlights a study for the UK Government by Kirby & Tantrum (1999) following an adverse report on the condition of the Dorset Heaths by The Council of Europe's Bern Secretariat. Kirby & Tantrum concluded that fires occurred at higher densities on the fringes of larger conurbations and in sites within developed urban areas, where fire events present a serious risk to ecological integrity. They considered that the statistical data, in combination with visual assessment and their fire event density map, suggested that the incidence of fires on heaths in urbanised areas was higher than those in more rural locations, and that this was likely to be due to easier access to these heaths, as the data suggested that most fires were deliberately set. The evidence suggested that fire setting by children of school age may be a significant factor in the pattern.
- 5.8.6 Heather burning is a traditional management tool on Grouse moors. But uncontrolled wildfire, particularly during spring and summer, destroys moorland vegetation which can then take many years to re-establish, depending on substrates and the characteristics of the fire. In various studies it took between 4 and 20 years for heathland vegetation to recover, and in some cases the fire triggered a change from heathland to woodland on the better soils. In most studies, burnt areas go through a successional phase of grassland before dwarf ericaceous shrubs re-establish.
- 5.8.7 Fire has a number of effects on the ecology of moorland habitats and bird populations. The most obvious effect is where spring and summer fires result in destruction of birds' nests. Fire also has a significant effect on the habitat structure and typical species even if there is no long term effect on species composition. This can have a major effect on the use of upland heathland by ground nesting birds such as Merlin, Short-eared Owl and Twite that select areas of taller heather in which to nest. More severe fire or repeated fires can have fundamental effects of the moorland soils and vegetation especially in areas of dry and drying heathland and blanket bog where fire can burn into the peat substrate. In these instances habitats can take many years to recover.
- 5.8.8 Although it is not possible to equate numbers of residents to numbers of fires it is clear that there is a relationship between urban development and fire incidents on moorlands. This was investigated by the Moors for the Future Partnership which commissioned research into moorland fire risk mapping on the South Pennine Moors (Walker *et al.*, 2009). This study

---

<sup>40</sup> [http://www.moorwatch.com/view-reports&report\\_start=0](http://www.moorwatch.com/view-reports&report_start=0)

identified c.400 fires occurring on the moorlands of the South Pennines in the nine year period between 2000 and 2008 (excluding North Yorkshire). Based on a 2x2km grid of wildfire occurrence, they identified three areas of high wildfire density and four areas of medium wildfire density as listed in Table 5.10 and shown in Figure 5.10. Overall, the study found that wildfire incidents were more likely to occur in areas close to centres of population, or where access to the moor was readily available.

**Table 5.10: High and medium fire density areas in West Yorkshire, Lancashire and Greater Manchester**

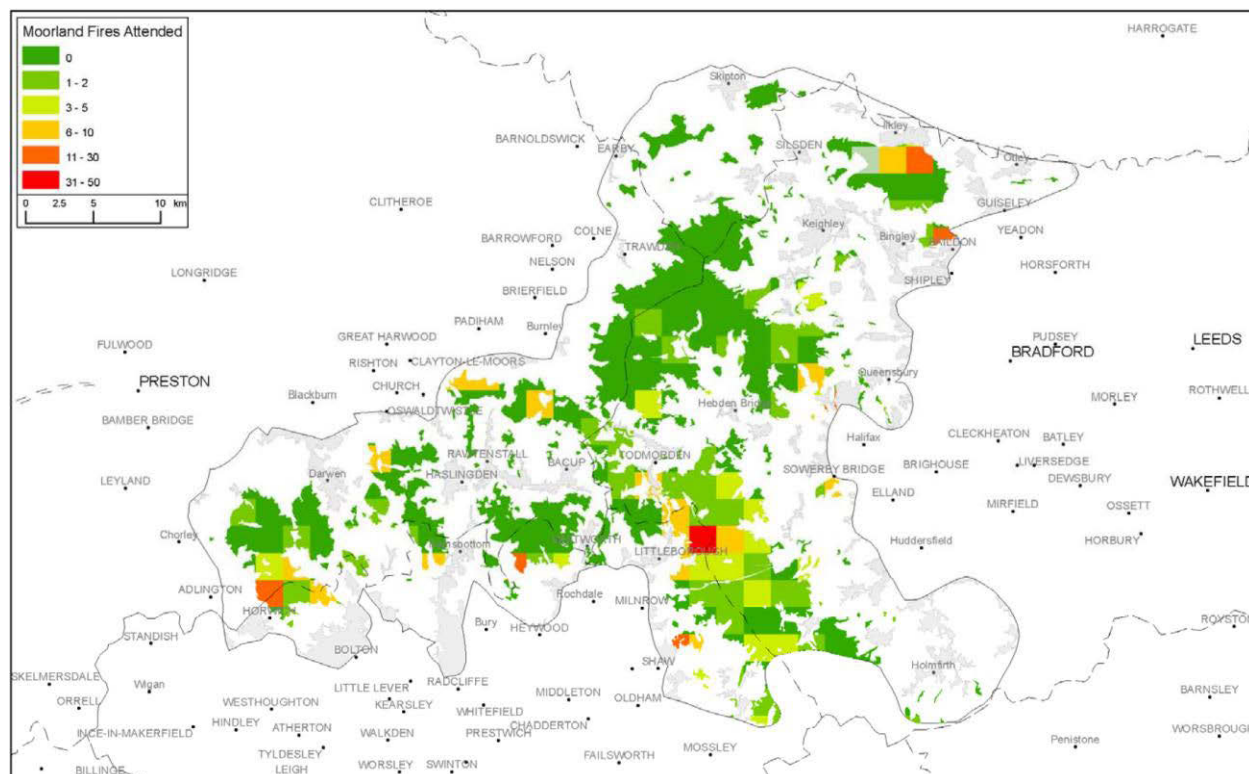
Moorland block(s)	County
<b>High fire density</b>	
Rishworth, Soyland & Blackstone Edge Moors	Greater Manchester, West Yorkshire
Crompton Moor	Greater Manchester
Illingworth *	West Yorkshire
<b>Medium fire density</b>	
Ilkley Moor	West Yorkshire
Baildon Moor *	West Yorkshire
Anglezarke and Rivington Moor	Greater Manchester, Lancashire
Ashworth Moor (Knowl Moor)	Greater Manchester

\* Illingworth, although within the Natural England ‘moorland line’ is actually two narrow wedges of scrub between two densely populated urban areas on the outskirts of Halifax, while Baildon Moor suffers high levels of recreational pressure from a number of sources, including a golf course (which extends across c.50% of its area) and caravan park.

5.8.9 Of the four Medium fire density areas it is interesting to note that they include Ilkley Moor and Baildon Moor. Both of these sites are located in the Bradford area. Ilkley Moor is within the SPA and SAC whereas Baildon Moor is not. Examining the extent of wildfires on Ilkley Moor Walker *et al.* (2009) determine that, although it is a good example of ‘true’ moorland habitat, it is strongly influenced by the town of Ilkley some of whose houses back directly onto the moor. Their analysis shows that 20 out of 26 of the recorded wildfires between 2000 and 2008 occurred within 1km of the urban boundary.

5.8.10 In summary, the information presented on fire identifies a number of key issues including:

- ▶ That fires are likely to occur in areas close to centres of population and where access to the moor is readily available;
- ▶ That heathland vegetation takes between 4 and 20 years to recover;
- ▶ The fire incidents can result in both the destruction of ground nesting bird’s nests and nesting habitat; and
- ▶ That wildfires present a serious risk to ecological integrity.



**Figure 5.10: Moorland fire density map of incidents attended between 2000-2008 at 2x2km cell resolution. Green indicates few to no fire occurrences, whilst red indicates fire hot spots (Source: Walker et al., 2009)**

**Pet predation (cats)**

- 5.8.11 Studies of the impacts of urban development on lowland heaths within southern England have identified the potential impact of predation by domestic cats on birds, reptiles and mammals. These can be European protected species, birds for which the SPA have been classified or typical species of qualifying habitats within SAC. A significant amount of research has been undertaken to understand the relationship between domestic cats and their effects on European wildlife sites.
- 5.8.12 The effects of cat predation on lowland heathlands are reviewed in detail by Underhill-Day (2005). Prey items taken by hunting cats have been collated from a number of studies and show that small mammals make up the greatest proportion of prey items (49-91%). Birds are the next most commonly preyed group making up between 5% and 30% of prey items. Amphibians, reptiles and fish make up the next most frequently preyed upon group with between 0.4% and 9.4% of prey items. Using this data, Underhill-Day (2005) estimates total numbers of prey caught by cats per 1000 households per annum as reproduced in Table 5.11.
- 5.8.13 The impact of cat predation on species populations is more difficult to assess. Mead (1982) could find no evidence of cats affecting the population of the eighteen bird species most commonly reported as having been taken by cats. However, cat predation was a significant cause of death for most of the species examined and accounted for 25% of all recoveries (ringed birds found dead) in six species. However, such levels of predation may be sustainable

for common and widespread species but may not apply to small populations found on localised or specialist habitat.

**Table 5.11: Total prey caught by cats per 1000 households per annum (Source: Underhill-Day (2005) estimated from Woods et al, 2003, and Howes, 2002)**

Species group	Estimated numbers	Estimated percentage
Mammals	6,735	72.7
Birds	2,075	22.4
Herpetofauna and fish	251	2.7
Invertebrates	140	1.5
Unidentified	6	0.7
<b>TOTAL</b>	<b>9,261</b>	<b>100.0</b>

- 5.8.14 Cats can range widely from their home. Again, a number of studies have assessed this ranging distance. In all studies, male cats range more widely than females. The distances they range vary considerably, from 80-400m for Cornish farm cats to 1107m ( $\pm$  589m) for male feral cats in Avonmouth Docks. Radio tracking studies have also looked at the size of cat home ranges and again show larger home ranges for male cats ranging in size from 615ha for cats in Australia to 134ha for cats in New Zealand. Using an average home range size for male cats from all studies of 365ha, and assuming a circular home range, gives a mean ranging radius of 1,078 m or just over 1km.
- 5.8.15 The potential impact of cat predation on the moorland habitats and birds has not previously been estimated. There are no quantifiable records of moorland birds being taken by cats; although cats have been recorded taking some species including Linnet *Carduelis cannabina* and Yellow Hammer *Emberiza citrinella* it is not recorded if these were killed on moorland or other habitats. Despite the inconclusive data of the potential impact of cats on moorland wildlife the evidence shows that cats kill a large number of animals including birds and mammals, and that cats range widely from their homes with male cats ranging up to 1,107 m.
- 5.8.16 Although the data remains inconclusive, as with lowland heaths, there is a potential threat from cat predation to birds and small mammals within 1km of urban areas.

**Urbanised avifauna**

- 5.8.17 Several species of birds are associated with urban and sub-urban areas including Crows *Corvus corone* and Magpies *Pica pica* (collectively known by their generic name of Corvids). The following review of the impact of these birds, and other urban predators, has been taken from Underhill-Day’s literature review of urban effects on lowland heaths and their wildlife (2005). It has been found that corvid numbers are higher on sites visited by more people (Taylor, 2002), and other predators have been recorded at higher densities in urban than rural environments including Magpies and Foxes *Vulpes vulpes*.



- 
- 5.8.18 Taylor (2002) investigated the predation risk to woodlarks on lowland heathland and analysed the degree of disturbance and the presence of predators, and found that as human activity increases, the presence and activity of corvids also increases. Hence the risk of predation is higher on sites with higher corvid activity.
- 5.8.19 The link between corvids and disturbance is much stronger early in the season; in late season it is no longer significant. Taylor considered that the link between human presence and greater number of corvids was not solely due to increased scavenging opportunities as litter was not common on the study sites and most disturbance was due to dog walkers. She suggested that corvids have greater opportunities to find food when sites are more heavily disturbed because the disturbance is associated with greater urban development around sites, which probably offers better scavenging opportunities.
- 5.8.20 The 2005 SPA breeding bird survey shows that the nearest breeding Golden Plover are 1km from settlement boundary of Ilkley. It is unlikely that predation by corvids will impact on these nesting birds. However, it may be that such effects are already operating and causing a displacement of birds away from the urban edge.

***Potential for In Combination effects***

- 5.8.21 The effects of increasing urbanisation are generally considered to operate over relatively short distances where new or existing developments are in close proximity to designated areas. Developments within surrounding districts (e.g. Craven, Harrogate, Leeds, Calderdale, Burnley and Pendle) within such a distance of the SAC/SPA could contribute to urban edge effects in that location. While these are unlikely to specifically act in combination with such impacts insofar as they may occur within Bradford district, when taken together, adverse effects on the overall integrity of the SAC/SPA are possible.

*This page is intentionally blank.*

## 6 Avoiding and/or Mitigating Impacts

### 6.1 Introduction

- 6.1.1 This section summarises changes that have been made in the Publication Draft Core Strategy in response to recommendations made in the Appropriate Assessment (AA) (May 2013) for the Further Engagement Draft Core Strategy, to avoid and/or mitigate the negative effects on the North and South Pennine Moors SAC/SPA.

### 6.2 Taking an Evidence-based Approach to Addressing Impacts

- 6.2.1 A number of additional studies were undertaken in order to improve our understanding of how the likely significant effects identified at the screening stage manifest themselves on the ground within the Bradford South Pennines.

#### **Visitor surveys**

- 6.2.2 Visitor surveys were needed to fulfil a number of data gaps including: the proportion of residents living around the moors that visit on a regular basis; how frequently they visit; from where and by what mode do they travel; what activities they undertake while visiting; and how far they penetrate into the designated sites. These data and related information were needed to enable impacts to be predicted more precisely, and to explore how impacts can be reduced by changing the overall spatial development strategy. They will also be essential to inform mitigation measures in future, including alternative recreational spaces and site management (see section 6.6 below).
- 6.2.3 Visitor surveys were subsequently carried out by the Council at 23 points of access to the South Pennine Moors SAC/SPA, plus three points on Harden Moor to provide comparator data. The distance travelled from home postcode to point of access was calculated, both for Bradford residents and all visitors recorded on site (where a full valid postcode was given). The results show that 75% of all visitors came from within approximately 10.5km of the SAC/SPA, while 75% of Bradford residents travelled around 5km to reach the site.
- 6.2.4 A clear cut-off point emerged at the 7km distance where 85% of Bradford residents were shown to travel from their home to the SPA/SAC as indicated in Figure 5.9. In relation to information presented in sections 5.7.26 – 5.7.31, 7km also reflects a broadly average figure in relation to the 75<sup>th</sup> percentile for all visitors (10km) and Bradford residents (5km) as indicated in Figure 5.8 and Figure 5.9. The distance of 7km has therefore been used to define the outer limit of the zone of influence proposed in the Core Strategy Strategic Core Policy 8 (SC8).

### ***Bird and habitat surveys***

- 6.2.5 Breeding bird surveys were carried out during spring/summer 2013 to explore how the target species utilise land around the SPA. West Yorkshire Ecology undertook bird surveys broadly focused around sites in the SHLAA update of May 2013, and within 2.5km of the SPA and within 1km of settlements. Habitat surveys were undertaken within a similar zone around settlements close to the SPA, in order to identify areas of supporting habitats.
- 6.2.6 The results of bird and habitat surveys undertaken in 2013 were analysed and interpreted (see section 5.2), and used to inform a review of the proposed spatial distribution of development (see below, 6.3).

### ***Traffic growth and air pollution***

- 6.2.7 Further traffic modelling work is needed to prepare more detailed projections of traffic flow increases on roads passing within 200m of the SAC/SPA, and to relate these to development scenarios within Bradford district. It is recommended that this more detailed traffic modelling is undertaken during the pre-allocations testing stage which will precede development of the Allocations DPD, the purpose of which will be to allocate sites for development to implement Core Strategy policy. Informal consultation with Natural England has indicated that it is broadly supportive of this approach.

### ***Wind turbines***

- 6.2.8 Research into the effects of small-scale wind turbine developments on breeding bird populations on the SPA is being carried out as part of a Manchester Metropolitan University research project and could be used to inform specific policy requirements in relation to renewable energy generation. It was recommended that the Core Strategy, or a later planning document such as the Allocations DPD, should give a clear indication of where and of what magnitude wind turbine developments would normally be permitted, and of the monitoring arrangements that might be required both pre- and post-construction. It was recommended that a precautionary approach be adopted to require development proposals to be constructed away from the SPA boundary and outside of the breeding season, following production of the necessary survey and ecological assessment.
- 6.2.9 Since then, West Yorkshire Ecology (2013) has issued guidelines applicable to all wind turbine proposals which do not require EIA, focused on the South Pennine Moors Phase 2 SPA and other sites with a notable ornithological interest. These define a Zone of Adverse Impact set at 600m for wind turbines with a hub height of 20m or more, which closely reflects the Provisional Mitigation Zoning plan included in the earlier edition of the AA. The guidelines go on to describe the level of survey effort that would need to be expended to allow a planning application to be determined.
- 6.2.10 Whilst it is not clear how uniformly the guidelines are being applied (they apply to the whole of West Yorkshire) they are considered to fulfil the recommendations contained in the earlier edition of the AA. It is now recommended that the guidelines are cross-referenced within the

Publication Draft Core Strategy under policy EN6, and consideration is given to adopting the Zone of Adverse Impact within the Allocations DPD and its Proposals Map.

### **North Pennine Moors**

- 6.2.11 Further ecological data was required on the distribution of Annex 1 habitat types and SPA bird species within the North Pennine Moors SPA and SAC, together with supporting habitat between the Bradford district boundary and the North Pennine Moors. This, together with visitor survey data for people visiting the North Pennine Moors, remains a data gap.

## **6.3 Adjusting the Scale and Spatial Distribution of Development**

- 6.3.1 The Appropriate Assessment for the Further Engagement Draft Core Strategy expressed concerns that the overall level of housing being proposed within Bradford district was such that adverse effects on SAC and SPA may not be capable of being avoided and mitigated. Using Rombalds and Ilkley Moors as an example, the settlements falling within approximately 2.5km of this moorland block (Addingham, Ilkley, Burley in Wharfedale, Menston, Bingley, East Morton, Keighley (outskirts) and Silsden) were provisionally allocated a combined total of 11,550 new dwellings over the plan period under the Further Engagement Draft Core Strategy. The report recommended that reducing the scale of housing allocations, particularly for settlements wholly or substantively within 2.5km of the SAC/SPA, was likely to be necessary to satisfy the requirements of the Habitats Regulations.
- 6.3.2 In accordance with the hierarchy of intervention, meaning that where significant effects are likely or uncertain decision-makers must firstly seek to avoid effects, the Council used information presented in the HRA Report and preliminary analysis of data from bird and habitat surveys to review the proposed distribution of housing development. Some account was taken of the extent to which land on the edge of individual settlements fell within the different zones of influence identified in Strategic Core Policy 8. As part of this process, an assessment was undertaken to ascertain by how much the SHLAA land capacity totals for each settlement, at that particular stage, would be reduced if all SHLAA sites which coincided with bird or habitat recordings were discounted, although no account was taken of indirect impacts. However, this was not done on the basis that all such sites would prove to be unsuitable for development. It should also be noted that the Publication Draft Core Strategy housing distribution in relation to settlements in the key 400m and 2.5km zones also reflects the contents of other evidence base updates that took place during this period, including the updated SHLAA, the Bradford Growth Study and the Sustainability Appraisal, as well as work on the Appropriate Assessment.
- 6.3.3 By using baseline data collected during the additional surveys, information relating to the key impact pathways discussed in this HRA Report, and the zones of influence around the SAC/SPA which stem from these, the Council has been able to establish housing targets for settlements in relatively close proximity to the SAC/SPA that nonetheless have a lower risk of adverse effects. The Publication Draft Core Strategy now proposes to allocate a total of 8,600 dwellings to Addingham, Ilkley, Burley in Wharfedale, Menston, Bingley, East Morton, Keighley and Silsden (see Table 1.1), a reduction of 25%, while Burley in Wharfedale and Menston are no longer designated as Local Growth Centres. The majority of the 8,600 dwellings are allocated

to Bingley, Keighley and Silsden (together accounting for 6,900 dwellings). These settlements are further from the SAC/SPA than Addingham, Ilkley, Burley in Wharfedale, Menston, East Morton (together allocated 1,700 dwellings, a reduction of approximately 50% from the Further Engagement Draft figure for these settlements).

- 6.3.4 The existing datasets collected in 2013 and presented here are considered to be sufficiently robust to inform the strategic level of decision-making being undertaken in the Core Strategy. This was confirmed by Natural England in its representation on the Core Strategy Publication Draft. The existing bird, habitat and visitor data, combined with breeding bird data collected by Natural England in 2014, will be used in discussion with Natural England, RSPB and West Yorkshire Ecology, to define more focused survey work which will inform the preparation of the Allocations DPD. This will allow regularly used areas to be protected from development and its associated impacts, and the potential for habitat enhancement and the delivery of mitigation measures to be given more detailed consideration.
- 6.3.5 In recent advice Natural England (pers. comm., 2014b) has stated that assessing the potential impacts of housing distribution on the SPA breeding bird assemblage should:
- (a) Consider the numbers of birds from the breeding bird assemblage that are present within functionally linked areas; and
  - (b) Identify those locations frequently visited by these birds and the numbers present compared against their populations.
- 6.3.6 Unless there is an in-combination effect, Natural England advised against removal of potential housing allocations on the basis of a single record of a bird from the breeding bird assemblage.
- 6.3.7 Natural England also advised the Council that when appraising potential development locations they should consider whether it is possible to identify locations that:
- (a) Are unlikely to be deliverable, where significant numbers of birds have been recorded within the site, or are likely to be disturbed off-site, or
  - (b) Are likely to be deliverable with mitigation (either site specific or strategic mitigation), or
  - (c) Are deliverable without mitigation (unconstrained).
- 6.3.8 The approach taken in the HRA to date is considered to broadly conform with that advocated by Natural England in so far as current data and levels of knowledge allow. In this revised HRA Report greater weight has been afforded to areas with comparatively higher abundance of bird records, or a combination of good quality habitats and bird records, as well as disturbance issues and key supporting habitats. Natural England commissioned a new South Pennine Moors SSSI/SPA Phase 2 Breeding Bird Survey in 2014. Further analysis of information gathered and data from the survey will provide a higher degree of confidence that Natural England's recent advice can be fully applied in relation to population figures for breeding waders.

## **6.4 Establishing a Spatial Approach to Avoiding and Mitigating Impacts**

- 6.4.1 The Appropriate Assessment for the Further Engagement Draft Core Strategy recommended that a precautionary spatial strategy should in the first instance seek to restrict residential development within 400m of the SAC/SPA boundary, in order to avoid the risk of urban edge effects such as fly-tipping, introduction of invasive species, cat/scavenger predation and increasing fire risk. To illustrate the importance of this zone, 922 breeding bird observations were made during the 2013 surveys of moorland fringe within 400m of the SPA (534 Curlew, 1 Dunlin, 32 Golden Plover, 346 Lapwing, 3 Merlin, 11 Redshank, and 62 Snipe), together with approximately 68.9ha of land containing rush pasture, c27.5ha containing species-rich semi-improved grassland, and c.2.9ha containing unimproved grassland. Protection for the 400m zone has now been incorporated within a new policy (SC8 Protecting the South Pennine Moors and their Zone of Influence). The RSPB have supported this approach, expressing concern about the issues of disturbance and displacement from the nest associated with domestic pets.
- 6.4.2 Secondly, the Council will take a precautionary approach to development within a zone extending from 400m to 2.5km from the SAC/SPA boundary. Within this zone the review and identification of potential greenfield sites for development will be based on an assessment of carrying capacity using the available evidence from bird and habitat surveys and appropriate additional monitoring. This is needed to safeguard supporting habitats as losses of feeding areas could otherwise have an adverse effect on bird populations for which the SPA has been classified, particularly Golden Plover.
- 6.4.3 It will remain vitally important to consider the findings of bird and habitat surveys, together with ongoing studies, during preparation of the Allocations DPD so that areas of least sensitive land are allocated for development. Within the 2.5km zone new development must avoid direct (e.g. land take) or indirect (e.g. increased disturbance) impacts on important supporting habitats. Measures to identify, protect and ensure future management of networks of supporting habitat need to be in place prior to sites being selected for development.
- 6.4.4 Finally, the AA for the Further Engagement Draft Core Strategy recommended that a further zone should be established around the SPA, within which contributions should be collected from residential development to (a) establish a network of alternative recreational spaces, and (b) adjust the management of visitors within the SAC/SPA. As described above, the results of visitor survey analysis show that 75% of all visitors come from within approximately 10.5km of the SAC/SPA, while 75% of Bradford residents travelled around 5km to reach the site. The distance of 7km has therefore been used to define the outer limit of the zone of influence in Bradford district. The RSPB is supportive of Policy SC8's Zone Bii and the basis for setting this zone in relation to disturbance from visitors, and dog walkers in particular.
- 6.4.5 The extent of each of these zones of influence is shown on Figure 6.1 to give an impression of the spatial avoidance and mitigation strategy that should be deployed for Bradford district's Publication Draft Core Strategy.

## 6.5 Identifying Strategic Avoidance Measures

- 6.5.1 The Core Strategy has responded to the risks assessed during the HRA through a multi-pronged approach to avoiding and mitigating adverse effects. The primary method of avoidance is an amended distribution of required residential development among the district's settlements lying in close proximity to the South Pennine Moors, including a residential development exclusion zone within 400m of the SAC/SPA.
- 6.5.2 The secondary avoidance measure is the provision of alternative sites for informal recreation, close to new or existing residential areas, which are intended to satisfy the majority of the daily recreational needs of those residents. By providing attractive, accessible greenspace close to home, alternative sites thereby reducing the likelihood of residents travelling to the SAC/SPA to satisfy this need. Alternative sites will be funded via development contributions. Further analysis of existing natural greenspace, visitor survey data and consideration of Natural England standards in relation to accessible natural greenspace will inform the approach.
- 6.5.3 The tertiary mitigation measure is the commitment to develop a Strategic Access Management and Monitoring Strategy to better manage access arrangements within the SAC/SPA (see section 6.6, below). In conjunction with the above avoidance measures, this will allow appropriate, feasible and publicly acceptable means to be identified to mitigate residual impacts. The SAMM Strategy and actions to implement it will be funded via development contributions.
- 6.5.4 Policy SC8 implements this approach to avoidance and mitigation, and is reproduced below:

### **Strategic Core Policy (SC 8) Protecting the South Pennine Moors and their zone of influence**

Development will not be permitted where it would be likely to lead to an adverse effect upon the integrity, directly or indirectly, of the South Pennine Moors Special Protection Area and Special Area of Conservation. To ensure these sites are not harmed, a number of zones have been identified:

#### **Zone A**

No development involving a net increase in dwellings would be permitted within a suitable buffer area around the upland heath/ South Pennine Moors (normally 400m) unless, as an exception, the form of residential development would not have an adverse effect upon the sites' integrity.

#### **Zone Bi**

Zone Bi would apply between 400m and 2.5km of the designated Site boundary

Within Zone Bi the Council will take a precautionary approach to the review and identification of potential Greenfield sites for development based on an assessment of carrying capacity using the available evidence from bird and habitat surveys and appropriate additional monitoring. The underlying principles will be to avoid loss or degradation of areas outside European Sites that are important to the integrity of sites and that sufficient foraging resources continue to be available, in order to ensure the survival of bird populations.

#### **Zone Bii**

Zone Bii would apply between 2.5km and up to 7km of the designated Site boundary

Within Zone Bii appropriate assessment is still likely to identify significant adverse effects in combination with other proposals, however appropriate avoidance or mitigation measures should allow development to take place.



### Zones Bi and Bii

Within Zones Bi (taking into account the need to avoid loss or degradation of areas outside European Sites that are important to the integrity of the sites) and Zone Bii residential developments that result in a net increase of one or more dwellings will be required to contribute to:

- 1 The provision of additional natural greenspace and appropriate facilities to deflect pressure from moorland habitats and the long-term maintenance and management of that greenspace.
- 2 The implementation of access management measures, which may include further provision of wardens, in order to reduce the impact of visitors
- 3 A programme of habitat management and manipulation and subsequent monitoring and review of measures

To mitigate impacts on European Sites due to the increase in population, an approach will be adopted that sets out a mechanism for the calculation of the planning contribution.

## 6.6 Designing Management Measures

6.6.1 The visitor survey discussed at section 6.2.2 provides data essential to enable a rationalisation of access management on moorland areas. A Strategic Access Management and Monitoring (SAMM) Strategy is needed to assess the relative benefits that could be gained via a suitable mix of the following interventions:











- ▶ Restrictions to access in relation to individual routes;
- ▶ Reducing or relocating car parking facilities;
- ▶ Zoned (both spatial and temporal) control of certain activities such as dog walking;
- ▶ Signage, interpretation and educational materials;
- ▶ Increased wardening; and
- ▶ Habitat management and manipulation.

6.6.2 Access management measure can influence visitor activity, particularly when coupled with pre-visit information (for example through the Watershed Landscape Project or Paws on the Moors<sup>41</sup>). However such measures will only be effective, and avoid discouraging residents from engaging in informal recreation, provided an adequate supply of alternative natural greenspaces are available within the district.

6.6.3 Further work needs to be undertaken to identify opportunities for utilising land, including both existing open spaces and new areas of land as alternative areas for recreation, providing natural greenspace that can draw pressure away from moorland. This will compliment work on identifying ecological networks and on a strategic approach to open space and green infrastructure.

<sup>41</sup> See <http://www.watershedlandscape.co.uk/> and <http://www.pawsonthemoors.org/>

# Zones of Influence

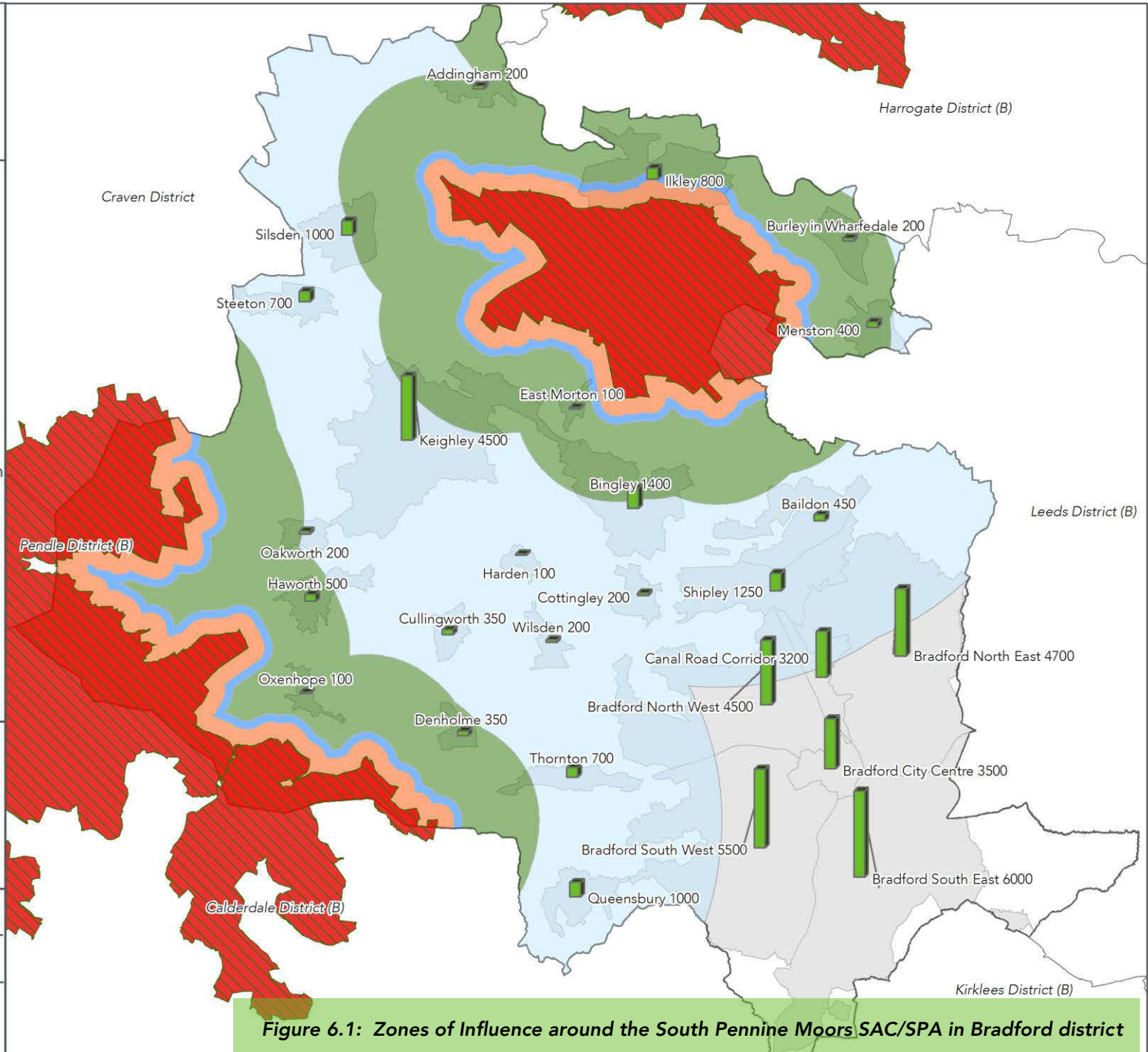
-  SAC
-  SPA
-  Residential exclusion zone: 400m
-  Turbine management zone: 600m
-  Supporting habitat mgt zone: 2.5km
-  Avoidance & mitigation zone: 7km
-  Local Authority Boundaries
-  CBMDC Outline
- CBMDC Settlements
-  3,000
-  Dwellings - Publication Draft



Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

  
 ENVIRONMENTAL CONSULTING  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1:125,000	<b>Date</b> Nov2014
<b>Created by</b> NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0112_Bradford_ZoI_4_141107	



**Figure 6.1: Zones of Influence around the South Pennine Moors SAC/SPA in Bradford district**

## 6.7 Small Scale Policy Recommendations

6.7.1 A number of minor policy amendments could be made to the Core Strategy to improve its integration with the HRA process. These include:

- ▶ The wording of policy SC8 could be amended as follows (amendment in **bold underline**) to better align it with the scope of the HRA: *“Within Zone Bi the Council will take a precautionary approach to the review and identification of potential Greenfield sites for development based on an assessment of carrying capacity using the available evidence from bird and habitat surveys and appropriate additional monitoring. The underlying principles will be to avoid loss or degradation of areas outside European Sites that are important to the integrity of sites and that sufficient foraging resources continue to be available, in order to ensure the survival of **populations of birds for which the SPA have been classified**”;*
- ▶ Although the Core Strategy does not allocate sites for minerals or energy developments, it is recommended that a further caveat is added to policy EN11 to highlight the possible risk of impacts from this type of development. For example, EN11 Part D Point 2 could be amended to read: *“Any sites where intrusive exploration or appraisal works are to take place are sited so as to avoid adverse impacts on people or the environment, including the risk of adverse effects on the South Pennine Moors SAC/SPA and the qualifying features, whilst allowing for the effective exploration and appraisal of the potential oil or gas resource”;*
- ▶ Although the Core Strategy does not allocate sites for waste developments, it is recommended that a further caveat is added to policy WM2 to highlight the possible risk of impacts from this type of development. For example, WM2 Part C Point 2 could be amended to read: *“Physical constraints to site development, including the risk of adverse effects on the South Pennine Moors SAC/SPA and the qualifying features”;*
- ▶ Including a section within EN6 (Energy) to draw attention to WYE’s *Guidance for ornithological information required to support Small Wind Turbine Developments in West Yorkshire*, and the need for sensitive site selection especially for turbines with a hub height of 20m or more within the 600m Zone of Adverse Impact (as highlighted on Figure 6.1); and
- ▶ Including a section within ID3 Developer Contributions to establish a funding mechanism for the HRA avoidance and mitigation package once it has been worked up in detail (albeit that this is mentioned in new policy SC8). The Council has stated its intention in the Local Development Scheme of producing an SPD based on the zones of influence identified around the South Pennine Moors.

## 6.8 In Combination Effects and Partnership Working

6.8.1 Experience of HRA in other parts of the country clearly highlights the benefits of co-ordinated partnership working and adopting a common approach where possible, and the Council intends to discuss the HRA and related outputs with a range of external partners, including

adjoining local authorities. However the Council has avoided making the assumption that resources on a strategic scale were likely to be available. This has led to an approach which broadly consists of seeking to fully avoid and mitigate the impacts of development proposed within the Bradford administrative area. It is considered that this has been achieved through the range of measures identified above.

## 7 Impact Assessment

### 7.1 Introduction

- 7.1.1 The following assessment uses the conservation objectives for each European site defined in Chapter 3 and considers these against the range of impact pathways described in Chapter 5, in the context of available avoidance and mitigation measures discussed in Chapter 6.

### 7.2 South Pennine Moors Phase 2 SPA

**Conservation Objectives – subject to natural change, to maintain or restore the:**

- **Objective 1: Extent and distribution of the habitats of the qualifying features;**
- **Objective 2: Structure and function of the habitats of the qualifying features;**
- **Objective 3: Supporting processes on which the habitats of the qualifying features rely;**
- **Objective 4: Populations of the qualifying features; and**
- **Objective 5: Distribution of the qualifying features within the site.**

#### ***Supporting habitat***

- 7.2.1 Recent surveys undertaken by West Yorkshire Ecology during 2013 have shown a number of locations used by Annex 1 and migratory birds (section 5.2) including Golden Plover, Merlin, Curlew and Lapwing. These are concentrated along the moorland fringe to the west of Keighley, Oxenhope and Denholme; an area to the north west of Ilkley Moor south of Addingham and another important area to the south and east of Rombalds / Ilkley Moor, between Burley in Wharfedale and Menston and north of the settlements of Bingley and Baildon.
- 7.2.2 Development that impinges upon these areas of supporting habitat, either directly or indirectly, may result in a loss of habitat and consequent decline in the population and range of these species within the SPA. The Core Strategy has responded to this risk within policy SC8 which states that a precautionary approach will be taken to the review and identification of potential greenfield sites for development based on an assessment of carrying capacity using the available evidence from bird and habitat surveys and in relation to the distribution of development.

#### ***Increased emissions to air***

- 7.2.3 There is evidence of degradation to the bog habitats of the qualifying bird species of the SPA (particularly Golden Plover and Dunlin) as a result of atmospheric pollution, both from industrial sources (past and present) and road traffic emissions. The nitrogen and acid deposition loading at all locations investigated was found to significantly exceed the critical load.

- 7.2.4 However, linking pollution loads to development proposed through the Core Strategy is not straight forward and at present there is insufficient data to enable the nature of impacts, where and when they might manifest themselves, to be properly explored. Haworth and Oxenhope Moors could be affected, particularly in the vicinity of A6033 Hebden Bridge Road. The most substantial impacts are likely to continue to occur around Rishworth and Moss Moors where a number of road corridors cross the Pennines towards Greater Manchester, although impacts here are likely to be from a combination of sources.
- 7.2.5 It is recommended that more detailed testing and traffic modelling is undertaken during the pre-allocations testing stage which will precede development of the Allocations DPD.

***Wind turbines – collision mortality risk and displacement***

- 7.2.6 Although recent scientific studies have led to mixed conclusions, there is some evidence to suggest that negative impacts from wind turbine development can occur, including through suppressed breeding densities and displacement, and locally reduced population size. Such impacts have been demonstrated (though not consistently) in relation to upland raptors and wading birds, including Golden Plover, a qualifying feature of the SPA. Adverse effects on birds using supporting habitats off the SPA are also possible. However, the Publication Draft Core Strategy does not allocate land for wind generation, but it does identify the SAC/SPA as a strategic constraint on potential new wind generation capacity.

***Recreation (including dog walkers)***

- 7.2.7 There is significant potential for additional recreational pressure having adverse effects on the populations of Annex 1 (Golden Plover, Merlin, and Short-eared Owl) and regularly occurring migratory birds (assemblage of breeding birds) within the South Pennine Moors Phase 2 SPA. Populations at particular risk are the Golden Plover on Rombalds / Ilkley Moor, the single possible breeding Short-eared Owl on Rombalds / Ilkley Moor, and the Merlin, Peregrine Falcon, Short-eared Owl, Golden Plover and Dunlin breeding on the Moors to the south and west of the South Pennine Towns and Villages. Declines in breeding numbers of SPA birds are also likely to result in a reduction in the range of these birds within the SPA, particularly if birds are displaced from isolated moorland blocks such as Rombalds and Ilkley Moors.
- 7.2.8 Data from the visitor survey carried out by the Council during July and August 2013 has been analysed to derive estimates of current visiting rates. The results suggest that the northern part of the SPA at Rombalds and Ilkley Moors is much more frequently visited (c.131,954 annual visits) than the moors to the south and west of Haworth (c. 69,480). Summing these figures for north and south to give overall Bradford district visits to the SPA, the current annual estimated figure is in the region of 201,434. This can be expected to increase in the context of proposals in the Publication Draft Core Strategy. This figure indicates visits from Bradford residents only and not from those living outside the district.
- 7.2.9 The summary of key findings from the analysis of visitor survey data and research relating to disturbance to breeding birds, presented in 5.7.38, indicates causes for concern in relation to cumulative impacts resulting in adverse effects on ecological integrity. Locating development

further away from the SPA allows a greater measure of confidence that residual impacts can be successfully managed and mitigated.

- 7.2.10 The distances travelled to reach the SPA were also analysed to explore whether an approximate visitor catchment area could be established. The resulting cumulative distribution curve is shown at Figure 5.9 which shows that 85% of Bradford residents travelled from within approximately 7km to reach the South Pennine Moors SAC/SPA in summer 2013. This is the zone within which provision of alternative recreational sites is likely to be most effective.
- 7.2.11 The Core Strategy has responded to these risks within policy SC8 which prevents a net increase in dwellings within 400m of the SPA, and requires residential developments within up to 7km of the SPA to provide or contribute to additional natural greenspace for recreation, and implementation of access management and monitoring measures within the SPA to reduce the impacts of recreational pressure.

#### ***Trampling and erosion (including pedestrian and off-road vehicles)***

- 7.2.12 Urban development threatens increased erosion of paths causing damage to habitats used by SPA bird populations, particularly on Rombalds / Ilkley Moor and the moors to the south and west of the South Pennine Town and Villages.
- 7.2.13 The Core Strategy has responded to this risk within policy SC8 which prevents a net increase in dwellings within 400m of the SPA, and requires residential developments within up to 7km of the SPA to provide or contribute to additional natural greenspace for recreation, implementation of access and habitat management measures within the SPA to reduce the impacts of recreational pressure.

#### ***Urban edge effects***

##### ***Fire***

- 7.2.14 Rombalds / Ilkley Moor has been identified as one of seven high and medium fire density areas within the South Pennine Moors (section 5.8.8). Additional housing development in the vicinity of this urban edge moorland is liable to further exacerbate the risk of fire on the moor, leading to potential loss of nest sites and habitats used by SPA birds, particularly Golden Plover and potentially Short-eared Owl. The moors to the south and west of the South Pennine Towns and Villages have been identified as currently having lower levels of fire density although it is evident from Figure 5.10 that moors closest to Queensbury have a raised incidence of fire.
- 7.2.15 It has been shown from studies on both lowland heathlands and the Pennine moors that fire risk is significantly increased where these sites are close to urban areas, where young people are concentrated and at times of day and periods of the year when young people are likely to have access to the heaths and moors.
- 7.2.16 It is considered likely that increased urban development near to the SPA is liable to result in an increase in threat from fire to SPA bird populations, their range and the habitats they use.

### ***Fly-tipping and garden waste / invasive species***

- 7.2.17 It is unlikely that these impacts will have an adverse effect on the SPA bird population, their range or the habitats they use.

### ***Dog fouling***

- 7.2.18 It is unlikely that dog fouling will have an adverse effect on the SPA bird population, their range or the habitats they use.

### ***Urbanised avifauna***

- 7.2.19 The effects of increased crow and magpie predation on SPA bird species is likely to operate where housing development is in close proximity to SPA birds' nest sites.

### ***Cat predation***

- 7.2.20 The South Pennine Towns and Villages are located slightly further from the SPA boundary than those within Wharfedale and Airedale and development here is unlikely to result in threats of cat predation to the SPA bird species. However, there is a risk of wide ranging cats reaching Rombalds / Ilkley Moor if green field development within Wharfedale or Airedale is permitted within close proximity to the SPA boundary. This could have localised impacts on the population and range of SPA birds.

### ***Responding to the risk of urban edge effects***

- 7.2.21 The Core Strategy Publication Draft has responded to urban edge effects through policy SC8 which seeks to protect the South Pennine Moors and their zone of influence. This prevents a net increase in residential units within 400m of the edge of the SPA/SAC. Evidence has been presented of the risk of a number of urban edge impacts occurring where there are urban communities beyond the 400m zone. Locating housing away from the zone where urban edge impacts are most likely to occur reduces the risk of adverse effects and allows a greater measure of confidence that residual impacts can be successfully managed and mitigated.

### ***Overall Assessment against the Conservation Objective of South Pennine Moors Phase 2 SPA***

- 7.2.22 Recreational impacts and urban edge effects from housing proposed in the Bradford Core Strategy risks reducing Annex 1 and migratory bird populations, habitat viability and range within the South Pennine Moors Phase 2 SPA. The release of greenfield sites for development (of any type) could result in a loss of supporting habitat for SPA birds, particularly within around 2.5km of the SPA boundary. Increased risks of fire could reduce the extent and viability of Annex 1 and migratory bird habitat. There is a risk of cat predation affecting bird populations and range within Rombalds / Ilkley Moor.
- 7.2.23 However, the Core Strategy establishes a reasonable and pragmatic strategic approach to reducing the risk of adverse effects (in policy SC8, and through a reduction in the settlement housing figures focused on settlements closest to the SPA/SAC, particularly Rombalds / Ilkley



Moor) to demonstrate that adverse effects are capable of being avoided and/or mitigated. Work to continue towards implementing these measures will be needed during preparation of the Allocations DPD to ensure that:

- (a) Delivery and funding mechanisms are established to ensure that additional recreational sites are brought forward to divert recreational pressures away from the European sites and important areas of supporting habitat, coupled with strategic access management and monitoring measures; and
  - (b) Greenfield sites to be released for development do not include areas of important supporting habitat, and that a sufficiently robust network of offsite foraging habitats continues to exist.
- 7.2.24 Taking into account the strategic approach to reducing and managing the identified risks, it can be concluded that the Core Strategy Publication Draft will not result in adverse effects on the ecological integrity of the South Pennine Moors Phase 2 SPA as a result of these impacts.
- 7.2.25 Traffic-related atmospheric pollution could affect the extent, structure and composition of the habitats of Annex 1 and migratory bird species. There is currently insufficient data to make a fuller assessment. It is envisaged that more detailed traffic modelling will be undertaken during the pre-allocations testing stage, which will precede the selection of sites to be released for development by the Allocations DPD, to ensure that traffic growth resulting from new development does not add significantly to levels of traffic and atmospheric pollution on roads within 200m of the European sites.

### 7.3 South Pennine Moors SAC

**Conservation Objectives – subject to natural change, to maintain or restore the:**

- **Objective 6: Extent and distribution of the qualifying natural habitats ;**
- **Objective 7: Structure and function (including typical species) of the qualifying natural habitats ; and**
- **Objective 8: Supporting processes on which the qualifying natural habitats rely.**

#### ***Increased emissions to air***

- 7.3.1 There is evidence of changes to the structure and composition of Blanket bog and Transition mire habitats of the SAC as a result of atmospheric pollution, and this may also be affecting the habitats' typical bird species including Golden Plover, Dunlin and Meadow Pipit.. Dry and wet heathland habitats are also vulnerable to inputs of nitrogen, with typical plant species being out-competed by nitrophilous species. The nitrogen and acid deposition loading at all locations investigated was found to significantly exceed the critical load.
- 7.3.2 However, linking pollution loads to development proposed through the Core Strategy is not straight forward and at present there is insufficient data to fully assess the nature of impacts. Haworth and Oxenhope Moors could be affected, particularly in the vicinity of A6033 Hebden Bridge Road. Impacts are most likely to occur around Rishworth and Moss Moors where a number of road corridors cross the Pennines towards Greater Manchester, although impacts

here are likely to be from a combination of sources. Further pressure points could arise as a result of locations identified for development or through increases in visitor numbers.

- 7.3.3 It is recommended that more detailed testing and traffic modelling is undertaken during the pre-allocations testing stage which will precede development of the Allocations DPD.

#### ***Wind turbines – collision mortality risk and displacement***

- 7.3.4 There is some evidence to suggest that negative impacts from wind turbine development can occur, including through suppressed breeding densities and displacement, and locally reduced population size. Such impacts have been demonstrated (though not consistently) in relation to upland raptors and wading birds, including Golden Plover and Curlew, typical species of the SAC habitats. Adverse effects on birds using supporting habitats off the SAC are also possible. However, the Publication Draft Core Strategy does not allocate land for wind generation.

#### ***Trampling and erosion (including pedestrian and off-road vehicles)***

- 7.3.5 Erosion from increased recreational use of tracks and paths in the SAC has significant potential to cause damage to both heathland and blanket bog habitats. The Core Strategy has responded to this risk within policy SC8 which prevents a net increase in dwellings within 400m of the SAC, and requires residential developments within up to 7km of the SAC to provide or contribute to additional natural greenspace for recreation, implementation of access and habitat management measures within the SAC to reduce the impacts of recreational pressure.

#### ***Urban edge effects***

##### ***Fire***

- 7.3.6 The increased risk of fire to the SAC from greater urbanisation of the moorland edge poses a potentially significant impact upon heathland and blanket bog habitats. Fire mapping data has shown the current relatively high levels of fire associated with the most urban moors such as Ilkley Moor. Research indicates that heathland vegetation takes between 4 and 20 years to recover and that fire events present a serious risk to ecological integrity.
- 7.3.7 Since 2008, a South Pennines Fire Operations Group, chaired by Bradford Council, has operated across the area. This is a partnership of Fire and Rescue Services, local authorities, water companies and major landowners, whose joint aim is to raise awareness of the impacts of wildfire on the South Pennine Moors, and to improve training and equipment for fighting wildfire. This provides a means of monitoring the incidence of fire which, if supplemented with monitoring in relation to impacts on vegetation and species, would allow the issue to be kept under review.

#### ***Fly-tipping and garden waste / invasive species***

- 7.3.8 Urban development near to the SAC or with easy access to car parks on the moorland fringe has the potential to result in damage to SAC habitats from introduced invasive species and from fly-tipping.

### ***Dog fouling***

- 7.3.9 Linked to the impacts of trampling and increases in the number of visitors accompanied by dogs is the potential for dog fouling to change soil nutrient levels and have an adverse effect on heathland and blanket bog habitats. This is likely to occur along paths and tracks leading from heavily used car parks. The effect tends to be localised and may not have an adverse effect on the SAC integrity, but the intensity of use will be a contributory factor.

### ***Responding to the risk of urban edge effects***

- 7.3.10 The Core Strategy Publication Draft has responded to urban edge effects through policy SC8 which seeks to protect the South Pennine Moors and their zone of influence. This prevents a net increase in residential units within 400m of the edge of the SPA/SAC. Evidence has been presented of the risk of a number of urban edge impacts occurring where there are urban communities beyond the 400m zone. Locating housing away from the zone where urban edge impacts are most likely to occur reduces the risk of adverse effects and allows a greater measure of confidence that residual impacts can be successfully managed and mitigated.

### ***Overall Assessment against the Conservation Objective of South Pennine Moors SAC***

- 7.3.11 There is a risk of loss of Annex 1 habitat extent and structure and function due to increased recreational use and consequent erosion and trampling, an increased threat of fire and risks from the consequences of fly-tipping and invasion of alien species, as well as changes induced by deposition of atmospheric pollutants.
- 7.3.12 However, the Core Strategy establishes a reasonable and pragmatic strategic approach to reducing the risk of adverse effects (in policy SC8, and through a reduction in the settlement housing figures focused on settlements closest to the SPA/SAC, particularly Rombalds / Ilkley Moor) to demonstrate that adverse effects are capable of being avoided and/or mitigated. Work to continue towards implementing these measures will be needed during preparation of the Allocations DPD. It can be concluded that the Core Strategy Publication Draft will not result in adverse effects on the ecological integrity of the South Pennine Moors SAC as a result of these impacts.
- 7.3.13 It is envisaged that more detailed traffic modelling will be undertaken during the pre-allocations testing stage, which will precede the selection of sites to be released for development by the Allocations DPD, to ensure that traffic growth resulting from new development does not add significantly to levels of traffic and atmospheric pollution on roads within 200m of the European sites.

## **7.4 North Pennine Moors SPA**

### **Conservation Objectives – subject to natural change, to maintain or restore the:**

- **Objective 1: Extent and distribution of the habitats of the qualifying features;**
- **Objective 2: Structure and function of the habitats of the qualifying features;**
- **Objective 3: Supporting processes on which the habitats of the qualifying features rely;**
- **Objective 4: Populations of the qualifying features; and**

▪ **Objective 5: Distribution of the qualifying features within the site.**

***Supporting habitat***

- 7.4.1 The North Pennine Moors SPA boundary is approximately 2.5km north of Ilkely, but most of the land between the two sites lies outside of the Bradford district. Housing allocations brought forward through the Bradford Core Strategy are therefore unlikely to have direct effects on SPA supporting habitats within this area. However, it is important that consideration is given to planning policies within the neighbouring planning authority to ensure this buffer between the SPA and the settlements within Wharfedale are conserved.

***Increased emissions to air***

- 7.4.2 There is evidence of degradation to the bog habitats of the qualifying bird species of the SPA (particularly Golden Plover, Dunlin and Curlew) as a result of atmospheric pollution, both from industrial sources (past and present) and road traffic emissions. The nitrogen (but not acid) deposition loading at both locations investigated was found to significantly exceed the critical load.
- 7.4.3 However, linking pollution loads to development proposed through the Core Strategy is not straight forward and at present there is insufficient data to enable the nature of impacts to be properly explored. Examining the layout of the road network emanating northwards from Bradford district, impacts could be expected at Round Hill close to the A59 Kex Gill Road, and at Embsay Moor on the B6160 (nr Barden Tower). It is recommended that more detailed testing and traffic modelling is undertaken during the pre-allocations testing stage which will precede development of the Allocations DPD.

***Wind turbines – collision mortality risk and displacement***

- 7.4.4 The Bradford Core Strategy which does not allocate land for wind turbine development, is not likely to adversely affect the SPA which lies just over 2km to the north of the district boundary.

***Recreation (including dog walkers)***

- 7.4.5 Addingham (with 200 dwellings proposed) is approximately 2km from the North Pennine Moors SPA, and Ilkley (with 800 dwellings proposed) is around 2.5km from the SPA. Visitor survey data collected on the South Pennine Moors indicates that 85% Bradford residents travel up to 7km to reach the site, but equivalent data is not available for the North Pennine Moors. There is potential for additional recreational pressure to have adverse effects on the populations of Annex 1 (Golden Plover, Merlin and Peregrine Falcon) within the North Pennine Moors SPA. However, this is likely to be of a much lesser scale than increased recreation on the South Pennine Moors Phase 2 SPA, due to the limited number of car parks and access points onto the North Pennine Moors SPA in the vicinity of settlements within the Bradford area.
- 7.4.6 The Core Strategy has responded to this risk within policy SC8 which requires residential developments within up to 7km of the South Pennine Moors Phase 2 SPA to provide or contribute to additional natural greenspace for recreation. This zone would also include all residential development within Bradford district which could contribute towards increasing

recreational pressure within the North Pennine Moors SPA. It is concluded that there will not be an adverse effect on this SPA as a consequence of the proposed development in the Core Strategy.

***Trampling and erosion (including pedestrian and off-road vehicles)***

- 7.4.7 It seems improbable that there would be a significant increase in path erosion and loss of habitat from proposed development in the Core Strategy on the North Pennine Moors SPA. This is due to the limited availability of access to the SPA from settlements within the Bradford area, the distance between the SPA and the Bradford settlements and the presence of alternative more accessible moorlands within the South Pennines SPA/SAC. It is concluded that there will not be an adverse effect on this SPA as a consequence of the proposed development in the Core Strategy.

***Fire***

- 7.4.8 It has been shown from studies on both lowland heathlands and the Pennine moors that fire risk is significantly increased where these sites are close to urban areas, where young people are concentrated and at times of day and periods of the year when young people are likely to have access to these heaths and moors. In all these respects the North Pennine Moors are unlikely to be used by new residents within the Bradford district and it is concluded that there is no significant risk of fire to the North Pennine Moors SPA as a consequence of the proposed development in the Core Strategy.

***Fly-tipping and garden waste / invasive species***

- 7.4.9 It is unlikely that these impacts will have an adverse effect on the SPA bird populations, their range or the habitats they use.

***Dog fouling***

- 7.4.10 It is unlikely that dog fouling will have an adverse effect on the SPA bird populations, their range or the habitats they use.

***Urbanised avifauna***

- 7.4.11 It is unlikely that there will be an adverse effect on bird populations from an urbanisation of the bird fauna associated with the proposed new development as this will all be at least 2km from the SPA boundary.

***Cat predation***

- 7.4.12 It is unlikely that cat predation will have an adverse effect on the SPA bird populations, their range or the habitats they use.

***Overall Assessment against the Conservation Objective of North Pennine Moors SPA***

- 7.4.13 It is concluded that development proposed by the Bradford Core Strategy will not have adverse effects on the ecological integrity of the North Pennine Moors SPA, or its supporting habitats,

due to recreation, trampling, erosion, fire, fly-tipping, dog fouling, urbanised avifauna, cat predation or wind generation.

- 7.4.14 Traffic-related atmospheric pollution could affect the extent, structure and composition of the habitats of Annex 1 and migratory bird species, especially around Round Hill and Embsay Moor. There is currently insufficient data to make a fuller assessment. It is envisaged that more detailed traffic modelling will be undertaken during the pre-allocations testing stage, which will precede the selection of sites to be released for development by the Allocations DPD, to ensure that traffic growth resulting from new development does not add significantly to levels of traffic and atmospheric pollution on roads within 200m of the European sites.

## 7.5 North Pennine Moors SAC

**Conservation Objectives – subject to natural change, to maintain or restore the:**

- **Objective 6: Extent and distribution of the qualifying natural habitats ;**
- **Objective 7: Structure and function (including typical species) of the qualifying natural habitats ; and**
- **Objective 8: Supporting processes on which the qualifying natural habitats rely.**
- 

### ***Increased emissions to air***

- 7.5.1 There is evidence of changes to the structure and composition of Blanket bog and Transition mire habitats of the SAC as a result of atmospheric pollution, and this may also be affecting the habitats' typical bird species including Golden Plover, Dunlin, Curlew and Meadow Pipit.. Dry and wet heathland habitats are also vulnerable to inputs of nitrogen, with typical plant species being out-competed by nitrophilous species. The nitrogen (but not acid) deposition loading at both locations investigated was found to significantly exceed the critical load.
- 7.5.2 However, linking pollution loads to development proposed through the Core Strategy is not straight forward and at present there is insufficient data to fully assess the nature of impacts. Impacts could be expected at Round Hill close to the A59 Kex Gill Road, and at Embsay Moor on the B6160 (nr Barden Tower). It is recommended that more detailed testing and traffic modelling is undertaken during the pre-allocations testing stage which will precede development of the Allocations DPD.

### ***Wind turbines – collision mortality risk and displacement***

- 7.5.3 The Bradford Core Strategy which does not allocate land for wind turbine development, is not likely to adversely affect the SAC which lies just over 2km to the north of the district boundary.

### ***Trampling and erosion (including pedestrian and off-road vehicles)***

- 7.5.4 It seems unlikely that there would be a significant increase in path erosion and loss of habitat from the proposed development in the Core Strategy on the North Pennine Moors SAC. This is due to the limited availability of access to the SAC from settlements within the Bradford District area, the distance between the SAC and the Bradford settlements and the presence of

alternative more accessible moorlands within the South Pennines SPA/SAC. It is concluded that there will not be an adverse effect on this SPA as a consequence of the proposed development in the Core Strategy.

### **Fire**

- 7.5.5 It has been shown from studies on both lowland heathlands and the Pennines moors that fire risk is significantly increased where these sites are close to urban areas, where young people are concentrated and at times of day and periods of the year when young people are likely to have access to heaths and moors. In all these respects the North Pennine Moors are unlikely to be used by new residents within the Bradford District and it is concluded that there is no significant risk of fire to the North Pennine Moors SAC as a consequence of the proposed development in the Core Strategy.

### **Fly-tipping and garden waste / invasive species**

- 7.5.6 It is unlikely that these impacts will have an adverse effect on the extent, structure and function or typical species of the Annex 1 habitats of the North Pennine Moors SAC.

### **Dog fouling**

- 7.5.7 It is unlikely that dog fouling will have an adverse effect on the extent, structure and function or typical species of the Annex 1 habitats of the North Pennine Moors SAC.

### **Urbanised avifauna**

- 7.5.8 It is unlikely that changes to the local bird fauna from urban development with Bradford district will have an adverse effect on the extent, structure and function or typical species of the Annex 1 habitats of the North Pennine Moors SAC.

### **Cat predation**

- 7.5.9 It is unlikely that cat predation will have an adverse effect on the extent, structure and function or typical species of the Annex 1 habitats of the North Pennine Moors SAC.

### **Overall Assessment against the Conservation Objective of North Pennine Moors SAC**

- 7.5.10 It is concluded that development proposed by the Bradford Core Strategy will not have adverse effects on the ecological integrity of the North Pennine Moors SAC due to recreation, trampling, erosion, fire, fly-tipping, dog fouling, urbanised avifauna, cat predation or wind generation. .
- 7.5.11 Traffic-related atmospheric pollution could affect the extent, structure and composition of the Annex 1 habitats of the SAC, especially around Round Hill and Embsay Moor. There is currently insufficient data to make a fuller assessment. It is envisaged that more detailed traffic modelling will be undertaken during the pre-allocations testing stage, which will precede the selection of sites to be released for development by the Allocations DPD, to ensure that traffic

growth resulting from new development does not add significantly to levels of traffic and atmospheric pollution on roads within 200m of the European sites.



## 8 Conclusions

### 8.1 Summary

- 8.1.1 This report presents an Appropriate Assessment under the Habitats Regulations for the Bradford District Core Strategy.
- 8.1.2 The Council previously undertook a joint HRA screening assessment for the Draft Core Strategy and Draft Waste Management DPD (Environ, 2012) which found that the Core Strategy was considered likely to lead to significant effects on European sites in and around the district. Following this, a more detailed Appropriate Assessment (JEEC, 2013) of issues affecting the European sites was prepared, which assessed the impacts of the Further Engagement Draft Core Strategy and included preliminary recommendations for avoidance and mitigation.
- 8.1.3 A further iteration of the HRA Report (February 2014) provided an assessment of the Publication Draft Core Strategy based on analysis of baseline information gathered during a number of studies undertaken during 2013. The current HRA Report includes further analysis of this data, particularly in relation to visitor surveys, and an element of review in response to the earlier consultation.

### 8.2 Scope of the Assessment

- 8.2.1 Four nature conservation sites of European importance are addressed by the assessment, the North Pennine Moors SAC and SPA, South Pennine Moors SAC and South Pennine Moors Phase 2 SPA. The following impact pathways are considered during the assessment:
- ▶ Loss of supporting habitats;
  - ▶ Increased water demand;
  - ▶ Impacts on water quality;
  - ▶ Increased emissions to air;
  - ▶ Wind turbines (collision mortality risk and displacement);
  - ▶ Recreational impacts; and
  - ▶ Effects from increasing urbanisation.

### 8.3 Findings

- 8.3.1 Adverse effects resulting from wind turbine development, increased water demand or impacts on water quality are not considered likely for any of the four European sites.

- 
- 8.3.2 Loss of supporting habitats and urbanisation impacts are unlikely to affect the North Pennine Moors SAC/SPA.
  - 8.3.3 Loss of supporting habitats and urban edge effects are assessed as likely to affect the South Pennine Moors SAC/SPA, however, they are considered to be adequately avoided and mitigated by the policy response in the Core Strategy Publication Draft.
  - 8.3.4 Recreational impacts are assessed as potentially affecting any of the four sites, however, they are considered to be adequately avoided and mitigated by the Core Strategy policy response.
  - 8.3.5 The likelihood of traffic-related atmospheric pollution will be subject to more detailed traffic modelling during the pre-allocations testing stage.
  - 8.3.6 The distribution and magnitude of impacts differs between the four designated areas. Evidence is presented to indicate that, if left unmitigated, impacts are likely to be greater in relation to the South Pennine Moors sites due to their relative proximity to locations for future development and high levels of accessibility, a key influence on the numbers of people visiting the sites and associated impacts.

#### **8.4 Conclusions**

- 8.4.1 Taking into account the range of avoidance and mitigation measures incorporated into the plan, it can be concluded that the Core Strategy Publication Draft will not result in adverse effects on the ecological integrity of the North Pennine Moors SAC and SPA, South Pennine Moors SAC and South Pennine Moors Phase 2 SPA.
- 8.4.2 To ensure that delivery and funding mechanisms for avoidance and mitigation measures are taken forward, the Council will produce a Supplementary Planning Document to guide implementation of the South Pennine Moors Zones of Influence Policy set out in Strategic Core Policy 8 in the Core Strategy Publication Draft.

---

## References and Bibliography

AECOM (2011): *Low carbon and renewable energy capacity in Yorkshire and Humber*. Final Report to Local Government Yorkshire and Humber.

Anderson P (1990): *Moorland Recreation and Wildlife in the Peak District*. Peak Park Joint Planning Board, Bakewell.

Anderson P (editor) (2001): *Countryside and Rights of Way Act, 2000 part I - Access to the countryside guidance for Statutory Authorities involved in assessing the nature conservation implications of a statutory right of access in England and Wales under clause 26*. A report produced for the Wildlife and Access Advisory Group.

Air Pollution Information System (APIS), accessed online at (17/10/12): <http://www.apis.ac.uk>

Bayfield NG (1985): Effects of extended use on footpaths in mountain areas in Britain. In: *The ecological impacts of outdoor recreation on mountain areas in Europe and North America*, 100-111. (eds. N.G. Bayfield and G.C. Barrow), Recreation Ecology Research Group Report 9, Wye College, Ashford, England.

Bayfield N and Aitken R (1992): *Managing the impacts of recreation on vegetation and soils: a review of techniques*. Institute of Terrestrial Ecology.

Bobbink R, Boxman D, Fremstad E, Heil G, Houdijk A and Roelofs J (1993): Nitrogen eutrophication and critical load for nitrogen based upon changes in flora and fauna in (semi)-natural terrestrial ecosystems. In: *Critical loads for nitrogen*. Proceedings of a UN-ECE workshop at Lökeberg, Sweden.

Burt J, Stewart D, & Turner M (2014): *Monitor of Engagement with the Natural Environment Survey (2009-2012): Visit taking in the South Pennines*. Natural England Commissioned Reports, Number 150.

Clarke R, Liley D, Underhill-Day J & Rose R (2006): *Visitor Access Patterns on the Dorset Heathlands*. English Nature Research Reports No. 683.

Cox JR and Pincombe NEJ (2011): *Habitats Regulations Assessment for the Whitehill Bordon Eco-town Draft Framework Masterplan (June 2010)*. A report by UE Associates and Jonathan Cox Associates on behalf of the Whitehill Bordon Eco-town.

Department for Communities and Local Government (DCLG, 2006): *Planning for the Protection of European Sites: Appropriate Assessment (Draft)*.

DCLG (2012): *National Planning Policy Framework*.

Dodd AM, Cleary BE, Dawkins JS, Byron HJ, Palframan LJ & Williams GM (2007): *The Appropriate Assessment of Spatial Plans in England: a guide to why, when and how to do it*.

---

Dore CJ *et al* (2003): *UK Emissions of Air Pollutants 1970 – 2003*. UK National Atmospheric Emissions Inventory.

Douglas DJT, Bellamy PE, and Pearce-Higgins JW (2011): Changes in the abundance and distribution of upland breeding birds at an operational wind farm. *Bird Study*, **58**, pp.37-43.

Drewitt AL and Langston RHW (2006): Assessing the impacts of wind farms on birds. *Ibis*, **148**, pp.29-42.

Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009): Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* **102**, pp296–341.

English Nature (1997a&b, 1999 and 2001): *Habitats Regulations Guidance Notes 1 – 4*.

English Nature (2004): *Internal Guidance to decisions on 'site integrity': A framework for provision of advice to competent authorities*.

Environ (2012): *Bradford Metropolitan District Council Core Strategy and Waste Management DPD: Habitats Regulations Screening Assessment*.

Environment Agency (2005): *Further Guidance on Applying the Habitats Regulations to Integrated Pollution Control (IPC), Pollution Prevention and Control (PPC) and Control of Major Accident Hazards (COMAH), Comprising of Appendix 7A for IPC and PPC and Appendices 7B and 7C for COMAH*. Number 37\_02.

Environment Agency (2009): *EU Habitats and Birds Directive Handbook: Operational Instructions*.

Environment Agency (2010): *Horizontal Guidance Note H1 – Annex (f)*. Published at [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency (undated): *Humber Estuary Review of Consents Fact File*.

European Commission (2000a): *Communication from the Commission on the Precautionary Principle*.

European Commission (2000b): *Managing Natura 2000 Sites: The provisions of Article 6 of the Habitats Directive 92/43/EEC*.

European Commission (2001): *Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and 6(4) of the Habitats Directive*.

European Council (1992): *Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*.

European Council (2009): *Council Directive 2009/147/EC on the conservation of wild birds*.

Fielding A, Haworth P, Whitfield P, McLeod D and Riley H (2011): *A Conservation Framework for Hen Harriers in the United Kingdom*. JNCC Report No: 441.

Finney SK, Pearce-Higgins JW & Yalden DW (2005): The effect of recreational disturbance on an upland breeding bird, the Golden Plover *Pluvialis apricaria*. *Biological Conservation* **121**, 53–63.

Highways Agency (2007): *Design Manual for Roads and Bridges: Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 Air Quality (HA207/07)*.

Joint Nature Conservation Committee (JNCC; 2001): *The UK SPA network: its scope and content*.

Kirby JS & Tantram DAS (1999): *Monitoring heathland fires in Dorset: Phase I*. Report to: Department of the Environment, Transport and the Regions: Wildlife and Countryside Directorate. Northampton: Terra Environmental Consultancy.

Langston RHW & Pullan JD (2003): *Windfarms and Birds: An analysis of the effects of windfarms on birds, and guidance on environmental assessment criteria and site selection issues*. BirdLife International on behalf of the Bern Convention.

Langston RHW, Liley D, Murison G, Woodfield E & Clarke RT (2007): What effects do walkers and dogs have on the distribution and productivity of breeding European nightjar *Caprimulgus europaeus*? *Ibis* **149** (Suppl. 1): 27 – 36.

Laxen D and Wilson P (2002): *A New Approach to Deriving NO<sub>2</sub> from NO<sub>x</sub> for Air Quality Assessment of Roads*. Report prepared on behalf of Defra and the devolved administrations.

Liley D & Clarke RT (2003): The impact of urban development and human disturbance on the numbers of nightjar *Caprimulgus europaeus* on heathlands in Dorset, England. *Biological Conservation* **114**: 219 – 230.

Liley D, Jackson D & Underhill-Day J (2006): *Visitor Access Patterns on the Thames Basin Heaths*. A Report to English Nature.

Liley D, Clarke RT, Mallord JW, & Bullock JM (2006): *The effect of urban development and human disturbance on the distribution and abundance of nightjars on the Thames Basin and Dorset Heaths*. Unpublished report, Footprint Ecology / Natural England. © Natural England / Footprint Ecology Ltd.

McMorrow J and Lindley S (2006): *Modelling the spatial risk of Moorland wildfire*. Final report to Moors for the Future. Geoinformatics Research Group, University of Manchester.

Murison G (2002): *The Impact of Human Disturbance on the Breeding Success of Nightjar *Caprimulgus europaeus* on Heathlands in South Dorset, England*. English Nature Research Reports No. 483.

Murison G, Bullock JM, Underhill-Day J, Langston R, Brown AF & Sutherland WJ (2007): Habitat type determines the effects of disturbance on the breeding productivity of the Dartford warbler *Sylvia undata*. *Ibis* **149** (Suppl. 1): 16 – 26.

Natural England (2008): *Guidelines for the creation of Suitable Accessible Natural Greenspace*.

Natural England (2009): *Mapping values: the vital nature of our uplands – an atlas linking environment and people (NE209)*.

Natural England (2011): Monitoring and modelling ecosystem services, A scoping study for the ecosystem services pilots. Natural England Commissioned Report NECR073.

Nilsson J and Grennfelt P (Eds) (1988): *Critical Loads for Sulphur and Nitrogen*. Quoted by the Air Pollution Information System, accessed online at (14/09/09): [http://www.apis.ac.uk/overview/issues/overview\\_Cloudslevels.htm](http://www.apis.ac.uk/overview/issues/overview_Cloudslevels.htm)

ODPM (2005): *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System*.

Pearce-Higgins JW, Finney SK, Yalden DW & Langston RHW (2007): Testing the effects of recreational disturbance on two upland breeding waders. *Ibis*, **149** (Suppl.1), pp.45-55.

Pearce-Higgins JW, Stephen L, Langston RHW, Bainbridge IP and Bullman R (2009): The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology*, **46**, pp.1323-1331.

Pearce-Higgins JW, Stephen L, Douse A and Langston RHW (2012): Greater impacts of wind farms on bird populations during construction than subsequent operation: results from a multi-site and multi-species analysis. *Journal of Applied Ecology*, **49**, pp.386-394.

Pers. comm. (2012a): Email correspondence with Giselle Murison, Biodiversity Action Plan Coordinator, West Yorkshire Ecology, Wakefield.

Pers. comm. (2012b): Telephone and email correspondence with Bob Smith, Trevor Hardy and Bethany Lovell (Conservation and Ecology Technical Services, Environment Agency, Rivers House, Leeds).

Pers. comm. (2012c): Telephone and email correspondence with Christopher Harrison, PhD Student, Manchester Metropolitan University.

Pers. comm. (2012d): Email correspondence with Danny Jackson, Countryside and Rights of Way Manager, City of Bradford Metropolitan District Council.

Pers. comm. (2014a): Telephone correspondence with Alan Drewitt, Senior Ornithologist, Natural England.

Pers. comm. (2014b (1<sup>st</sup> August 2014)): Email correspondence between Jane Scott (Development Plan Team, City of Bradford Metropolitan District Council) and John King (Marine and Sustainable Development, Yorkshire and Northern Lincolnshire, Natural England).

Pincombe NEJ and Smallbone K (2009a): *Visitor Access Patterns on Ashdown Forest*. UE Associates Ltd and University of Brighton Report for Mid Sussex and Wealden District Councils.

Pincombe NEJ and Smallbone K (2009b): *Visitor Access Patterns on European Sites surrounding Whitehill and Bordon, East Hampshire*. UE Associates Ltd and University of Brighton Report for the Whitehill Bordon Eco-town and East Hampshire District Council.

Pitcairn CER, Fowler D and Grace J (1991): Changes in species composition of semi-natural vegetation associated with the increase in atmospheric inputs of nitrogen. *Report to Nature Conservancy Council*. Institute of Terrestrial Ecology.

---

Resources for Change Ltd (2008): *South Pennines Watershed Project: Access and Audience Development Plan*.

Standing Conference of South Pennine Authorities (SCOSPA; 1998). *The South Pennine Moors Integrated Management Strategy and Conservation Action Programme*.

Steer Davies Gleave (2010): *Bradford District-wide Transport Study in support of the Core Strategy*. Final Report (October 2010).

Taylor E (2002): *Predation risk in woodlark Lullula arborea habitat: the influence of recreational disturbance, predator abundance, nest site characteristics and temporal factors*. MSc Dissertation. University of East Anglia.

Transport and Travel Research Ltd (2005): *Best Practice Guide for Assessment of Traffic and Air Quality Impacts*. Prepared for The West London Air Alliance Quality Cluster Group, with Bureau Veritas.

Tyldesley D (2009): *The Habitats Regulations Assessment of Local Development Documents: Revised Draft Guidance for Natural England*.

Tyldesley D (2011): *Assessing projects under the Habitats Directive: guidance for competent authorities*. Report to the Countryside Council for Wales, Bangor.

Underhill-Day JC (2005): *A literature review of urban effects on lowland heaths and their wildlife*. English Nature Research Reports, No. 623.

Underhill-Day JC & Liley D (2007): Visitor patterns on southern heaths: a review of visitor access patterns to heathlands in the UK and the relevance to Annex I bird species. *Ibis* **149** (Suppl. 1): 112 – 119.

United Nations Educational, Scientific and Cultural Organisation (UNESCO, 1971): *Convention on Wetlands of International Importance especially as Waterfowl Habitat*. (Ramsar (Iran), 2 February 1971, UN Treaty Series No. 14583).

Urban Edge Environmental Consulting Ltd (UEEC; May 2013): *Habitats Regulations Assessment for the City of Bradford District Core Strategy: Appropriate Assessment Report for the Further Engagement Draft Document (October 2011)*. With Jonathan Cox Associates Ecological Consultancy Ltd.

UEEC (January 2014): *South Pennine Moorland Fringe Habitat Surveys: Supporting data to inform City of Bradford Metropolitan District Council Core Strategy Development Plan Document*. With Jonathan Cox Associates Ecological Consultancy Ltd.

Walker J, Hewson W & McMorrow J (2009): *Spatial pattern of wildfire distribution on the moorlands of the South Pennines*. Moors for the Future Partnership.

West Yorkshire Ecology (2009): *National Vegetation Classification mapping data for the South Pennine Moors SAC*.

West Yorkshire Ecology (2013): *Guidance for ornithological information required to support Small Wind Turbine Developments in West Yorkshire*.

Yorkshire Water (November 2013): *Revised Draft Water Resource Management Plan 2015-40.*

Yorkshire Water (August 2014): *Water Resource Management Plan 2015-40.*



# Appendix I: Screening Matrix

Please see insert.

*This page is intentionally blank.*

		SAC		SPA	
		South Pennine Moors	North Pennine Moors	South Pennine Moors	North Pennine Moors
<b>City of Bradford District Core Strategy</b>					
<b>ID</b>	<b>Sustainable Development</b>	<b>Likely Significant Effect(s)</b>			
P1	Presumption in Favour of Sustainable Development	-	A1	A1	A1
<b>ID</b>	<b>Strategic Core Policies</b>	<b>Likely Significant Effect(s)</b>			
SC1	Overall Approach and Key Spatial Priorities	-	A1	A1	A1
SC2	Climate Change and Resource Use	-	A2	A2	A2
SC3	Working together to make Great Places	-	A1	A1	A1
SC4	Hierarchy of Settlements	-	A5	A5	A5
SC5	Location of Development	-	A1	A1	A1
SC6	Green Infrastructure	-	A3	A3	A3
SC7	Green Belt	-	A5	A5	A5
SC8	Protecting the South Pennine Moors and their Zone of Influence	-	A3	A3	A3
SC9	Making Great Places	-	A5	A5	A5
<b>ID</b>	<b>Sub Area Policies</b>	<b>Likely Significant Effect(s)</b>			
BD1	City of Bradford including Shipley and Lower Baildon Sub Area (inc. 28,650 dwellings + 100ha employment)	Loss of supporting feeding sites, atmospheric pollution, recreational impacts and urban edge effects	D1/2	D1/2	D1/2
AD1	Airedale Sub Area (inc. 8,350 dwellings + 30ha employment)	Loss of supporting feeding sites, atmospheric pollution, recreational impacts and urban edge effects	C2	D1/2	C2
AD2	Investment Priorities for the Airedale Sub Area	-	A4	A4	A4
WD1	Wharfedale Sub Area (inc. 1,600 dwellings + 5ha employment)	Loss of supporting feeding sites, atmospheric pollution, recreational impacts and urban edge effects	C1	D1/2	C1
WD2	Investment Priorities for the Wharfedale Sub Area	-	A4	A4	A4
PN1	South Pennine Towns and Villages Sub Area (inc. 3,500 dwellings)	Loss of supporting feeding sites, atmospheric pollution and recreational impacts	C2	D1/2	C2
PN2	Investment Priorities for the South Pennine Towns and Villages Sub Area	-	A4	A4	A4
<b>ID</b>	<b>Economy</b>	<b>Likely Significant Effect(s)</b>			
EC1	Creating a successful and competitive Bradford District economy within the Leeds City Region	-	A1	A1	A1
EC2	Supporting Business and Creating Jobs	-	A5	A5	A5
EC3	Employment Land Requirement	Principally atmospheric pollution, possible loss of supporting feeding sites	D1/2	D1/2	D1/2
EC4	Sustainable Economic Growth	-	A1	A1	A1
EC5	City, Town, District and Local Centres	-	A1	A1	A1

City of Bradford District Core Strategy

		SAC		SPA	
		South Pennine Moors	North Pennine Moors	South Pennine Moors	North Pennine Moors
<b>ID</b>	<b>Transport</b>	<b>Likely Significant Effect(s)</b>			
TR1	Travel Reduction and Modal Shift	-	A1	A1	A1
TR2	Parking Policy	-	A1	A1	A1
TR3	Public Transport, Cycling and Walking	-	A1	A1	A1
TR4	Transport and Tourism	Possible recreational impacts	D1/2	A4	D1/2
TR5	Rural Transport	-	A1	A1	A1
TR6	Freight	-	A1	A1	A1
TR7	Transport Investment and Management Priorities	-	A1	A1	A1
TR8	Aircraft Safety	-	A1	A1	A1
<b>ID</b>	<b>Housing</b>	<b>Likely Significant Effect(s)</b>			
HO1	Scale of Housing Required	-	A5	A5	A5
HO2	Strategic Sources of Supply	-	A5	A5	A5
HO3	Distribution of Housing Requirement	Loss of supporting feeding sites, atmospheric pollution, recreational impacts and urban edge effects	C2	D1/2	C2
HO4	Phasing and Release of Housing Sites	-	A1	A1	A1
HO5	Density of Housing Schemes	-	A1	A1	A1
HO6	Maximising use of Previously Developed Land	-	A1	A1	A1
HO7	Housing Site Allocation Principles	-	A1	A1	A1
HO8	Housing Mix	-	A1	A1	A1
HO9	Housing Quality	-	A1	A1	A1
HO10	Overcrowding and Vacant Homes	-	A1	A1	A1
HO11	Affordable Housing	-	A1	A1	A1
HO12	Provision of Sites for Gypsies, Travellers and Travelling Showpeople	-	A1	A1	A1
<b>ID</b>	<b>Environment</b>	<b>Likely Significant Effect(s)</b>			
EN1	Open Space, Sports and Recreation	-	A1	A1	A1
EN2	Biodiversity and Geodiversity	-	A2	A2	A2
EN3	Historic Environment	-	A3	A3	A3
EN4	Landscape	-	A2	A2	A2

			SAC		SPA	
			South Pennine Moors	North Pennine Moors	South Pennine Moors	North Pennine Moors
<b>City of Bradford District Core Strategy</b>						
EN5	Trees and woodlands	-	A2	A2	A2	A2
EN6	Energy	Collision risk mortality / displacement	D1/2/3	A4	D1/2/3	A4
EN7	Development and Flood Risk	-	A1	A1	A1	A1
EN8	Environmental Protection Policy	-	A2	A2	A2	A2
ID	Minerals	Likely Significant Effect(s)				
EN9	New Minerals Extraction Sites	Possible loss of supporting feeding sites	D1/2	A4	D1/2	A4
EN10	Sand Stone Supply	-	A1	A1	A1	A1
EN11	Sand, Gravel, Fireclay and Coal Supply	-	A1	A1	A1	A1
EN12	Minerals Safeguarding	-	A1	A1	A1	A1
ID	Waste Management	Likely Significant Effect(s)				
WM1	Waste Management	-	A1	A1	A1	A1
WM2	Identifying Waste Management Sites	Possible atmospheric pollution	D1/2	A4	D1/2	A1
ID	Design	Likely Significant Effect(s)				
DS1	Achieving Good Design	-	A1	A1	A1	A1
DS2	Working with the Landscape	-	A1	A1	A1	A1
Ds3	Urban Character	-	A1	A1	A1	A1
Ds4	Streets and Movement	-	A1	A1	A1	A1
DS5	Safe and Inclusive Places	-	A1	A1	A1	A1
ID	Implementation and Delivery	Likely Significant Effect(s)				
ID1	Development Plan Documents and Authority Monitoring Report	-	A1	A1	A1	A1
ID2	Viability	-	A1	A1	A1	A1
ID3	Developer Contributions	-	A1	A1	A1	A1
ID4	Working with Partners	-	A1	A1	A1	A1
ID5	Facilitating Delivery	-	A1	A1	A1	A1
ID6	Simplification of Planning Guidance to Encourage Sustainable Development	-	A1	A1	A1	A1
ID7	Community Involvement	-	A1	A1	A1	A1
ID8	Regeneration Funding and Delivery	-	A1	A1	A1	A1








## City of Bradford District Core Strategy

		SAC		SPA	
		South Pennine Moors	North Pennine Moors	South Pennine Moors	North Pennine Moors
<b>Assessment Key</b>					
<b>Category A: No negative effect</b>					
A1	Options / policies that will not themselves lead to development e.g. because they relate to design or other qualitative criteria for development, or they are not a land use planning policy.				
A2	Options / policies intended to protect the natural environment, including biodiversity.				
A3	Options / policies intended to conserve or enhance the natural, built or historic environment, where enhancement measures will not be likely to have any negative effect on a European Site.				
A4	Options / policies that positively steer development away from European sites and associated sensitive areas.				
A5	Options / policies that would have no effect because development is implemented through later policies in the same plan, which are more specific and therefore more appropriate to assess for their effects on European Sites.				
<b>Category B: No significant effect</b>					
B	Options / policies that could have an effect, but the likelihood is there would be no significant negative effect on a European site either alone or in combination with other elements of the same plan, or other plans or projects.				
<b>Category C: Likely significant effect alone</b>					
C1	The option, policy or proposal could directly affect a European site because it provides for, or steers, a quantity or type of development onto a European site, or adjacent to it.				
C2	The option / policy could indirectly affect a European site e.g. because it provides for, or steers, a quantity or type of development that may be ecologically, hydrologically or physically connected to it or increase disturbance.				
C3	Proposals for a magnitude of development that, no matter where it was located, the development would be likely to have a significant effect on a European site.				
C4	An option / policy that makes provision for a quantity / type of development but the effects are uncertain because its detailed location is to be selected following consideration of options in a later, more specific plan.				
C5	Options / policies for developments or infrastructure projects that could block alternatives for the provision of other development in the future, that may lead to adverse effects on European sites, which would otherwise be avoided.				
C6	Options, policies or proposals which are to be implemented in due course - if implemented in one or more particular ways, the proposal could possibly have a significant effect on a European site.				
C7	Any other options, policies or proposals that would be vulnerable to failure under the Habitats Regulations at project assessment stage; to include them in the plan would be regarded by the EC as 'faulty planning'.				
C8	Any other proposal that may have an adverse effect on a European site, which might try to pass the tests of HRA at project level by arguing that the plan provides IROPI to justify its consent despite a negative assessment.				
<b>Category D: Likely significant effects in combination</b>					
D1	The option, policy or proposal alone would not be likely to have significant effects but if its effects are combined with the effects of other policies within the same plan the cumulative effects would be likely to be significant.				
D2	Options, policies or proposals that alone would not be likely to have significant effects but if their effects are combined with the effects of other plans or projects, the combined effects would be likely to be significant.				
D3	Options or proposals that are, or could be, part of a programme or sequence of development delivered over a period, where the implementation of the later stages could have a significant effect on European sites.				
?	Uncertain effects because the issue/option currently lacks detail. The screening assessment will be re-visited as more detail becomes available.				

## **Appendix II: Extent of 2013 Moorland Fringe Habitat Surveys**

Please see insert.

# South Pennine Moorland Fringe Habitat Survey

-  MeadowSurveyMasterV5
-  SAC
-  SPA
-  County Boundaries
-  Local Authority Boundaries
-  CBMDC Outline
-  CBMDC Settlements

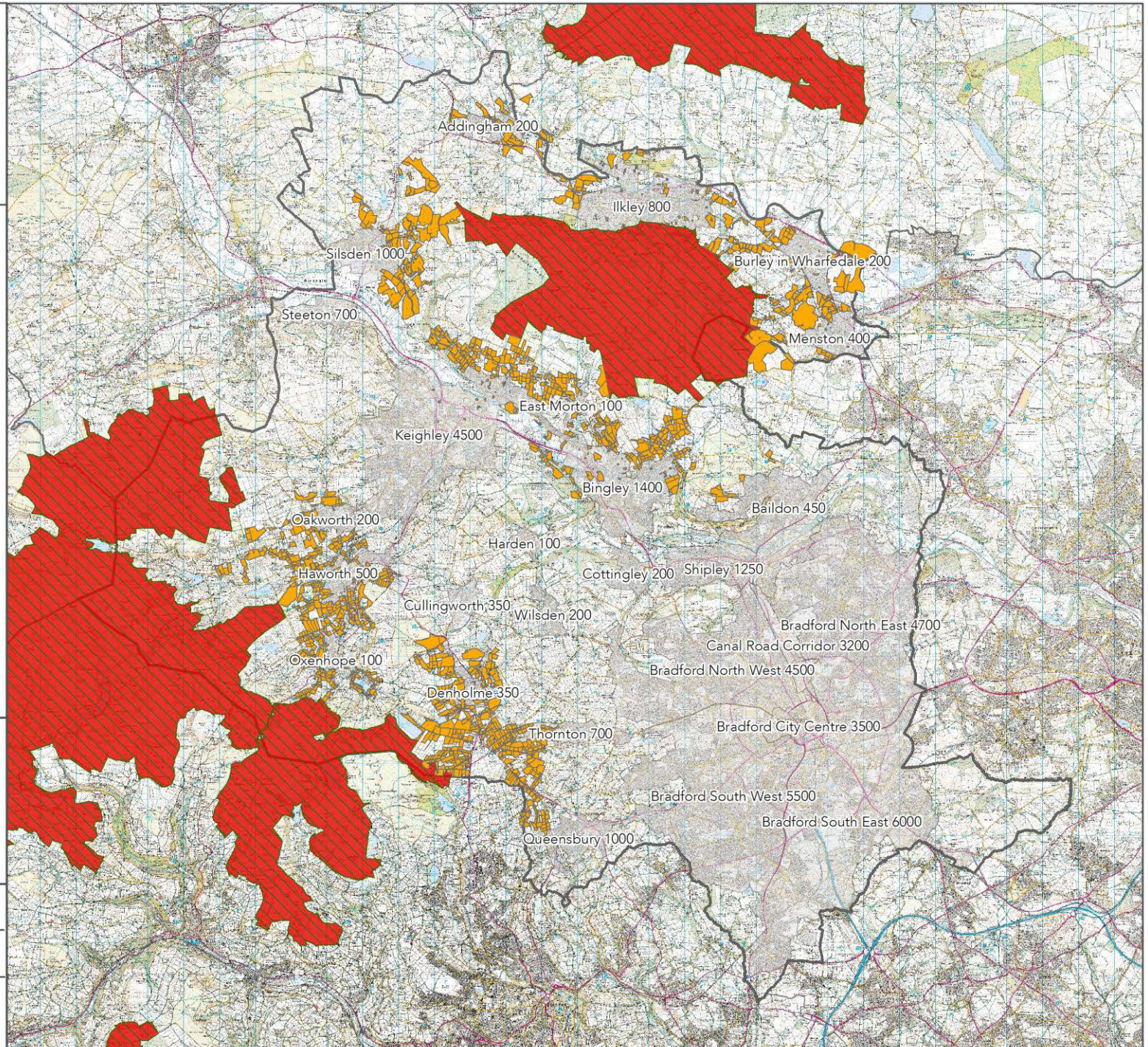


Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



ENVIRONMENTAL  
 CONSULTING  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 141,068	<b>Date</b> Nov2014
<b>Created by</b> NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Survey_Coverage_3_141107	





## **Appendix III: Mapping of SPA Birds, Supporting Habitats and SHLAA Sites**


Please see inserts.

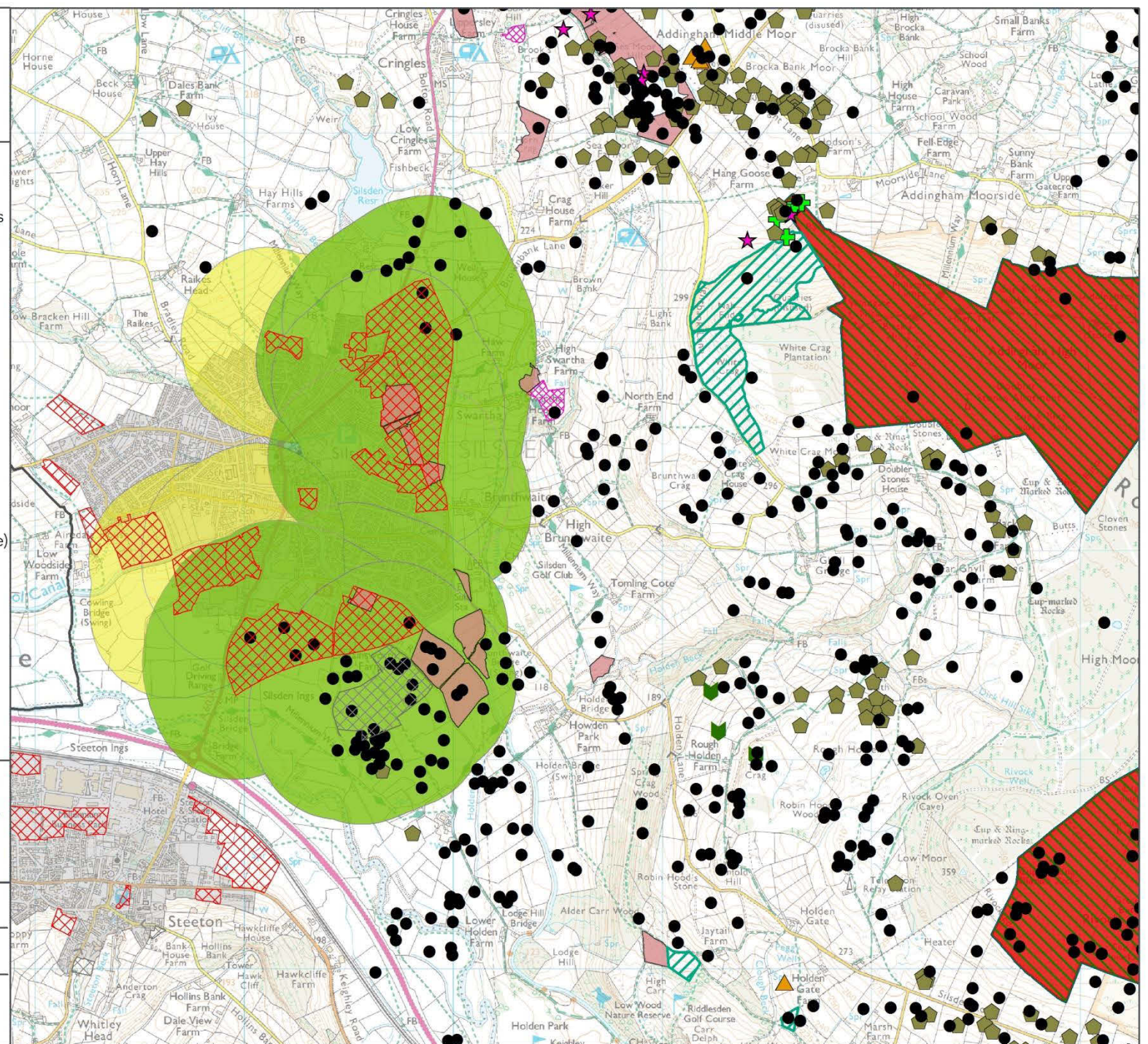
# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline



Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

 ENVIRONMENTAL CONSULTING Unit 5 Westergate Business Centre Brighton BN2 4QN	<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
	<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
	<b>Drawing number</b> UE-0126_Birds-Habs_Series _3_131114	



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline

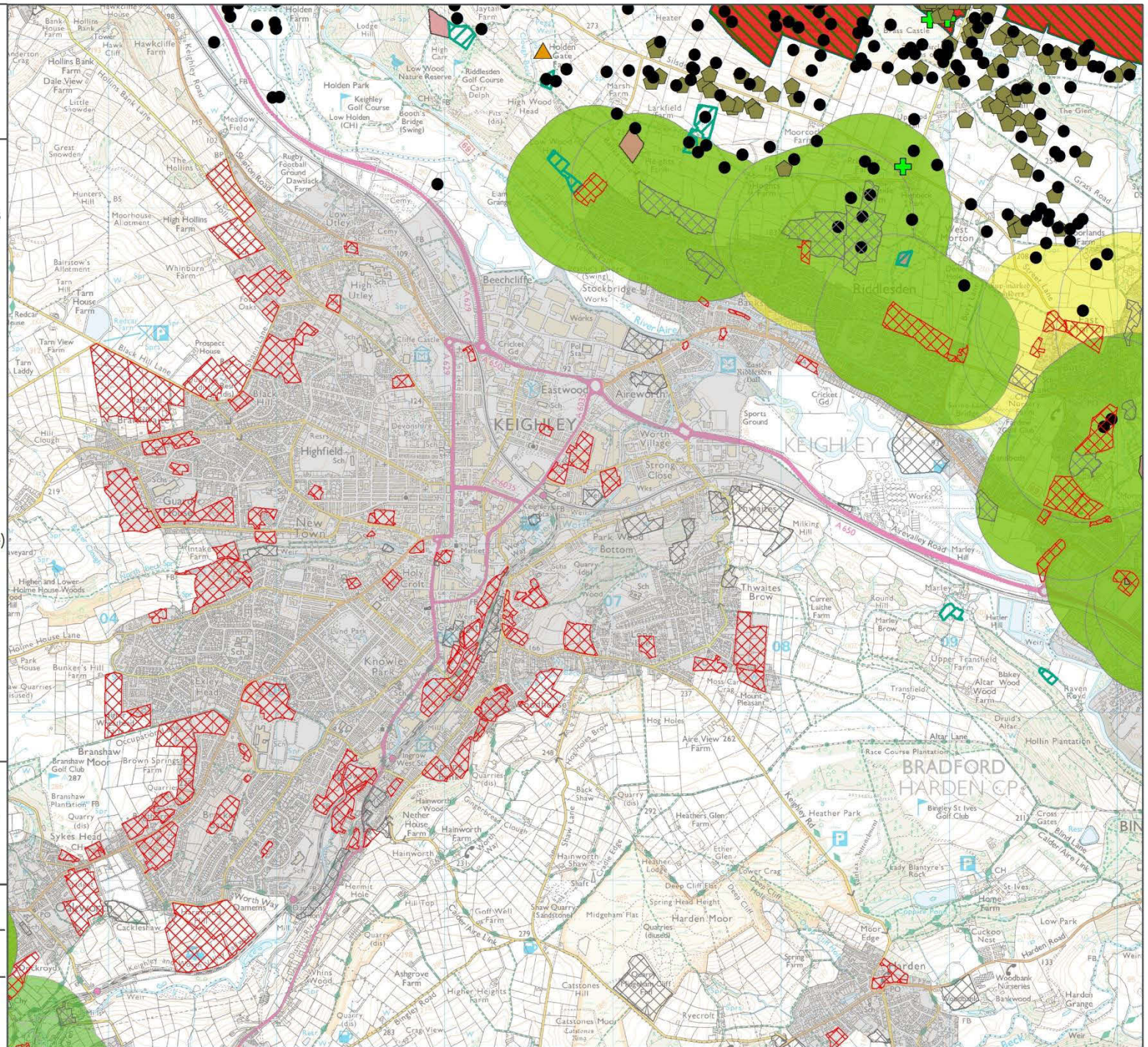


Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

  
**ENVIRONMENTAL CONSULTING**  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 30,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP

**Drawing number**  
 UE-0126\_Birds-Habs\_Series  
 \_3\_131114



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

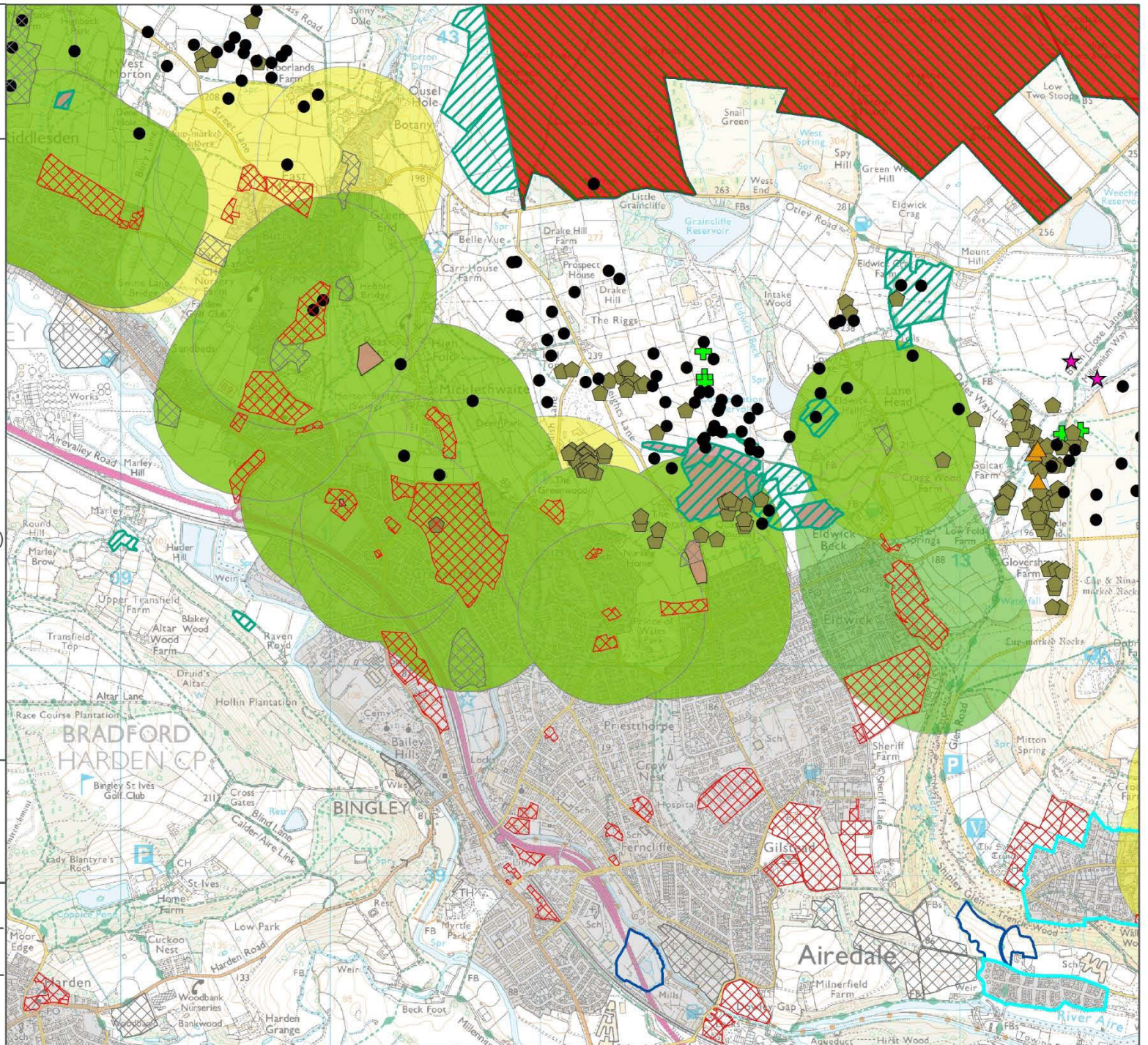
-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline



Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

**ENVIRONMENTAL CONSULTING**  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Birds-Habs_Series_3_131114	



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

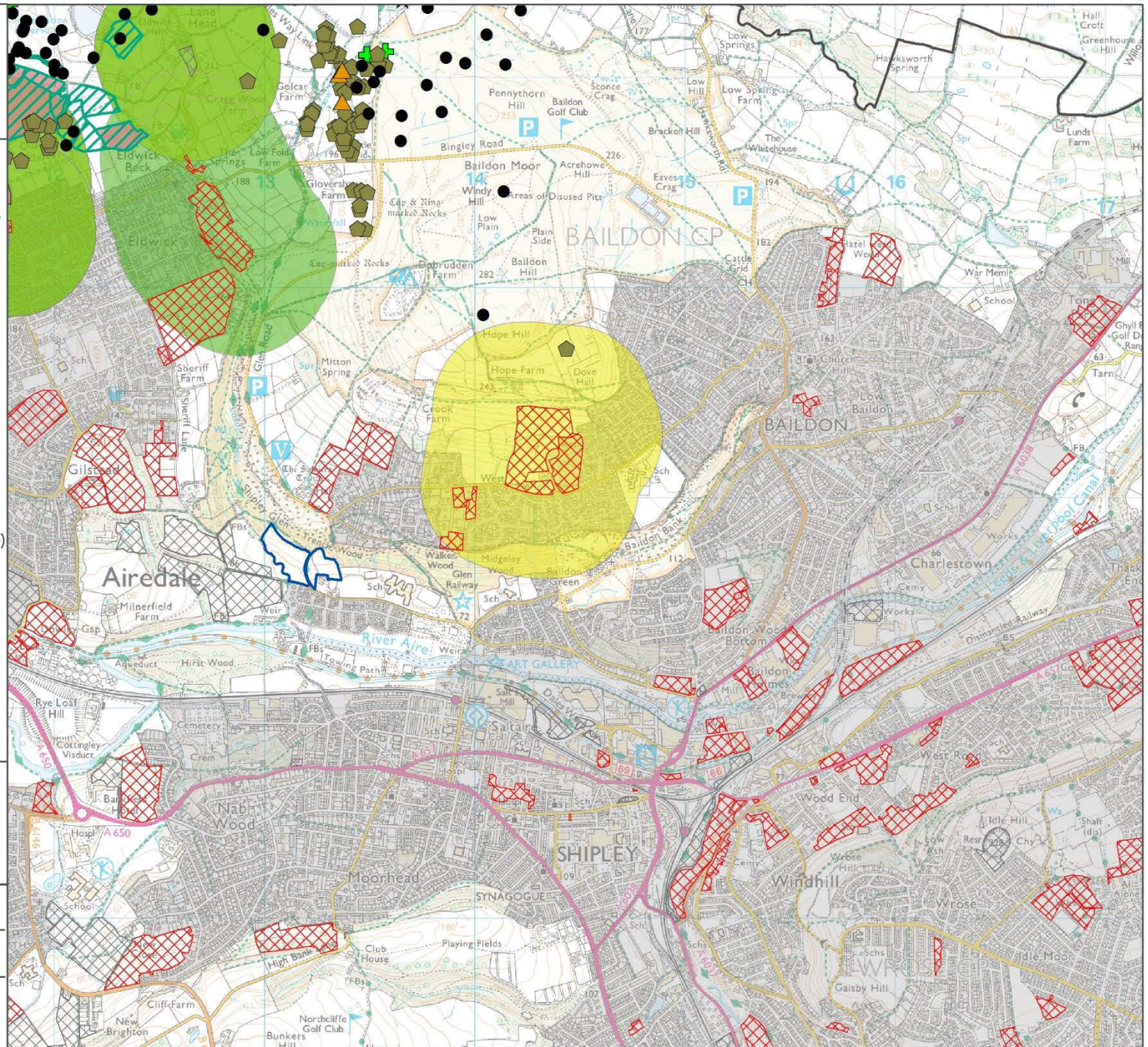
-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline


















Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

  
 ENVIRONMENTAL  
 CONSULTING  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Birds-Habs_Series_3_131114	



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline

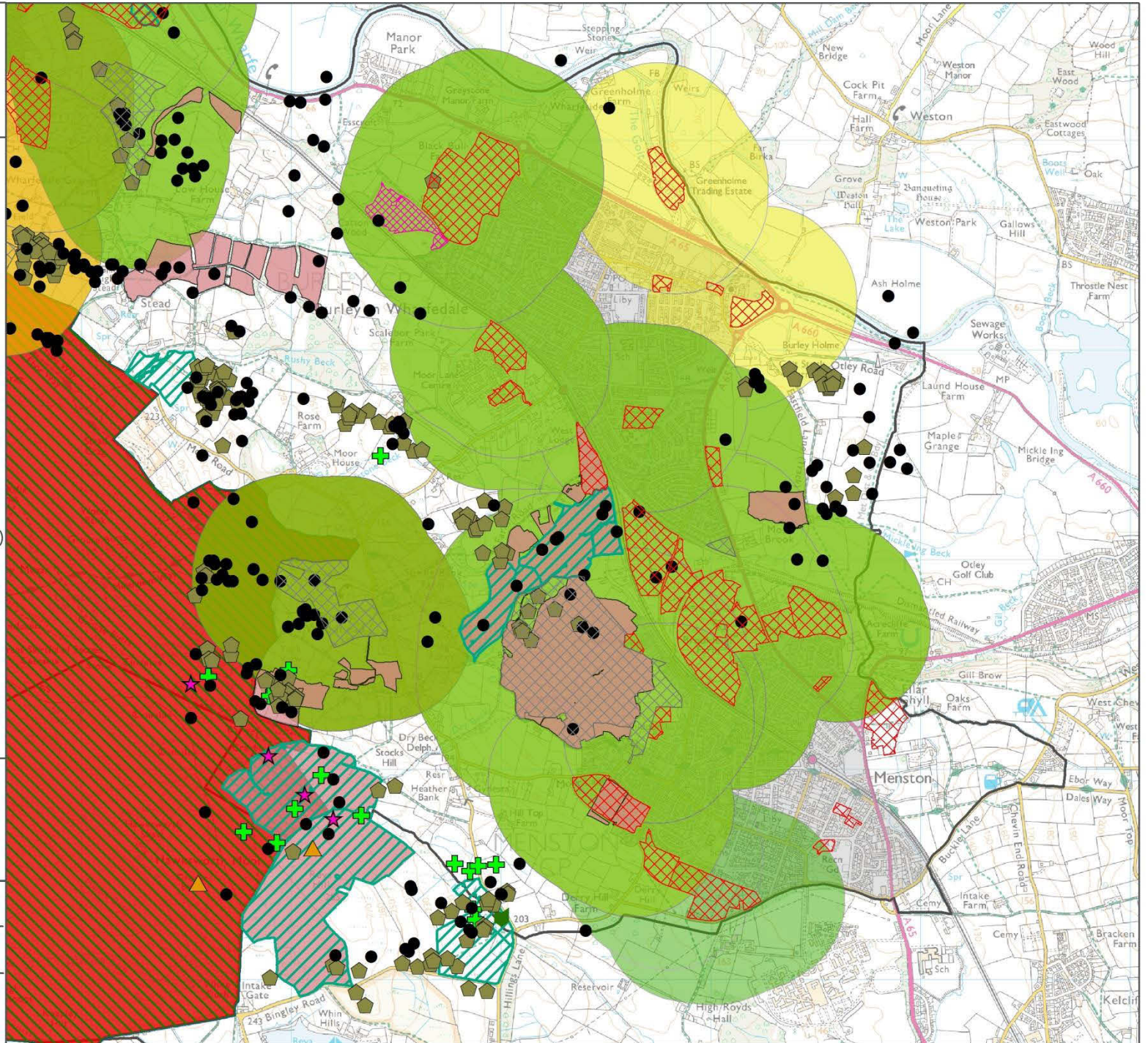


Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

  
 ENVIRONMENTAL  
 CONSULTING  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP

**Drawing number**  
 UE-0126\_Birds-Habs\_Series  
 \_3\_131114



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

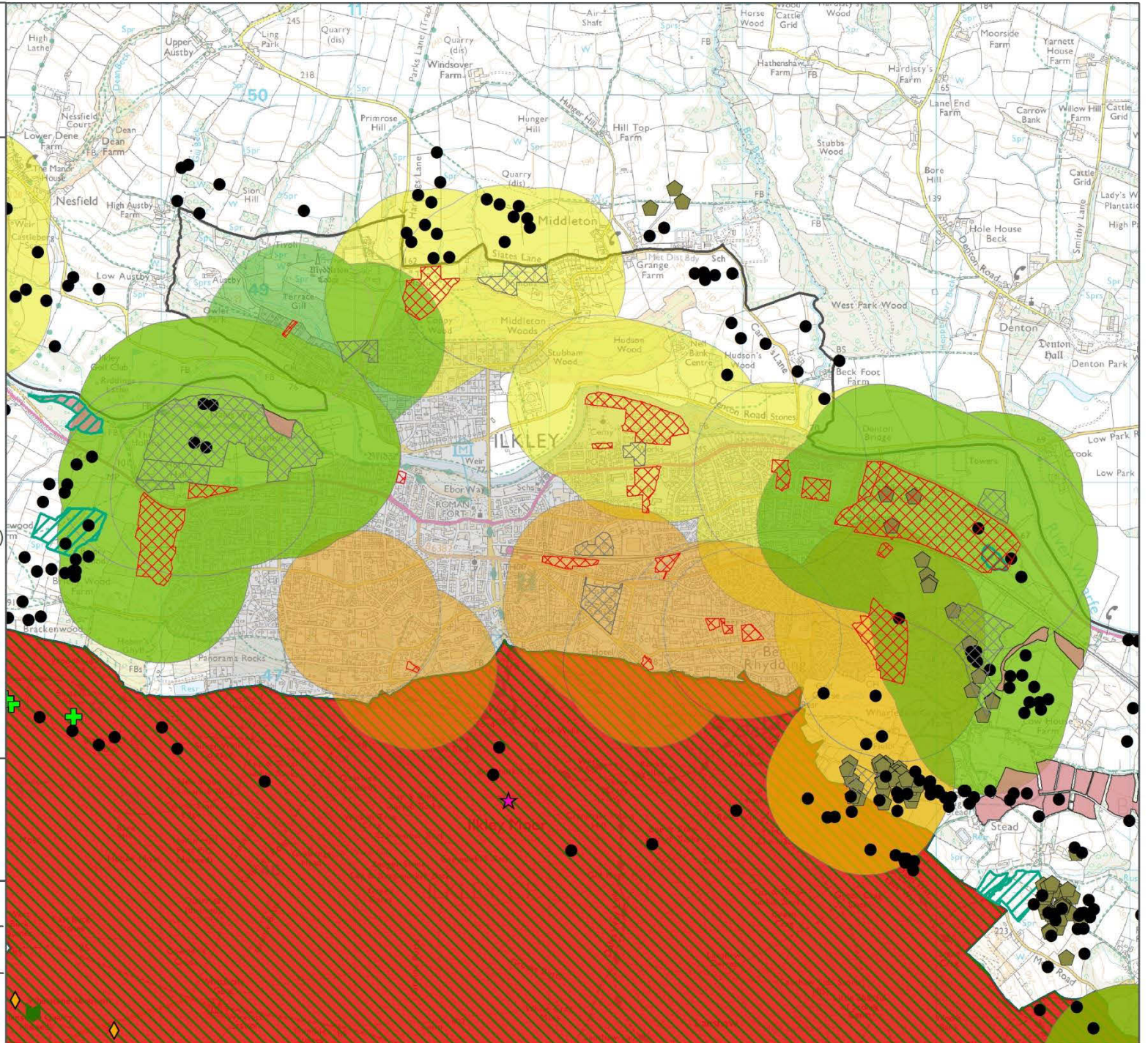
-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline



Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

  
 ENVIRONMENTAL CONSULTING  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 26,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Birds-Habs_Series _3_131114	



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

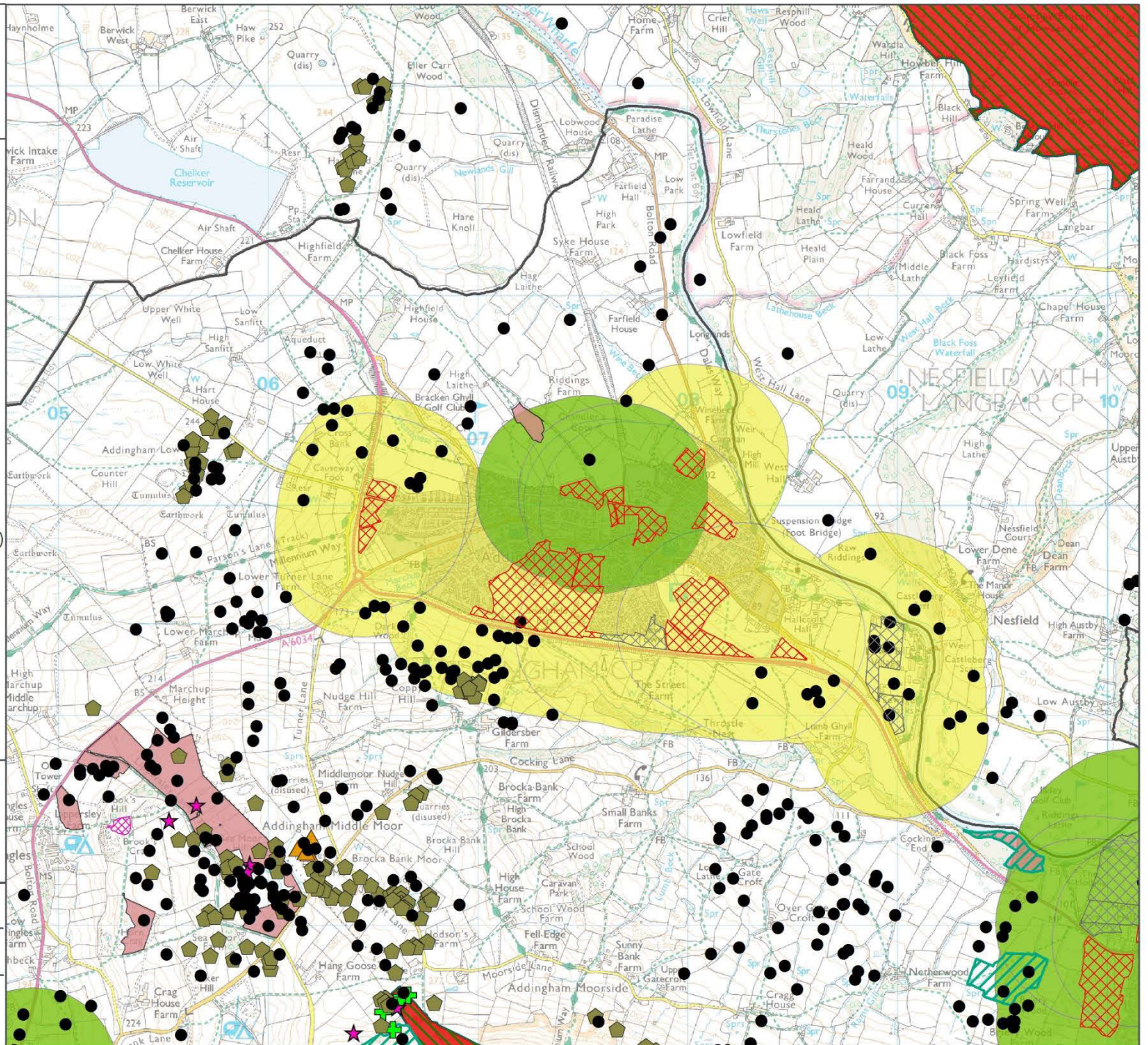
-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline



Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

  
 ENVIRONMENTAL CONSULTING  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 15,896	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Birds-Habs_Series_3_131114	





# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

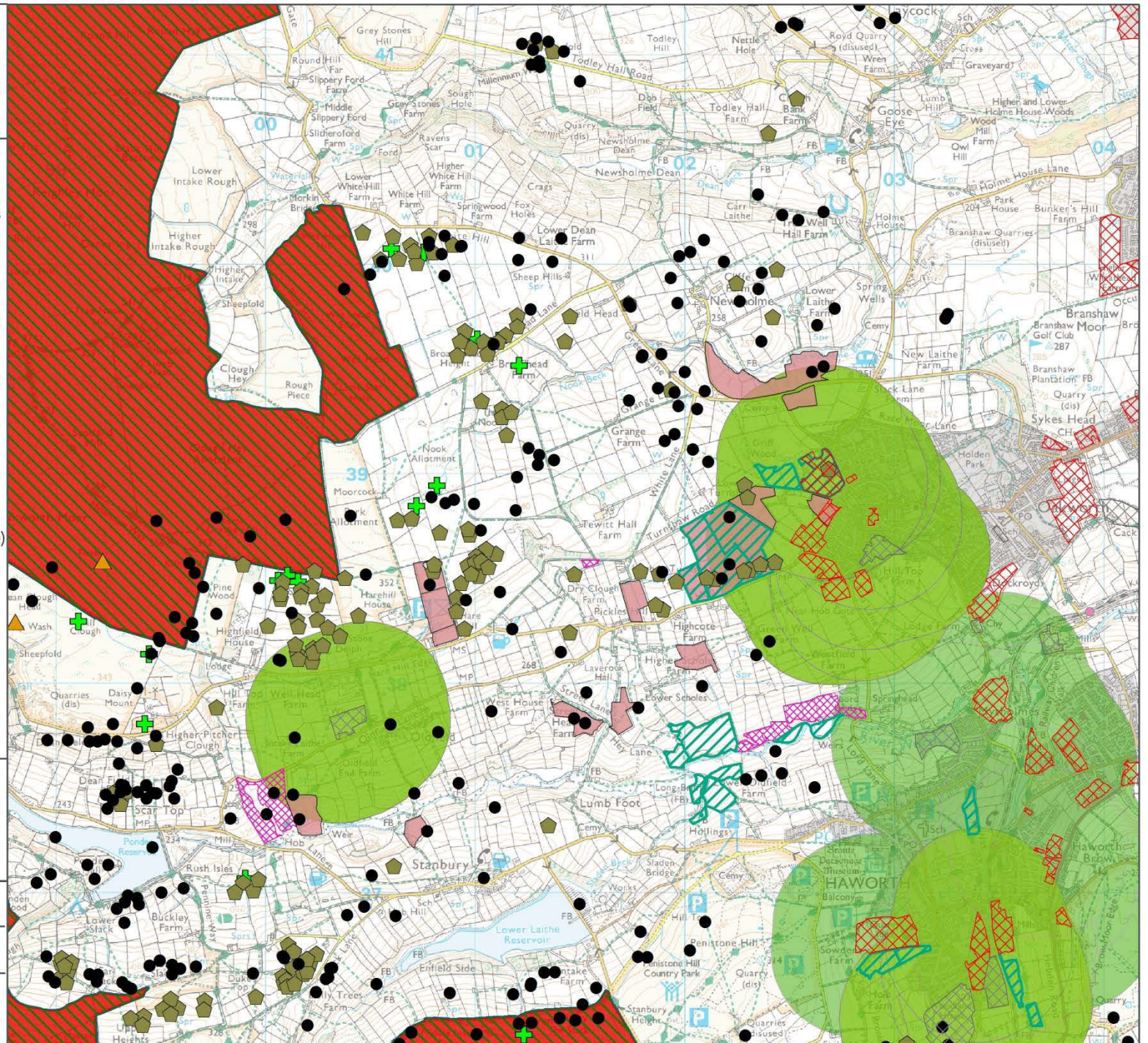
-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline



Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

  
**ENVIRONMENTAL CONSULTING**  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Birds-Habs_Series_3_131114	




# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline



Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304

 ENVIRONMENTAL CONSULTING Unit 5 Westergate Business Centre Brighton BN2 4QN	<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
	<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
	<b>Drawing number</b> UE-0126_Birds-Habs_Series _3_131114	



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Spp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline

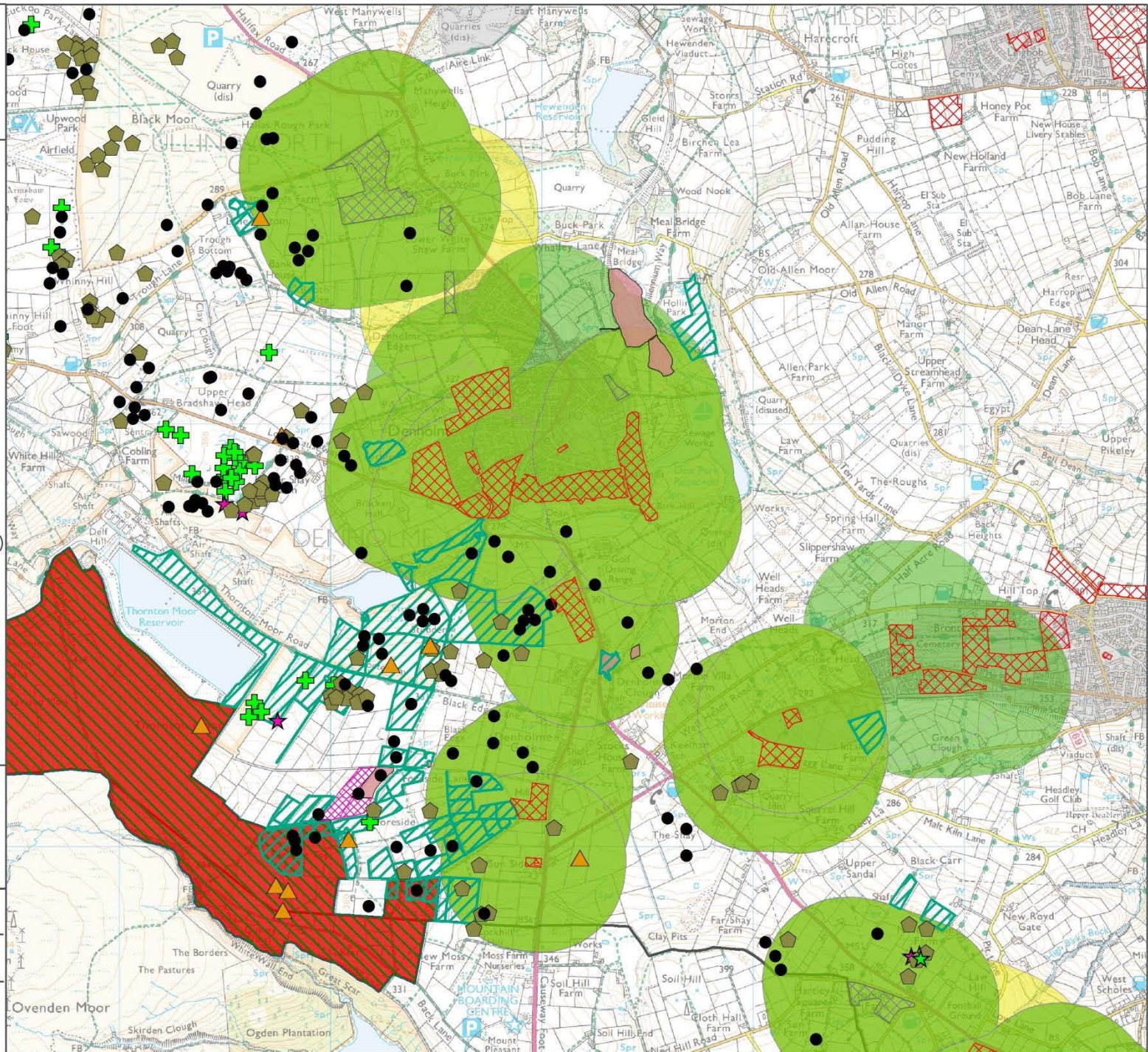


Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



**ENVIRONMENTAL CONSULTING**  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Birds-Habs_Series_3_131114	



# SPA/Typical Birds, Supporting Habitats and SHLAA Sites

-  SHLAA sites (not in trajectory)
-  SHLAA sites (in trajectory)
-  SHLAA 400m with SPA birds & waders
-  SHLAA 400m with supporting habitat
-  SHLAA 400m with SPA
-  Curlew (not flying)
-  Dunlin
-  Golden plover
-  Lapwing (not flying)
-  Merlin
-  Redshank
-  Short-eared owl
-  Snipe
-  Rush pasture (all coverage)
-  Sp. rich semi-improved (all coverage)
-  Unimproved (all coverage)
-  SAC
-  SPA
-  SSSI
-  Settlements (with residential units)
-  CBMDC outline

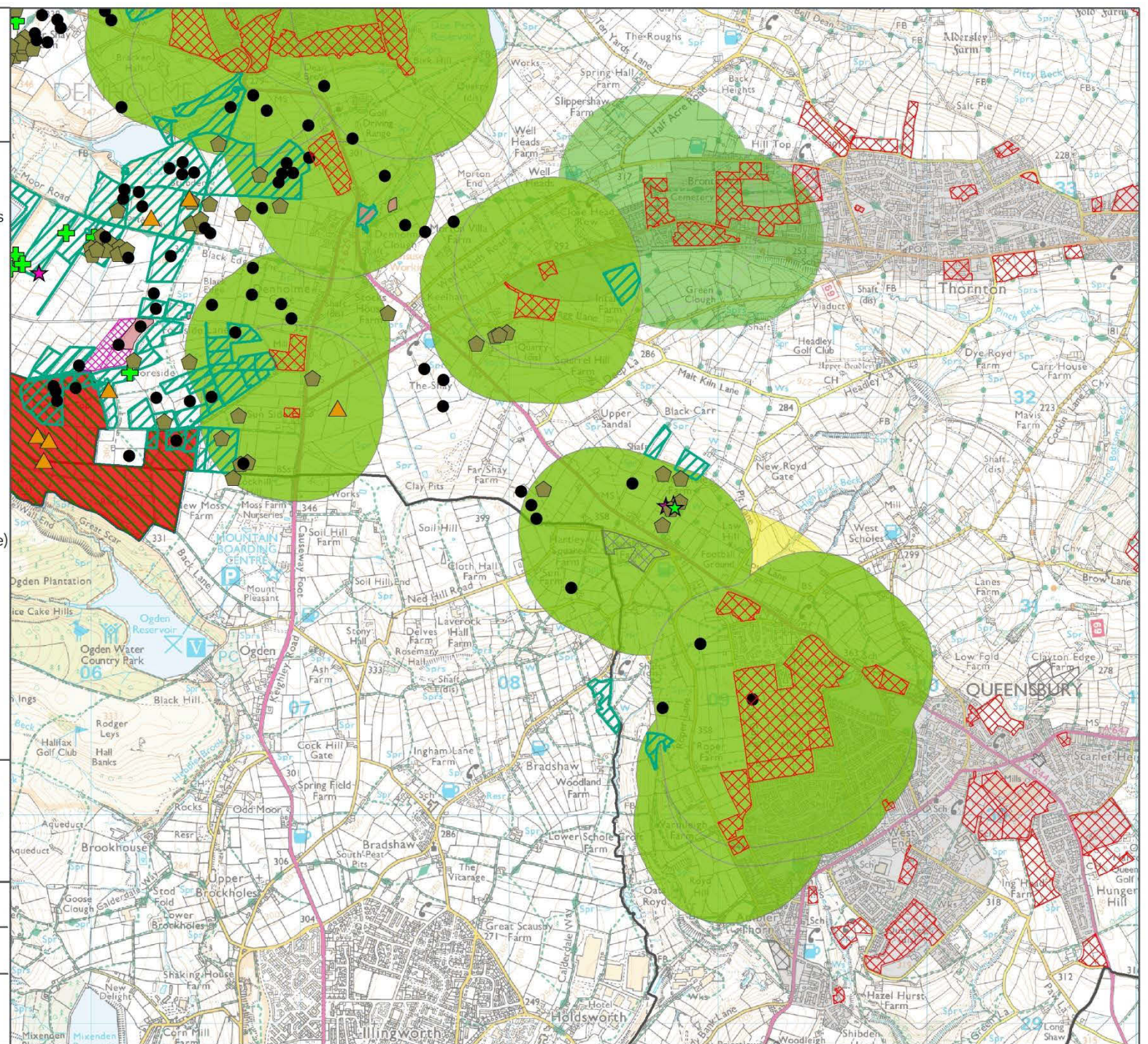


Contains data from West Yorkshire Ecology 2013  
 Contains data from Natural England 2012  
 © Crown copyright and database right [2012]  
 Ordnance Survey 0100019304



**ENVIRONMENTAL CONSULTING**  
 Unit 5 Westergate  
 Business Centre  
 Brighton  
 BN2 4QN

<b>Scale</b> 1: 24,000	<b>Date</b> Nov2013
<b>Created by</b> JC/NP	<b>Reviewed by</b> NP
<b>Drawing number</b> UE-0126_Birds-Habs_Series_3_131114	



## Appendix IV: APIS Grid Reference Data

The following tables show data held by [APIS](#) (at 30/11/14) for exceedances of critical loads/levels for atmospheric pollutant types relevant to the HRA, at a range of grid references on the strategic road network connecting to Bradford district. All locations are both within a European site, and within 200m of a road corridor. Cells highlighted in red are already exceed; those highlighted in yellow have a background load/level >70% of the critical load/level. The following abbreviations apply:

CL = Critical load or level for target habitat at this location

Dep. / conc. = Current rates of deposition or concentration

Exceed. = The amount by which CL is exceeded (against the lowest CL value where a range is given)

**EU site name:** North Pennine Moors SAC/SPA (Round Hill)  
**Queried habitat(s):** Fen, Marsh and Swamp  
**Grid ref(s):** 412280,454781  
**Map ref:** 1  
**Road corridor(s):** A59 Kex Gill Road

412280,454781			
Pollutant:	CL	Dep. / conc.	Exceed.
Acid dep. (keq/ha/yr)	This habitat is not sensitive to acidity	1.93 (N: 1.66   S: 0.4) (2010-12)	n/a
N dep. (kgN/ha/yr)	Valley mires, poor fens and transition mires: 10 – 15 Rich fens: 15 - 30	23.24 (2010-12)	Valley mires, poor fens and transition mires: 13.24 Rich fens: 8.24
NOx (µgm <sup>-3</sup> )	30	8.15 (2010-12)	-21.85

**EU site name:** North Pennine Moors SAC/SPA (Embsay Moor)  
**Queried habitat(s):** Fen, Marsh and Swamp  
**Grid ref(s):** 405015,456825  
**Map ref:** 2  
**Road corridor(s):** B6160 (nr Barden Tower)

405015,456825			
Pollutant:	CL	Dep. / conc.	Exceed.
Acid dep. (keq/ha/yr)	This habitat is not sensitive to acidity	1.73 (N: 1.48   S: 0.36) (2010-12)	n/a
N dep. (kgN/ha/yr)	Valley mires, poor fens and transition mires: 10 – 15 Rich fens: 15 - 30	20.72 (2010-12)	Valley mires, poor fens and transition mires: 10.72 Rich fens: 5.72
NOx (µgm <sup>-3</sup> )	30	6.94 (2010-12)	-23.06

**EU site name:** South Pennine Moors SAC/SPA (Wadsworth Moor)  
**Queried habitat(s):** Bogs  
**Grid ref(s):** 401140,433000  
**Map ref:** 3  
**Road corridor(s):** A6033 Hebden Bridge Road

401140,433000			
Pollutant:	CL	Dep. / conc.	Exceed.
Acid dep. (keq/ha/yr)	CLmaxS: 0.47 CLminN: 0.32 CLmaxN: 0.8	2.32 (N: 1.96   S: 0.53) (2010-12)	Yes
N dep. (kgN/ha/yr)	Valley mires, poor fens and transition mires: 10 – 15 Raised and blanket bogs: 5 - 10	27.44 (2010-12)	Valley mires, poor fens and transition mires: 17.44 Raised and blanket bogs: 22.44
NOx (µgm <sup>-3</sup> )	30	9.6 (2010-12)	-20.4

**EU site name:** South Pennine Moors SAC/SPA (Thornton Moor)  
**Queried habitat(s):** Bogs  
**Grid ref(s):** 401400,432985  
**Map ref:** 4  
**Road corridor(s):** A6033 Hebden Bridge Road

401400,432985			
Pollutant:	CL	Dep. / conc.	Exceed.
Acid dep. (keq/ha/yr)	CLmaxS: 0.47 CLminN: 0.32 CLmaxN: 0.79	2.32 (N: 1.96   S: 0.53) (2010-12)	Yes
N dep. (kgN/ha/yr)	Valley mires, poor fens and transition mires: 10 – 15 Raised and blanket bogs: 5 - 10	27.44 (2010-12)	Valley mires, poor fens and transition mires: 17.44 Raised and blanket bogs: 22.44
NO <sub>x</sub> (µgm <sup>-3</sup> )	30	9.6 (2010-12)	-20.4

**EU site name:** South Pennine Moors SAC/SPA (Soyland Moor)  
**Queried habitat(s):** Bogs  
**Grid ref(s):** 397697,418193  
**Map ref:** 5  
**Road corridor(s):** B6138 Turvin Road & A58 Rochdale Road

397697,418193			
Pollutant:	CL	Dep. / conc.	Exceed.
Acid dep. (keq/ha/yr)	CLmaxS: 0.44 CLminN: 0.32 CLmaxN: 0.76	1.87 (N: 1.59   S: 0.41) (2010-12)	Yes
N dep. (kgN/ha/yr)	Valley mires, poor fens and transition mires: 10 – 15 Raised and blanket bogs: 5 - 10	22.26 (2010-12)	Valley mires, poor fens and transition mires: 12.26 Raised and blanket bogs: 17.26
NO <sub>x</sub> (µgm <sup>-3</sup> )	30	13.06 (2010-12)	-16.94

**EU site name:** South Pennine Moors SAC/SPA (Rishworth/Moss Moor)  
**Queried habitat(s):** Dwarf Shrub Heath  
**Grid ref(s):** 401955,415950  
**Map ref:** 6  
**Road corridor(s):** A672 Oldham Road & M62(J23-J22)

401955,415950			
Pollutant:	CL	Dep. / conc.	Exceed.
Acid dep. (keq/ha/yr)	CLmaxS: 0.57 CLminN: 0.64 CLmaxN: 1.21	2.21 (N: 1.91   S: 0.45) (2010-12)	Yes
N dep. (kgN/ha/yr)	10-20	26.74 (2010-12)	16.74
NOx ( $\mu\text{gm}^{-3}$ )	30	15.36 (2010-12)	-14.64

**EU site name:** South Pennine Moors SAC/SPA (Moss Moor)  
**Queried habitat(s):** Bogs  
**Grid ref(s):** 402280,414043  
**Map ref:** 7  
**Road corridor(s):** B6114 & A640 New Hey Road

402280,414043			
Pollutant:	CL	Dep. / conc.	Exceed.
Acid dep. (keq/ha/yr)	CLmaxS: 0.52 CLminN: 0.32 CLmaxN: 0.84	2.2 (N: 1.88   S: 0.48) (2010-12)	Yes
N dep. (kgN/ha/yr)	Valley mires, poor fens and transition mires: 10 – 15 Raised and blanket bogs: 5 - 10	26.32 (2010-12)	Valley mires, poor fens and transition mires: 16.32 Raised and blanket bogs: 21.32
NOx ( $\mu\text{gm}^{-3}$ )	30	13.13 (2010-12)	-16.87





**Urban Edge Environmental Consulting Ltd**

Unit 5 | Westergate Business Centre | Brighton | BN2 4QN

T: 01273 68 67 66 | E: [enquiries@ueec.co.uk](mailto:enquiries@ueec.co.uk)

[www.ueec.co.uk](http://www.ueec.co.uk) |  [@UrbanEdgeEnviro](https://twitter.com/UrbanEdgeEnviro)

© Urban Edge Environmental Consulting Ltd 2014

## **Urban Edge Environmental Consulting Ltd**

Unit 5 | Westergate Business Centre | Brighton | BN2 4QN

T: 01273 68 67 66 | E: [enquiries@ueec.co.uk](mailto:enquiries@ueec.co.uk)

[www.ueec.co.uk](http://www.ueec.co.uk) |  @UrbanEdgeEnviro

© Urban Edge Environmental Consulting Ltd 2014

**UE** URBAN EDGE  
ENVIRONMENTAL  
CONSULTING

**NATURAL PROGRESSION**