



# **Kirklees Local Plan**

## **Technical Paper: Environmental Designations**

**November 2015**

Planning Policy Group  
Investment and Regeneration Service  
Kirklees Council  
PO Box B93  
Civic Centre III  
Huddersfield  
HD1 2JR

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# 1 Introduction

- 1.1 Within Kirklees, there is a varied natural environment, ranging from remote Pennine uplands of the west to the intensively farmed agricultural land to the south-east. An extensive range of sites are protected for their biodiversity and geodiversity, including European, national and locally designated sites.
- 1.2 This technical paper supports the preparation of the Kirklees Local Plan and provides a summary of the evidence used to designate the most important areas and sites in the district requiring protection for nature conservation and geological significance.
- 1.3 This paper explains the processes used to identify and designate the following designations shown on the Kirklees Local Plan:-
  - Internationally designated sites: Special Protection Area (SPA), Special Area of Conservation (SAC), Natura 2000 (N2K)
  - Nationally designated sites: Site of Special Scientific Interest (SSSI)
  - Local Wildlife Sites
  - Local Geological Sites
  - Kirklees Wildlife Habitat Network
  - Kirklees Biodiversity Opportunity Zones
  - Strategic Green Infrastructure Networks

## 2 National Planning Policy Context

### 2.1 National Planning Policy Framework

2.1.1 The National Planning Policy (NPPF) states that a core principle of the planning system is to conserve and enhance the natural environment. Planning policies and decisions should minimise impacts on biodiversity and geodiversity and aim to maintain and enhance biodiversity when determining planning applications.

2.1.2 NPPF (paragraph 109) states that the planning system should contribute to and enhance the natural and local environment by:

*“...minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, **including by establishing coherent ecological networks that are more resilient to current and future pressures...**”*

2.1.3 Local planning authorities should set criteria based policies against which to proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. **Distinctions should be made between the hierarchy of international national and locally designated sites**, so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks (NPPF, paragraph 113).

2.1.4 Local planning authorities are also required to:-

*“set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure..”* (NPPF, paragraph 114).

2.1.5 Paragraph 117 of NPPF states that to minimise impacts on biodiversity and geodiversity, planning policies should:

*“...**identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;**”* and

*“...promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets, and identify suitable indicators for monitoring biodiversity in the plan...”*

## 2.2 National Planning Practice Guidance

2.2.1 National Planning Practice Guidance states that relevant evidence in identifying and mapping local ecological networks includes:

- the broad geological, geomorphological and bio-geographical character of the area, creating its main landscapes types;
- key natural systems and processes within the area, including fluvial and coastal;
- the location and extent of internationally, nationally and locally designated sites;
- the distribution of protected and priority habitats and species;
- areas of irreplaceable natural habitat, such as ancient woodland or limestone pavement, the significance of which may be derived from habitat age, uniqueness, species diversity and/or the impossibilities of re-creation;
- habitats where specific land management practices are required for their conservation;
- main landscape features which, due to their linear or continuous nature, are important for the migration, dispersal and genetic exchanges of plants and animals, including any potential for new habitat corridors to link any isolated sites that hold nature conservation value, and therefore improve species dispersal;
- areas with potential for habitat enhancement or restoration, including those necessary to help biodiversity adapt to climate change or which could assist with the habitats shifts and species migrations arising from climate change;
- an audit of green space within built areas and where new development is proposed;
- information on the biodiversity and geodiversity value of previously developed sites and the opportunities for incorporating this in developments; and
- areas of geological value which would benefit from enhancement and management.

2.2.2 NPPG also notes that local designated sites (which include 'Local Wildlife Sites' and 'Local Geological Sites') make an important contribution to ecological networks and are overseen by Local Sites systems. These systems vary considerably in terms of size (both the administrative area they cover and the number of sites selected) and cover contrasting landscapes in coastal, rural and urban situations.

### **3 Local Context**

#### **3.1 Kirklees Biodiversity Strategy**

3.1.1 The objectives of the Biodiversity Strategy in Kirklees are:

- To inform key partners, landowners and the private sector of the importance of land management for biodiversity and, its role in addressing and mitigating the effects of climate change.
- To ensure that biodiversity is addressed and taken into account in the delivery of all relevant council services, the council is compliant with, and meets all legal obligations, adopts best practice and supports the positive conservation management of Local Sites.
- To support biodiversity work in the wider district.

#### **3.2 Kirklees Biodiversity Action Plan**

3.2.1 The Kirklees Biodiversity Action Plan (BAP) identifies the habitats and species found within the district which are a priority for conservation (referred to as Habitats and Species of Principal Importance or Priority Species or Priority Habitats) and which are a material consideration for planning and development. These habitats and species also come within the duty imposed by the Natural Environment & Rural Communities Act (2006) – the so-called NERC Duty. All public bodies should have regard for the conservation of these species and habitats in carrying out their functions.

3.2.2 In addition the Kirklees BAP highlights the issues impacting upon these species and habitats and identifies the actions needed for their conservation, actions which all land managers – from community groups to farmers - can implement if they so wish. To provide further guidance in this process the Kirklees BAP has subdivided the district into zones based upon the natural characteristics of each zone and the habitats and species most likely to be found there. It is recommended that conservation efforts in these zones are directed towards those habitats and species found there.

## **4 Designated Sites**

### **4.1 International and National Sites**

- 4.1.1 At the international level, the South Pennine Moors Special Protection Area (SPA) has the highest level of statutory protection being of European importance for several upland breeding bird species classified under the Birds Directive. These moorlands are also designated as a Special Area for Conservation (SAC) which provides protection for blanket bog and upland heath habitats through the European Habitats Directive.
- 4.1.2 The council is required by law to carry out a Habitats Regulations Assessment when preparing the new Local Plan. Therefore, the council has commissioned an external environmental consultant to undertake the Habitats Regulations Assessment on behalf of the council. The Draft Kirklees Local Plan Habitats Regulations Assessment Report (October 2015, Land Use Consultants) has been published on the council's website.
- 4.1.3 At the national level, Sites of Special Scientific Interest (SSSIs) are sites designated for their national importance and protected by law to conserve their wildlife or geology. There are three designated SSSI's in Kirklees: The South Pennines Moor (with boundaries which mirror the SPA/SAC boundaries); Park Clough, Marsden and Honley Station Cutting, Honley. These sites are protected by law under the Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000 and the Conservation of Habitats and Species Regulations 2010 (as amended). Development which is likely to have an adverse effect on a SSSI will not be permitted. Exceptions will only be made where the benefits of development outweigh any impact and measures are provided to mitigate harmful impacts.

### **4.2 Local Sites and West Yorkshire Local Sites Partnership**

- 4.2.1 In 2006 Defra brought out "Local Sites, Guidance on their Identification, Selection and Management" which introduced the terms 'Local Site' and subdivisions of 'Local Wildlife Site' and 'Local Geological Site' for non-statutory nature conservation sites. These terms provide consistent terminology across England and have been adopted across all districts in West Yorkshire.
- 4.2.2 "Local Sites are all areas of substantive value including both the most important and most distinctive species, habitats, geological and geomorphological features within a national, regional and local context. Sites within the series may also have an important role in contributing to the public enjoyment of nature conservation." (Defra 2006)
- 4.2.3 Following the 2006 Defra guidance, the West Yorkshire Local Sites Partnership (WYLSP) was established in 2011, covering the 5 districts of West

Yorkshire, to establish the Local Sites system for the identification, safeguarding and conservation based management of Local Sites. The following 10 organisations make up the full WYLSP:-

- 5 councils of Bradford, Calderdale, Kirklees, Leeds and Wakefield
- West Yorkshire Ecology
- Natural England
- West Yorkshire Geology Trust
- Yorkshire Wildlife Trust
- Yorkshire Naturalists Union

4.2.4 The WYLP has agreed a set of written selection criteria against which each Local Wildlife and Geological Site has been assessed to ensure it is of a sufficiently high quality to be designated. The guidelines and criteria for selection are set out in:-

- the West Yorkshire Local Site Selection Criteria (2011); and
- the Guidelines for the Identification and Selection of Local Geological Sites in West Yorkshire (2011).

4.2.5 Two working groups with appropriate expertise were established to undertake the assessments and these are the:-

- Local Wildlife Sites Panel ; and
- Local Geological Sites Panel

### **4.3 Local Wildlife Sites**

#### ***Introduction***

4.3.1 A set of written selection criteria for the designation of Local Wildlife Sites has been drawn up and agreed by the West Yorkshire Local Sites Partnership. These are set out in the above guidance the West Yorkshire Local Site Selection Criteria (2011 as amended).

#### ***Criteria for the Selection of Local Wildlife Sites***

4.3.2 The guidelines and criteria used for the selection of Local Wildlife Sites set out in guidance are divided into 2 parts:-

- Habitat characteristics; and
- Species groups

4.3.3 The habitat guidelines describes the status of the habitat with reference to International and National, Natural Area and West Yorkshire context, and set out the criteria and attributes on which the designation of a Local Wildlife Site is based.

4.3.4 For each species group, details of the legal protection/status afforded are provided where applicable. Specific guidelines establish the selection



thresholds on which a Local Wildlife Site is designated and set out the rationale for each guideline and how it should be applied.

### ***Methodology***

- 4.3.5 The process of identifying Local Wildlife Sites is comprehensively described in the West Yorkshire Local Site Selection Criteria (2011). A summary of the methodology used is set out below:-
- a) West Yorkshire Ecology Service (WYES), in conjunction with the council, identify candidate sites that are of suitable quality to be surveyed and assessed for designation as Local Wildlife Site.
  - b) Sites have been surveyed by WYES. The survey results of each site include a written citation, habitat and boundary map, species list and whether the threshold for designation has been met.
  - c) The Local Wildlife Sites Panel examines the survey data and assesses the sites against the agreed selection criteria. A recommendation together with supporting evidence is presented to the West Yorkshire Local Sites Partnership.
  - d) Sites are approved and designated by the West Yorkshire Local Sites Partnership. The Partnership advocate that the list of Local Wildlife Sites is included in local development documents.

### **Kirklees Local Wildlife Sites**

- 4.3.6 All sites formerly identified on the Kirklees UDP as Sites of Scientific Interest and Sites of Wildlife Significance have been considered for their suitability to be surveyed and assessed for designation as a Local Wildlife Site or Local Geological Site. New sites have also been proposed by the Kirklees Wildlife and Landscape Partnership (KWLP).
- 4.3.7 The process of assessing these sites against the agreed selection criteria has resulted in a significant number of sites being approved for designation as Local Wildlife Sites in Kirklees. These are listed in Appendix 1 and show the selection criteria that each site meets. A more detailed description of the selection criteria specifically relevant to the Local Wildlife Sites in Kirklees are shown in Appendix 3. Some candidate sites have been approved by the Local Wildlife Sites Panel but have yet to be fully endorsed by the West Yorkshire Local Sites Partnership and other sites have yet to be approved. These are also identified in Appendix 1.
- 4.3.8 A small number of sites have not met the selection criteria for approval as a Local Wildlife Site and have therefore not been designated. These are shown in Appendix 2 with an explanation.

## 4.4 Local Geological Sites

### **Introduction**

- 4.4.1 A set of written selection criteria for the designation of Local Geological Sites have also been drawn up and agreed by the West Yorkshire Local Sites Partnership. These are set out in the “Guidelines for the Identification and Selection of Local Geological Sites in West Yorkshire” (April 2011).

### **Criteria for the Selection of Local Geological Sites**

- 4.4.2 Local Geological Sites are selected on a local basis using the 4 nationally agreed selection criteria set out in the “Local Sites – Guidance on their Identification, Selection and Management (Defra 2006)”:-
- Value of the site for educational purposes in life-long learning
  - Value of the site for study by professional and amateur Earth scientists
  - Historic value of a site in terms of important advances in Earth science knowledge, events or human exploitation
  - Aesthetic value of a site in the landscape, particularly in relation to promoting public awareness and appreciation of Earth sciences

**Table 1: Local Geological Sites Selection Criteria**

<p><b>Criteria for designation of Local Geological Sites in West Yorkshire</b></p> <ul style="list-style-type: none"><li>• That the site should contain geological and/or geomorphological features</li><li>• That the site should have value for one or more of these reasons; scientific, historical, educational and/or aesthetic value</li><li>• That the site should be regionally important for West Yorkshire</li></ul> <p><b>Guidelines to assist in making an objective decision about whether a site should be designated as a Local Geological Site</b></p> <ul style="list-style-type: none"><li>• The site is important because:</li><li>• It has rocks which are representative of their stratigraphic position in West Yorkshire</li><li>• It is a good example of the rock or feature it contains</li><li>• It has an interesting or unusual geological structure or feature which is not found elsewhere in the county</li><li>• It is or has been important for geological research</li><li>• It is particularly easy to access, especially for educational purposes</li><li>• A site may not be of interest on its own, but in combination with other nearby sites, it may tell an interesting or educational story</li><li>• It is being permanently preserved as a rock exposure and will be accessible in the future.</li></ul> <p>It is expected that only one or two of these statements will apply to each site.</p>
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### ***Methodology***

4.4.3 A summary of the methodology used for the designation of Local Geological Sites is set out below:-

- a) West Yorkshire Geology Trust (WYGT), in conjunction with the council, identified candidate sites that are of suitable quality to be surveyed and assessed for designation as Local Geological Sites.
- b) Sites are surveyed by competent geologists to record the necessary geodiversity information required to make an assessment.
- c) All relevant data and other data collected is provided to West Yorkshire Geology Trust who compile all assessments, descriptions and maps for consideration by the Local Geological Sites Panel.
- d) The Local Geological Sites Panel examines the survey reports and assesses the sites against the agreed selection criteria to make a recommendation regarding designation of the site.
- e) The outcome of the Local Geological Sites Panel is presented to the full West Yorkshire Local Sites Partnership for formal endorsement and designation as a Local Geological Site. The Partnership advocate that the list of Local Geological Sites is included in local development documents.

### **Kirklees Local Geological Sites**

4.4.4 All sites formerly identified as Sites of Scientific Interest/Regionally Important Geological Sites in Kirklees have been considered for their suitability to be surveyed and assessed for designation as a Local Geological Site. New sites have also been identified by the WYGT. Most sites were approved Local Sites by the West Yorkshire Local Sites Partnership on 11/06/2011 and a further three sites approved on 18/10/2012.

4.4.5 The process of assessing these sites against the agreed selection criteria has resulted in 19 sites being approved for designation as Local Geological Sites in Kirklees. These are listed in Appendix 4 together with a summary of the reasons for designation.

## **5 Wildlife Habitat Network**

### **5.1 Introduction**

- 5.1.2 In recent years, there has been a change in the approach to nature conservation. This is no longer based solely on the protection of individual sites which is not sufficiently adequate to halt and reverse the decline in biodiversity. Rather the creation and protection of ecological networks can help to address this decline by reducing habitat fragmentation and making the landscape more permeable to wildlife.
- 5.1.3 An ecological network is the description given to important areas for wildlife and the existing and potential linkages between them into the wider landscape. Identifying and protecting these connections and developing new ones will help create more coherent and resilient networks, especially in the face of climate change and increasing landscape modification. This adheres to the principles laid out in the Lawton Review “Making Space for Nature” (Defra 24/09/2010).
- 5.1.4 This approach is now embedded in national policy via the 2011 Natural Environment White Paper: The Natural Choice, the England Biodiversity Strategy: Biodiversity 2020 and the National Planning Policy Framework (NPPF).
- 5.1.5 The council commissioned West Yorkshire Ecology to identify and map the components of the Kirklees Wildlife Habitat Network to connect designated sites of biodiversity and geological importance and notable habitat links within the district, such as woodlands, watercourses, natural and semi-natural areas.
- 5.1.6 The Kirklees Unitary Development Plan 1999 (UDP) identified green corridors as “links between, and including, areas of semi-natural wildlife habitats within urban areas which also have value or potential value as means of providing for human movement, visual amenity, local climatic regulation or the amelioration of pollution”. The UDP green corridor designation has been replaced by two separate designations in the Draft Local Plan: the Kirklees Wildlife Habitat Network and the Core Walking and Cycling Network.

## 5.2 Methodology

- 5.2.1 West Yorkshire Ecology identified the Kirklees Wildlife Habitat Network by firstly mapping designated nature conservation sites of at least district-level of importance and linking these by identifying continuous stretches of permeable habitat that can be used over time by species moving between these core areas.
- 5.2.2 The Wildlife Habitat Network was produced using Geographical Information System (GIS) and MapInfo Professional 12.0.1 using the data used is set out in the table below:-

**Table 2: Spatial Datasets used to identify the Kirklees Wildlife Habitat Network**

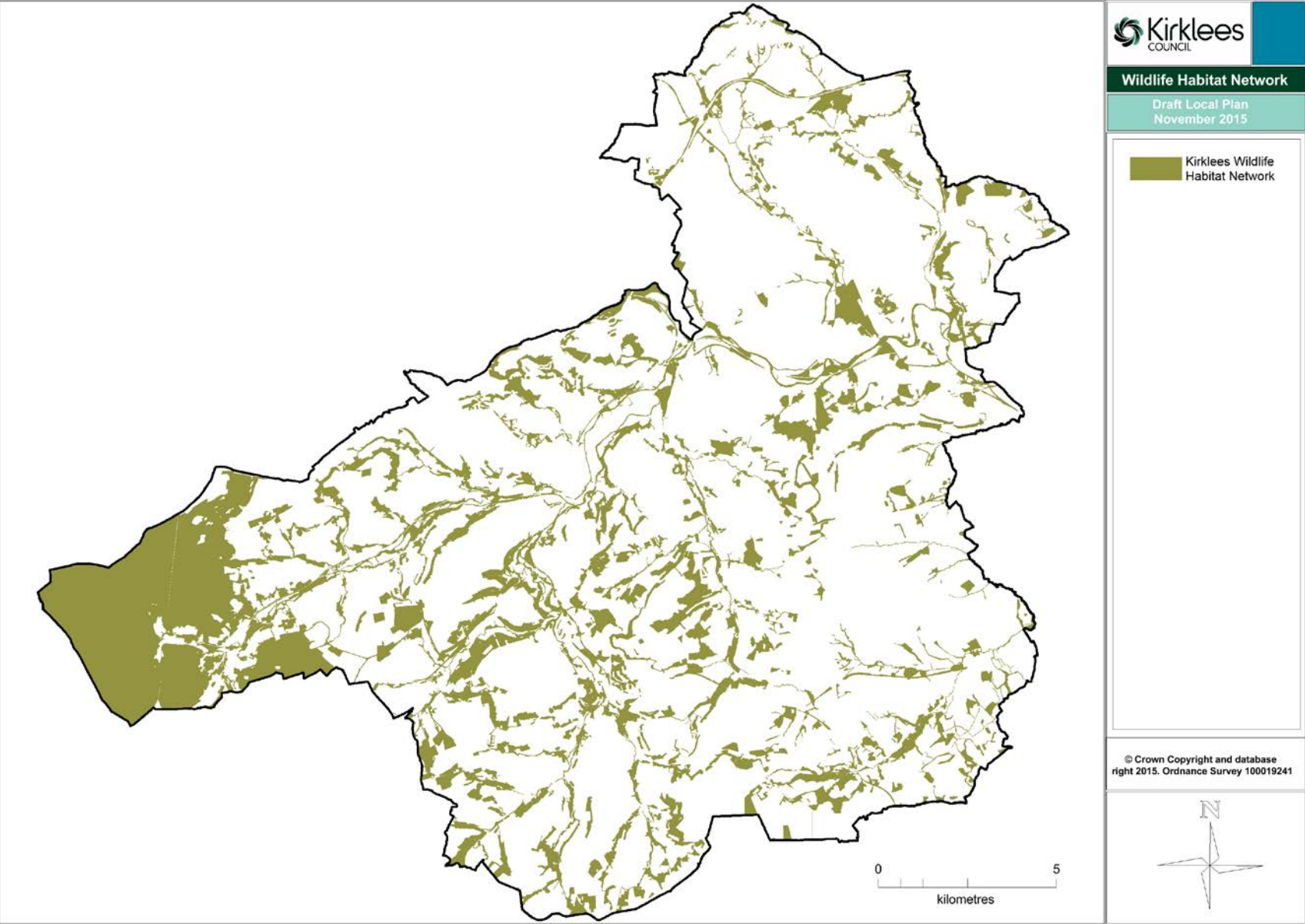
Datasets	Data
<b>Designated wildlife site boundaries</b>	Natura 2000: Special Area of Conservation (SAC)/ Special Protection Area (SPA)
	Sites of Special Scientific Interest (SSSI)
	Sites of Ecological & Geological Importance (SEGI)
	Local Wildlife Site (LWS)
	Local Nature Reserve (LNR)
	Country Park
	Kirklees Sites of Wildlife Significance (SWS)
<b>Habitat datasets</b>	Ancient Woodland boundaries
	Natural England Priority Habitat Inventory (PHI)
	Natura 2000 (SAC/SPA) 2009 NVC surveys
	SSSI/SEGI 1997 and 2002 NVC surveys
	Local Wildlife Site surveys 2010-2015
	2012 South Pennine Moorland Fringe bird & habitat surveys
	1990- Local Authority Grassland Surveys
<b>Species</b>	Bat species (2000-)
	Great Crested Newt (1990-)
	Twite (2000-)
<b>Other datasets</b>	Kirklees Biodiversity Opportunity Zones
	Kirklees UDP
	Tree Preservation Orders (TPO)
	Kirklees BAP Sites
<b>Natural England</b>	Green Infrastructure Corridors
	Impact Risk Zones (IRZs) for SSSIs
<b>Raster Images</b>	Phase I Habitat Survey 1990
<b>Base layers</b>	OS MasterMap Topo_Area
	OS MasterMap Topo_Line
	Bing Aerial Photography

- 5.2.3 Core areas were identified using existing habitat spatial layers (e.g. Natural England's Priority Habitat Inventory (PHI) layer; designated site survey data; other information held by West Yorkshire Ecology local records centre) and data derived from OS MasterMapTopo-Area layer. Other sites of lesser value than the Core Areas but with some significant ecological value (e.g. an area with a Habitat of Principal Importance), were identified as 'Stepping Stones' for wildlife.
- 5.2.4 Field units were taken from MasterMap and assigned a broad habitat type category woodland, grassland, wetland, heathland and other using Bing aerial photography and the 1990 Phase I Habitat raster maps for West Yorkshire. The habitat type categories cover:-
1. Woodland: broad-leaved/ mixed woodland, including traditional orchards; dense scrub and hedgerows (occasional coniferous plantations).
  2. Grassland: semi-improved and unimproved grassland, including upland hay meadow; lowland meadow; lowland dry acid grassland; good quality semi-improved grassland and grass moor.
  3. Heathland: upland and lowland dry and wet heathland; bog habitats, including blanket bog; purple moor grass; upland flushes, fens & swamps; bracken.
  4. Wetland: rivers/ becks (including culverted stretches), ponds, lakes, lowland fen, floodplain grazing marsh, reedbeds.
  5. Other: tracks, hard standing, gardens.
- 5.2.5 The GIS dataset for Kirklees Wildlife Habitat Network GIS includes the following:
- Wildlife Habitat Network polygons
  - Broad habitat type (woodland, grassland, wetland, heathland, other)
  - Sources of data
  - Size (ha)
  - Grid reference Eastings and Northings for polygon centroid

### ***The Kirklees Wildlife Habitat Network***

- 5.2.6 The Wildlife Habitat Network is shown below and is intended to enable species populations to be sustained by protecting and enhancing the ecological corridors and linkages within the wider environment, includes links to adjoining districts (particularly Bradford, Leeds and Wakefield who already have identified Wildlife Habitat Networks). This can be achieved through the use of the Wildlife Habitat Network as a guidance tool for decision making relating to the placing of future developments and the provision of ecological mitigation to maintain and enhance the functionality of the network.

Figure 1: The Kirklees Wildlife Habitat Network



5.2.7 Development within the Wildlife Habitat Network will not necessarily be prevented but the council will seek to ensure that development proposals maintain and enhance the continuity of the network and protect the nature conservation of the land affected.



## 6 Biodiversity Opportunity Zones

### 6.1 Introduction

6.1.1 The Council has established priorities and opportunities for biodiversity in specific geographical areas of Kirklees, known as the Kirklees Biodiversity Opportunity Zones Map. These distinct biodiversity zones have been identified through the overall habitat types which characterise these areas to ensure that any conservation efforts are effectively targeted.

### 6.2 Establishing Biodiversity Priorities

6.2.1 **Species and habitat priorities:** For each of the biodiversity opportunity zones, a species/habitat table has been produced. This identifies the species associated with those habitats within any particular zone. These species and habitats should be the focus of conservation work within each zone unless there is sufficient justification to do otherwise.

6.2.2 **Ecological connectivity priorities:** The relevance of ecological connectivity within and between these zones - and beyond the district - is critical to species survival, especially in adapting to climate change. Three distinct connectivity gradients have been identified:

- North-south or latitudinal gradient;
- East-west or altitudinal gradient;
- Gradient of high to low biodiversity value areas.

The relevance of these gradients within the each zone differs and this is used to determine the nature of the ecological networks found there.

6.2.3 **Efficiency of resource use:** In line with the increasing need to consider multi-functional land use, the potential for integrating biodiversity along with other land uses is also highlighted for the different zones.

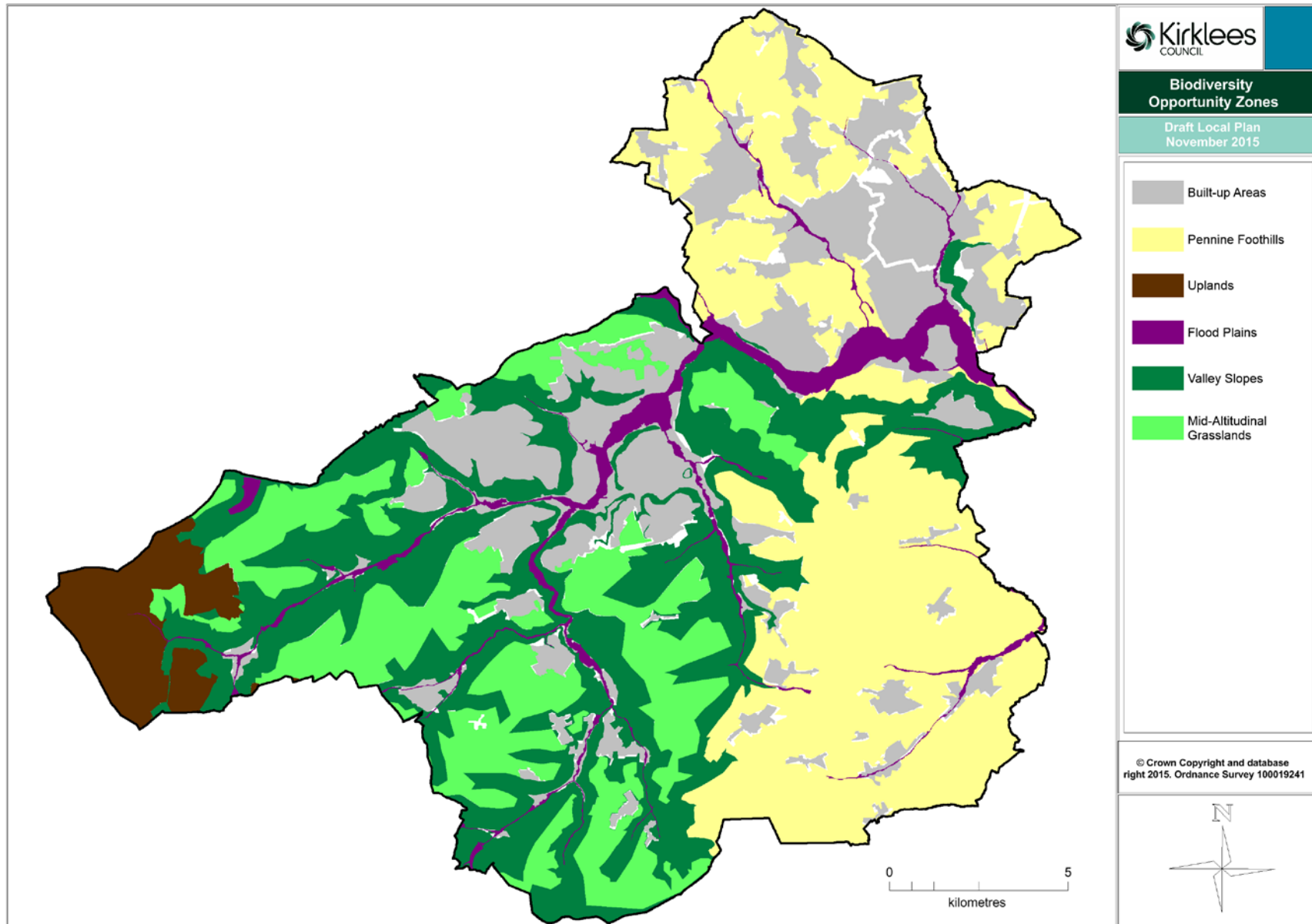
### 6.3 The Kirklees Biodiversity Opportunities Zones

6.3.1 The Kirklees Biodiversity Opportunity Zones are shown in Figure 2 below and include the following characteristic zones:-

- The Uplands
- The Mid-Altitudinal Grasslands
- Valley Slopes
- Floodplain and Riverine Corridors
- Pennine Foothills
- Urban Areas

The characteristics are used to define these areas are described below.

Figure 2: Kirklees Biodiversity Opportunity Zones



### ***The Uplands***

- 6.3.2 This area takes in the European designated and protected sites of the South Pennines and Dark Peak. They are dominated by Upland Heath and Blanket Bog, both UK Habitats of Principal Importance. The sites have been designated for their breeding bird communities and are sensitive to the many pressures exerted upon them. Much of the area is classified as being in unfavourable and recovering with much restoration work now underway through agri-environment schemes and European Life funding..

Green Infrastructure Value: carbon storage, water resource/flood risk management, stock rearing and recreation/tourism.

#### Connectivity Issues

- The designation of the uplands along much of the Pennine chain illustrates their importance to nature conservation and the need for a coherent approach to their protection as a unit along a linear north-south axis.
- There is an important interface with the grassland habitats adjacent to the uplands with upland breeding bird communities being dependent upon these areas at some stage during their breeding cycle (see grasslands below).
- Wetlands in the floodplain are of some relevance to the migration of birds breeding in the uplands and wintering elsewhere. There are, however, currently no wetlands of significance in Kirklees, most occurring further east (see floodplain below).

#### Overarching objectives/opportunities

1. Protect and bring designated areas into favourable condition.
2. Maintain ecological connectivity with other upland areas along the Pennines.
3. Enhance migration routes for upland breeding birds.
4. Bring the adjacent and complementary grasslands into favourable condition.

### ***The Mid-Altitudinal Grasslands***

- 6.3.3 These areas occur primarily in the Valley wards with some representation in the western portion of the Denby Dale ward. The grasslands occur at elevations from around 200 metres upwards. They are characterised by relatively flat land. In the past this would have been managed as pasture and hay meadow (Habitats of Principal Importance) but much now, is agriculturally improved for intensive grazing and silage production. The primary importance of the area is for the remaining semi-natural grasslands and their breeding bird communities. Also, the grasslands within 2km of the upland protected sites can be important for the integrity of those sites and

the species found there (e.g. feeding areas for Golden Plover and Twite which breed in the Uplands).

Green Infrastructure Value: water resource/flood risk management, stock rearing, recreation/tourism and wind-sourced renewables.

#### Connectivity Issues

- Ecological connectivity in a linear sense is less important in this area as bird species are highly mobile. Notably, the more ecologically valuable grasslands also tend to coincide with the areas of greatest ornithological interest forming core areas of biodiversity value. The focus of connectivity should, therefore, be to build on these existing 'core areas', to ensure greater resilience of species' populations (eg. against predation).
- There is a linear, north-south ecological connectivity along the Pennine fringe.
- There is some relevance in terms of the interface with other zones. Of primary importance are the upland protected sites (see upland section above relating to breeding birds) and that with the woodlands of the valley slopes are also significant – see valley slopes below.

#### Overarching objectives/opportunities

1. Protect and enhance those areas which are an important component of the habitats upon which upland breeding bird communities are dependent.
2. Restore grasslands and populations of grassland breeding bird communities focusing around the core areas of greatest interest and diversity.
3. Protect and enhance habitats along the interface with adjacent areas (see Valley Slopes below).
4. Ensure that new development does not impinge upon areas of ecological value in these areas.

#### **Valley Slopes**

- 6.3.4 The valley slopes – because of their steepness - tend not to have been improved for agriculture and are less developed. Hence, woodland (including some ancient woodland sites) is a dominant habitat. Even within the urban areas this is the case (hence, the identity of the valley slopes through the urban areas has been retained on the Opportunities Map). Woodland type is that found on acidic soils and varies from Upland Oak Woodland at higher elevations to Lowland Mixed Deciduous Woodland, both UK Habitats of Principal Importance. Whilst the primary habitat can be considered as woodland, it needs to be recognised that this is interspersed with Scrub (local Habitat of Principal Importance), Lowland Acid Grassland and Lowland Heath (both UK Habitats of Principal Importance). As such, a more accurate

description of the overarching habitat type is a 'Forest Habitat Network'. This mosaic is very distinctive of the district (giving a sense of place) and serves to support a range of Species of Principal Importance.

Green Infrastructure Value: timber and wood fuel production, amelioration of air pollution, flood risk reduction, carbon store, sense of place and recreation.

#### Connectivity Issues

- Linear ecological connectivity is a significant issue for this woodland based mosaic of habitats. This is especially so in the face of climate change where there is likely to be a shift in species distribution from low altitude (east of the district) habitats to higher altitude (west of the district). A number of species associated with such habitats exhibit poor powers of dispersal across habitats unsuited to their needs.
- The interface between this area and the Floodplain and Mid-altitudinal Grasslands is important for a range of species which utilise different habitats (ie. bats, birds and invertebrates for which the woodland edge is a critical habitat – whether the interface is grassland or wetland).

#### Overarching objectives/opportunities

1. Maintain and enhance the integrity of the ecological network of woodland associated habitats by maintaining a balanced mosaic to retain species diversity and aid species migration.
2. Maintain and enhance the habitats along the interface of this area with the floodplain, grassland and other zones.

#### ***Floodplain and Riverine Corridors***

- 6.3.5 There has been significant development in the floodplain within the district, reducing the areas of wildlife habitat, severing its ecological connectivity and impacting upon the natural flow of rivers and streams. This severing also applies to the in-stream habitats where weirs impact on the sustainability of fish populations by preventing migration. Although there appears to be little of existing significant biodiversity interest, especially wetland based systems, it may be the area's value is understated through lack of knowledge. Even so, there is potential and if the ecological integrity of these corridors is to be restored then it will be important to maximise opportunities to create new wetland habitats. In particular, there is a number of Species of Principal Importance associated with wetlands and rivers which should benefit from such habitat network enhancements (eg. otter and salmon).

Green Infrastructure Value: flood risk management, water resource management, informal recreation and formal recreation (ie. sport).

### Connectivity Issues

- Barriers (essentially weirs) within the rivers are a significant obstacle to the migration of fish, which are returning as water quality is improved.
- The lack of linear connectivity in suitable wetland and terrestrial habitats is a critical issue for some species such as otter, great-crested newt and other species.
- Similarly, whilst birds are more mobile, the lack of larger wetland bodies along the floodplain limits opportunities for the purposes of breeding, wintering and migration stop offs.
- In contrast, the lack of connectivity can be critical to the survival of some species such as the water vole and white-clawed crayfish where isolation can aid survival of populations.

See also comments in Valley Slopes zone with regard to interface of wetland and woodland habitats and use of these areas by a range of species.

### Overarching objectives/opportunities

1. Protect and enhance existing wetland features and the associated habitats.
2. Maximise the opportunities to create new larger wetland habitat mosaics through the planning system (eg. mineral extraction) and other mechanisms.
3. Utilise SuDS and new Public Open Space to create an enhanced ecological network based upon wetland habitats.
4. Use development opportunities to remove barriers to fish passage.
5. Ensure habitat enhancements are targeted to specific species and their differing requirements and ensure they are not detrimental to other species.
6. Maintain and enhance the habitats along the interface of this area with other zones especially the valley slopes.

### ***Pennine Foothills***

- 6.3.6 The Pennine Foothills encompass the wards of Denby Dale, Kirkburton and those of North Kirklees. The zone is characterised by gently rolling countryside with a mix of woodland (some ancient woodland sites), hedgerows and agricultural land – primarily pasture (mostly agriculturally improved) but with some arable cropping. Both Lowland Deciduous Woodland and Hedgerows are UK Habitats of Principal Importance and the latter especially are widely distributed across the more rural areas. Arable Field Margins, another UK Habitat of Principal Importance, is also relevant.

Green Infrastructure Value:, flood risk management, wood fuel, agriculture, wind-sourced renewables and informal recreation.

### Connectivity Issues

- Issues revolve around the connectivity of the lattice network of semi-natural corridors within the farmed landscape. This is especially relevant to woodland edge species and linking woodlands and hedgerows.
- The agricultural land bordering these habitats (field margins) is an especially important component of the hedgerow and woodland habitat mosaic for a range of priority species (i.e. replicates the woodland edge interface in both cases). However, much of this land is agriculturally improved and hence, of poor quality and, many hedgerows managed inappropriately for biodiversity benefit. This is likely to result in long term significant change to the landscape where trees are gradually being lost from hedgerows and not replaced.

### Objectives/opportunities

1. Protect, restore and enhance network of hedgerows.
2. Protect, restore and expand areas of woodland, especially adjacent to ancient woodland sites.
3. Enhance the ecological network of habitats, considering opportunities offered by gardens and Public Open Space in new developments.
4. Manage hedgerows to allow new tree growth to replace the dwindling number of trees in hedgerows.

### ***Urban Areas***

- 6.3.7 These cover a significant part of the district, especially in North Kirklees and along the main river valleys. Development has obviously greatly impacted upon natural habitats although some significant areas do still exist on the valley slopes. The characteristic habitat type will be dependent upon where the urban area falls within the above zones, which should influence priorities for habitat creation. Whilst it may be more difficult to do this in a meaningful way in built up areas, the existence of a semi-natural urban habitat network is a fundamental component of urban living which serves to improve quality of life of residents. This is a fundamental principle of green infrastructure.

Green Infrastructure Value: Quality of life issues including amelioration of pollution, flood risk management and active travel.

### Connectivity Issues

- Ecological connectivity is much fragmented within urban areas.
- There is a need to reinforce existing semi-natural linear corridors, by making new links between isolated semi-natural sites, utilising greenways, green corridors, transport corridors, gardens, parks and other formal landscaped areas.
- There is need to utilise all above areas to ameliorate the impacts of the urban environment on biodiversity.

#### Objectives/opportunities

1. Restore the ecological networks and their functionality by creating an urban habitat network utilising the principles as set out in the NPPF and the 'Making Space for Nature' report.
2. Exploit opportunities for enhancement through the planning system, including those involving SuDS and floodplain habitats.
3. Exploit other opportunities for enhancement, especially community based projects.
4. Develop a different approach to the management of formal areas such as gardens and parks to enhance their role in improving the functionality of the ecological network.



## 7. Strategic Green Infrastructure Networks

### 7.1. Introduction

7.1.1. Natural England define green infrastructure as set out below:

*“Green Infrastructure is a strategically planned and delivered network comprising the broadest range of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering those ecological services and quality of life benefits required by the communities it serves and needed to underpin sustainability. Its design and management should also respect and enhance the character and distinctiveness of an area with regard to habitats and landscape types. Green infrastructure includes established green spaces and new sites and should thread through and surround the built environment and connect the urban environment to its wider rural hinterland. Consequently, it needs to be delivered at all spatial scales from sub-regional to local neighbourhood levels, accommodating both accessible natural green spaces within local communities and often much larger sites in the urban fringe and wider countryside”*

Natural England Green Infrastructure Guidance, Natural England, 2009

7.1.2. Natural England, working with the Leeds City Region authorities, has developed a green infrastructure evidence base which includes the mapping and analysis of strategic green infrastructure across the Yorkshire and Humber Region. Although this work was collated to support the delivery of the green infrastructure policy in the Yorkshire & Humber Regional Strategy which has since been abolished, it still remains important for the consideration of green infrastructure issues within Kirklees. It provides a consistent approach to delivery of green infrastructure policies and in particular identifies strategic green infrastructure which runs across administrative boundaries.

7.1.3. The assessment follows a number of steps to map existing and potential green infrastructure sites and corridors and to establish a hierarchy of strategic green infrastructure based on the number of functions each corridor serves. The results show a network of regional, sub-regional and district corridors.

## 7.2 Methodology

7.2.1 Natural England used the following steps to create a regional data set for green infrastructure across the Yorkshire and Humber region:

### **Step 1: Mapping of existing physical green infrastructure assets**

7.2.2 A baseline dataset of existing green infrastructure assets was created by pulling together GIS greenspace and green infrastructure data from Natural England and partner organisations. This covered sites already in existence such as open space, nature reserves and woodland. All available green infrastructure datasets were included. This asset database included data which covered the whole Region and data which was only available at local level. This meant that there was both universal regionally consistent data and locally relevant data. All possible green infrastructure sites, with their exact location and boundaries were collected.

### **Step 2: Mapping sites with potential for introducing green infrastructure**

7.2.3 Sites which did not constitute green infrastructure assets in themselves but might have potential to introduce it, such as derelict land, were collected and mapped. Additional data which helped with understanding the functions of green infrastructure, but was not site based, e.g. area health statistics was also collected.

### **Step 3: Mapping of green infrastructure corridors**

7.2.4 Natural England held joint workshops with participants from adjacent local authority areas to enable green infrastructure to be examined across administrative boundaries. The workshops included the relevant local authorities and organisations with a close interest such as Forestry Commission, Pennine Prospects, the Wildlife Trusts and Leeds City Region. The staff involved were invited from a wide variety of disciplines to reflect the multifunctional nature of green infrastructure including Greenspace/Parks & Countryside, Forward Planning, Forestry, Tourism, Nature Conservation/Ecology, Rights of Way, sport and recreation, Geographic Information and historic environment.

7.2.5 Participants at the workshops examined maps which included all the data collected from stages 1 and 2 and use their local knowledge of land use, land ownership, planning policy and local initiatives, to develop corridors and networks of green infrastructure. The functionality and connectivity between different green infrastructure assets was considered. Firstly in terms of how single functions of green infrastructure can be linked, for instance connecting public open space together into corridors (detailed information on the functions is included in annex 6). Secondly linking multifunctional assets together such as connecting a designated nature area, to a lake, a woodland, or a historic tourism site for example. Participants were also asked to consider realistic opportunities to increase green infrastructure based on known proposed initiatives such as major redevelopment schemes. Corridors

were defined on maps using physical boundaries on the ground such as roads and rail lines to define the edges and to ensure future legibility. These maps were then digitised and sent to the organisations involved at the workshops for them to check.

#### **Step 4: Creating a hierarchy of corridors**

- 7.2.6 A follow up workshop was held with participants to look again at the green infrastructure corridors they had defined in the first workshop to:
- Check the corridor boundaries
  - Agree the green infrastructure functions that each corridor contained
  - Place the green infrastructure corridors into a hierarchy.
- 7.2.7 Natural England examined various studies which included definitions of green infrastructure functions and agreed a list of fifteen functions to work with in the corridor analysis. These are listed below with key indicators:
- **Open space** – Contains open space assets such as parks and woodlands
  - **Biodiversity** – Contains one or more site of significant wildlife value
  - **Landscape** – Contains at least one landscape feature worthy of protection or enhancement
  - **Products from the land** – Includes areas in agricultural or food production
  - **Mitigating flood risk** – Contains floodplain, areas at risk from flooding or areas where green infrastructure could be used to reduce run off into flood risk areas
  - **Contribution to mitigating climate change** – Contains areas which are, or could be, managed for non-flooding climate change mitigation through, carbon sequestration in areas such as peatlands, managed woodlands or locations for energy crop production
  - **Health** – Includes Air Quality Management Areas or locations with populations with poor health where green infrastructure can be used to increase outdoor activity or address pollution issues
  - **Accessibility** – Contains rights of way allowing access by foot, cycle or horse riding along the corridor
  - **Recreation** – Contains formal and informal outdoor recreational assets such as golf courses, play areas and sports pitches
  - **Education** – Visitor centre or site already used for environmental education
  - **Cultural** – Contains gardens, cemeteries, historic features or buildings with public access
  - **Tourism** – Includes tourism assets which would form part of at least a day trip for people from outside the immediate area
  - **Poor quality environment** – Contains existing poor quality environments which could be improved with investment in green infrastructure
  - **Land and property values** – Areas where investment in green infrastructure would be likely to positively affect local land and property values

- **Economic growth** – Includes areas where development is proposed and increased green infrastructure is likely to attract further economic investment e.g. higher value industry

7.2.8 Participants considered each corridor in turn and agreed which functions were present. A strategic approach was taken and therefore functions provided within the corridor had to be significant to be considered. Sites providing localised green infrastructure functions, were not scored as having strategic functionality e.g. incidental open space. A category for each corridor was determined based on the number of functions present, the corridor size and local knowledge of initiatives and likely opportunities for interventions.

7.2.9 The corridor categories are given below:

- **Strategic/Regional** – Likely to cross several local authority boundaries and demonstrates 13 to 15 functions.
- **Sub-regional** – Likely to cross two or more local authority boundaries and has 10 to 13 functions.
- **District** – Likely to be contained within a single local authority or simply connect two localities across a boundary and demonstrates 8 to 11 functions.

7.2.10 The number of functions in each category overlaps i.e. a corridor scoring 11 functions could be both sub-regional and district. In the pilot work it was found that having absolute number of functions for each category was too rigid. This was because a few corridors demonstrated a high number of functions but were too small in scale to be considered as being categorised at a higher level. In these cases these corridors were examined in great detail to place them in the right category taking into account their scale and the degree to which each function was present.

#### **Step 5: Corridor descriptions**

7.2.11 In order to provide a robust evidence base justifying the functions identified in the corridors and the hierarchy of each corridor a table was developed which included:

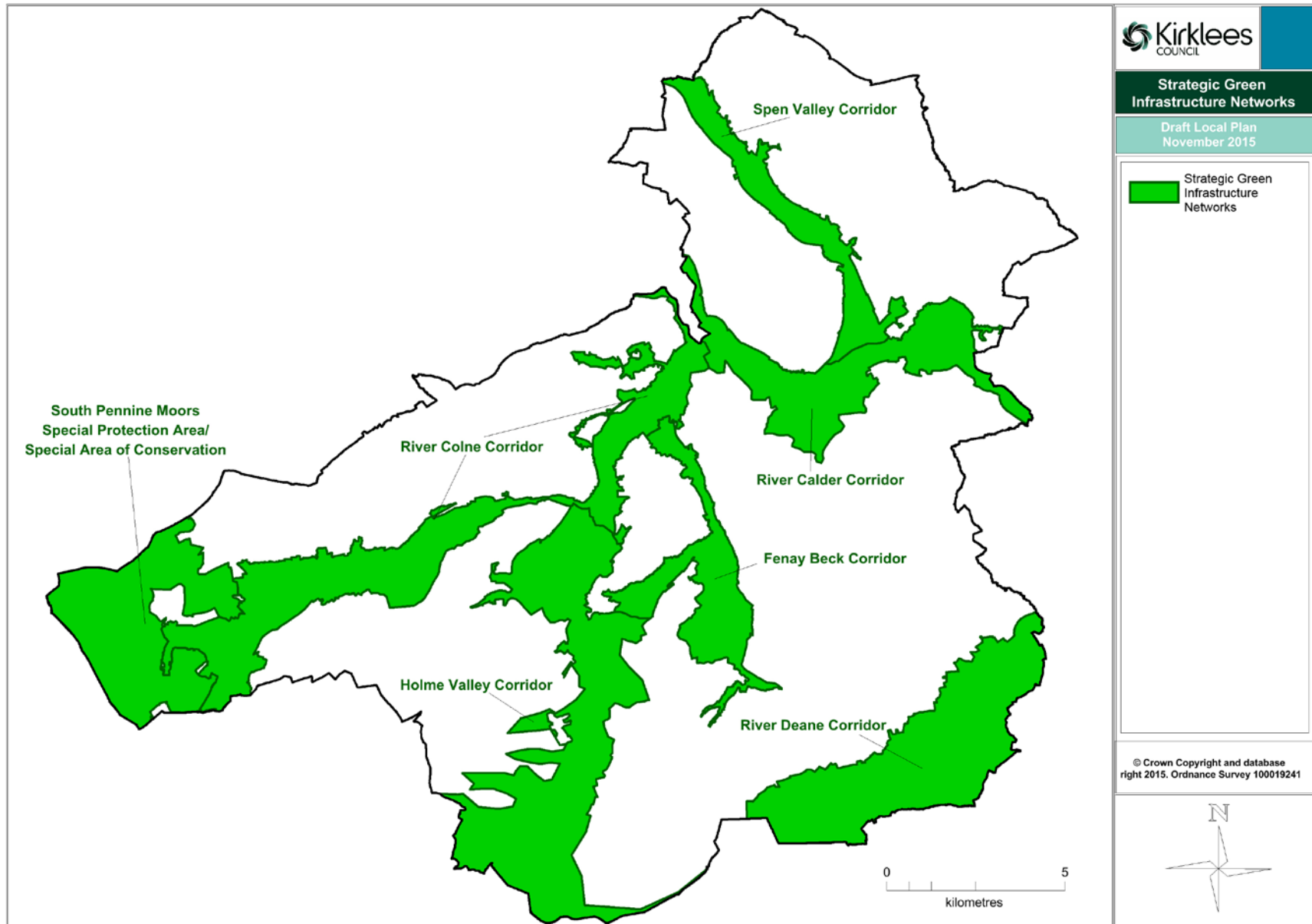
- A description of each corridor explaining the main features and key future opportunities for green infrastructure
- Evidence against each function to justify its inclusion. For example if the biodiversity function had been identified then sites such as SSSIs were named.

## **7.3 Kirklees Strategic Green Infrastructure Networks**

7.3.1 Using the above information the following strategic green infrastructure networks were identified in Kirklees and are shown in Figure 3 below:-

- The River Calder Corridor
- The River Dearne Corridor
- The River Colne Corridor
- The Spen Valley Corridor
- The Fenay Beck Corridor
- The Holme Valley Corridor
- The South Pennine Moor Special Protection Area/Special Area of Conservation

Figure 3: Kirklees Strategic Green Infrastructure Networks



- 7.3.2 Within Kirklees, these networks of accessible greenspaces and natural habitats which occur within, and links, the towns and villages, function in different ways and provide multiple benefits for wildlife; people's health and well-being; local food production; timber production; mitigating climate change, such as flood alleviation and for the local economy by providing a high quality environment to help attract further economic investment.
- 7.3.3 The main river corridors of the Calder and Dearne are regionally important and flow through the district and function as key linkages which connect Kirklees with neighbouring local authorities. Flooding is an important issue within the Calder corridor and green infrastructure investment to provide new green spaces in the valley bottom would be beneficial in helping to ameliorate flooding. Vastly improving water quality is increasing biodiversity and recreation opportunities. Regeneration opportunities in South Dewsbury may provide new and improved green infrastructure.
- 7.3.4 The Spen Valley and Colne corridors are of sub-regional importance. The Spen Valley corridor links the Calder at Ravensthorpe with the River Aire in Shipley. It includes the Spen Valley Greenway, Dewsbury Country and the River Spen. The main possibilities for green infrastructure in this corridor lie in urban regeneration and opportunities to increase and improve habitat networks for the benefit of wildlife. Water quality in the Colne corridor is improving with a related improvement in biodiversity.
- 7.3.5 The Fenay Beck and Holme Valley corridors have been identified as being of district significance. Woodlands are an important biodiversity resource and both have potential for greenway development dependent on funding and partnership working. There is potential to increase recreational use in the Holme Valley corridor.
- 7.3.6 The Council have also identified the South Pennine Moor Special Protection Area/ Special Area of Conservation as part of the strategic green infrastructure network in recognition of the international importance of this landscape and the significant green infrastructure functions this area performs.
- 7.3.7 There are other significant areas of green infrastructure in Kirklees that are strategically important, including Oakwell Hall Country Park and Dewsbury Country Park. The Council recognises the importance of these to local communities for recreation, education and wildlife conservation.
- 7.3.8 In locating new development, strategic green infrastructure networks should be carefully considered. Where there are good reasons for developing land within these areas development will only be acceptable where measures are incorporated to retain or replace key features and functionality of networks. The Council will seek to maximise opportunities for new and improved green

infrastructure and connecting links into the network where opportunities exist.

### **Further Information:**

The Kirklees Biodiversity Strategy

The Kirklees Biodiversity Action Plan

Local Sites: Guidance on their identification, Selection and Management (Defra 2006)

The West Yorkshire Local Site Selection Criteria (2011)

Guidelines for the Identification and Selection of Local Geological Sites in West

Yorkshire (2011)

Yorkshire and the Humber Green Infrastructure Mapping Project (Natural England, 2010)



## Appendix 1 Kirklees Local Wildlife Sites

Site Ref	UDP Designation	Site Address	Site Area (ha)	Guideline Criteria	Date Approved by West Yorkshire Local Sites Partnership
LWS1	SWS	Dogloitch Wood, Shaw Cross	6.16	Wd1	09/10/2014
LWS2	SWS	Dunn Wood, Dewsbury	5.33	Wd1	09/10/2014
LWS3	SWS	Scargill Wood, Woodkirk, Dewsbury	2.16	Wd1	25/02/2015
LWS4	SWS	Soothill Wood, Batley	1.97	Wd1	25/02/2015
LWS5	N/A	Cockleshaw Wood, East Bierley	2.31	Wd1, Wd3, Wd5	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS6	N/A	Oakwell Park	41.44	Vanl2	25/02/2015
LWS7	SWS	Tong Moor	3.98	Vanl2	25/02/2015
LWS8	SWS	Hanging Wood, Cleckheaton	2.38	Wd1	25/02/2015
LWS9	SWS	Hanging Wood (additional)	1.47	Wd1	25/02/2015
LWS10	N/A	Hunsworth Great Wood and Little Wood, Hunsworth	3.53		Candidate site surveyed but yet to be approved
LWS11	N/A	Howroyd Beck Fields, Lower White	2.76	Gr3, Gr5	18/10/2012
LWS12	SWS	Sparrow Wood, Thornhill Lees	3.58	Vanl2	25/02/2015
LWS13	SWS	Lower Spen Wildlife Area	3.95	Vanl2	25/02/2015
LWS14	SWS	Briery Bank Wood, Lower Hopton, Mirfield	6.35	Wd5	20141009
LWS15	N/A	Covey Clough Wood, Mirfield	1.73	Wd5  Extension Wd3	25/02/2015  17/09/2015 Extension (approved by Local Wildlife Sites Panel)
LWS16	SWS	Gregory Spring Wood, Mirfield	19.45	Wd3, Wd5	24/07/2013
LWS17	SWS	Jordan Wood & Oliver Wood	10.49	Wd5	09/10/2014
LWS18	SWS	Liley Wood, Lower Hopton, Mirfield	16.81	Wd3, Wd5	24/07/2013
LWS19	SWS	Sunny Bank Ponds	0.16	Vanl2	25/02/2015

LWS20	SWS	Whitley Wood, Mirfield (includes Hagg Wood)	30.85	Wd5	09/10/2014
LWS21	N/A	Arkenley Lane, Almondbury	2.51	Gr3, Gr5	23/07/2015
LWS22	N/A	Castle Hill	9.89	Vanl2	25/02/2015
LWS23	SWS	Gawthorpe Lower Wood, Lepton	1.96	Wd5	09/10/2014
LWS24	SSI	Lepton Great Wood	25.07		Candidate site surveyed but yet to be approved
LWS25	N/A	Wakefield Road, Lepton	1.19		Candidate site surveyed but yet to be approved
LWS26	SWS	Grimescar Wood, Birkby	24.24	Wd5	09/10/2014
LWS27	N/A	Lower Fell Greave, Huddersfield	9.12		Candidate site surveyed but yet to be approved
LWS28	SWS	Dean Wood, Netherton	15.43	Wd3 & part Wd1	25/02/2015
LWS29	SWS	Delves Wood (and Butter Nab Spring)	16.92	Wd3	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS30	SWS	Dalton Bank	20	Vanl2	25/02/2015
LWS31	SSI	Laneside Quarry, Kirkheaton	9.99		Candidate site surveyed but yet to be approved
LWS32	SSI	Huddersfield Broad Canal (Sir John Ramsden Canal), Huddersfield	7.02	Vanl1, Sw5	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS33	N/A	Round Wood, Tandem	4.07	Wd1	25/02/2015
LWS34	N/A	Round Wood, Tandem (additional)	0.77		Candidate site surveyed but yet to be approved
LWS35	N/A	Gledholt Woods	9.41	Vanl2	25/02/2015
LWS36	N/A	Hey Lane, Lowerhouses	7.22		Candidate site surveyed but yet to be approved
LWS37	SWS	Park Wood, Berry Brow	4.55		Candidate site surveyed but yet to be approved
LWS38	SWS	Upper Park Wood, Honley	4.32	Vanl2	09/10/2014
LWS39	SSI	Drop Clough, Marsden	7.29	Wd3	25/02/2015
LWS40	N/A	Holme Bank Wood	0.77	Wd1	25/02/2015

LWS41	SSI	Huddersfield Narrow Canal	11.36	Van1, Sw1	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS42	SSI	Low Westwood Pond, Lintwaite	0.1		Candidate site surveyed but yet to be approved
LWS43	N/A	Naze Top Wood	1.57	Wd1	25/02/2015
LWS44	SWS	Shaw Wood, Outlane	3.45	Wd3, Wd5	09/10/2014
LWS45	N/A	Blacker Wood, Scissett	6.97	Wd3	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS46	N/A	Deffer Woods, Denby Dale	91.46		Candidate site surveyed but yet to be approved
LWS47	SSI	Denby Delph, Upper Denby	7.08		Candidate site surveyed but yet to be approved
LWS48	N/A	High Bridge Wood, Denby Dale	3.32		Candidate site surveyed but yet to be approved
LWS49	SWS	Kirkby Wood, Flockton	4.59		Candidate site surveyed but yet to be approved
LWS50	LWS	Lower Jane Well, Upper Cumberworth	0.99	Gr1, Gr3, Gr5	09/10/2014
LWS51	LWS	Park Gate Dyke	2.27	Gr1	09/10/2014
LWS52	N/A	Riding Wood, Clayton West	1.73	Wd1	25/02/2015
LWS53	N/A	Riding Wood, Clayton West (additional)	4.79		Candidate site surveyed but yet to be approved
LWS54	SSI	Turpin Hill, Upper Cumberworth			Candidate site surveyed but yet to be approved
LWS55	SWS	Bank Wood, Meltham	3.68	Wd3	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS56	SWS	Cliff Wood	6.62	Wd3, Wd5	23/07/2015 (approved by Local Wildlife Sites Panel)
LWS57	SSI	Hagg Wood, Honley	17.73	Wd3	18/02/2015 (approved by Local Wildlife Sites Panel)
LWS58	SWS	Hall Hayes Wood, Meltham	4.42	Wd1  Wd3 Wd3	25/02/2015  Wd3 & Wd5 09/07/2015 (approved by Local

					Wildlife Sites Panel)
LWS59	SSI	Hey Wood/West Wood	26.67	Wd3, Wd4, Wd5	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS60	SSI	Honley Wood	70.01	Wd3	18/02/2015 (approved by Local Wildlife Sites Panel)
LWS61	N/A	Round Wood, Brockholes	2.78	Wd1	25/02/2015
LWS62	SSI	Spring Wood, Honley	13.96	Wd1, Wd3, Wd6	18/07/2011
LWS63	N/A	Carr Green Meadows, Holmbridge	2.22	Gr1, Gr5	18/10/2012
LWS64	SSI	Digley Reservoir/Marsden Clough	44.45		Candidate site surveyed but yet to be approved
LWS65	SSI	Holme House Grasslands, New Mill	0.68	Gr1 (mq5)	25/02/2015
LWS66	N/A	Holme House Wood, New Mill	3.67	Wd1	25/02/2015
LWS67	N/A	Holmroyd Wood, Netherthong	1.56	Wd1  Wd5	25/02/2015  Wd5: 17/09/2015 (approved by Local Wildlife Sites Panel)
LWS68	SWS	Malkin House Wood, Holmfirth	5.91	Wd3	09/10/2014
LWS69	SSI	Morton Wood	12.62	Wd1, Wd3	25/02/2015
LWS70	N/A	New Laith Fields, Holmbridge	10.73	Gr1, Gr3, Gr5	18/10/2012
LWS71	N/A	Raikes Wood	2.78	Wd3	25/02/2015
LWS72	SSI	Wild Boar Clough	0.98		Candidate site surveyed but yet to be approved
LWS73	SSI	Yateholme Reservoirs & Plantations	298.23		Candidate site surveyed but yet to be approved
LWS74	N/A	Allen Wood	3.34	Wd3	17/09/2015 (approved by Local Wildlife Sites Panel)

LWS75	N/A	Almondbury Common Woods	21.92	Wd1	22/01/2014
LWS76	N/A	Arthur Woods, Huddersfield	2.65	Wd1	22/01/2014
LWS77	N/A	Birks Wood, Stocksmoor	2.65	Wd5	24/07/2015
LWS78	N/A	Browns Knoll Meadows	10.44	Gr1, Gr3, Wd1, Wd5	18/10/2012
LWS79	N/A	Carr Wood, New Mill	39.83	Wd3, Wd5	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS80	N/A	Clough Wood, Stocksmoor	2.71	Wd1	22/01/2014
LWS81	N/A	Gelder Wood, Kirkburton	2.34	Wd3	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS82	N/A	Grassland Site at Stocksmoor	3.24	Gr5, MG6	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS83	N/A	Hutchin Wood, Houses Hill, Huddersfield	2.22		Candidate site surveyed but yet to be approved
LWS84	N/A	Lumb House, Stocksmoor	3.12	Gr3, Gr4, Fe3	31/01/2013
LWS85	N/A	Molly Carr Wood, Kirkburton	6.15	Wd1	22/01/2014
LWS86	N/A	Roaf Woods, Kirkburton	3.54	Wd1	22/01/2014
LWS87	SWS	Shelley Wood, Shelley	15.56	Wd1, Wd3	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS88	N/A	Shepley Mill Wood, Shelley	3.16	Wd5	17/09/2015 (approved by Local Wildlife Sites Panel)
LWS89	N/A	Springs Wood, Skelmanthorpe	3.04		Candidate site
LWS90	N/A	Thunderbridge Meadows	5.29		Candidate site surveyed but yet to be approved
LWS91	SSI	Upper & Lower Stones Wood, Shepley	31.88	Wd3 & part Wd1	25/02/2015
LWS92	SWS	Woodview Meadows (Range Dike), Farnley Tyas	6.39	Gr3, Gr4, Mh2	18/10/2012
LWS93	SWS	Yew Tree Wood, Shepley	5.86	Wd3, Vp3	09/10/2014

## Appendix 2 Sites that do not meet the Local Wildlife Site Selection Criteria

Site Ref	UDP	Site Address	Size (ha)	Reason
LWS94	SWS	Bradley Golf Course	0.89	Insufficient evidence at this stage to meet criteria
LWS95	SWS	Clough House Lane Pond, Slaithwaite	0.75	Screened out as very unlikely to meet the LWS selection criteria.
LWS96	SWS	Mill Shaw Grove, Hepworth	1.21	Site surveyed but did not meet the LWS selection criteria.
LWS97	SWS	Oakcliff Hill Knoll, Denby Dale	2.14	Site surveyed but did not meet the LWS selection criteria.
LWS98	SWS	Wither Wood, Denby Dale	7.88	Site surveyed and did not meet the LWS selection criteria. Much of the woodland in plantation with relatively impoverished ground flora.
LWS99	SWS	Woodsome Lees, Farnley Tyas	3.01	Site surveyed and did not meet the LWS selection criteria.
LWS100	SSI	Blackmoorfoot Reservoir, Huddersfield	50.96	Data obtained from the Huddersfield Bird Watchers but the site did not meet any of the bird criteria.
LWS101	SSI	Holme Styes Heathland, Holmfirth	2.3	Screened out as very unlikely to meet the LWS selection criteria. Site is too small to meet heathland habitat criteria and previous reason for designation (presence of green hairstreak butterfly) is irrelevant to the LWS selection criteria.
LWS102	SWS	Dogley, Penistone Road, Kirkburton	2.32	Site surveyed but has no qualifying features to meet the LWS selection criteria.
LWS103	SWS	Smith Wood/Jenkinson Wood, Stocksmoor	17.82	Site surveyed but has no qualifying features to meet the LWS selection criteria.
LWS104	SWS	Boshaw Whams Reservoir, Hade Edge	5.91	Data obtained from the Huddersfield Bird Watchers but the site did not meet any of the bird criteria.
LWS105	SSI	Merry Dale Clough, Slaithwaite	8.99	Screened out as very unlikely to meet the LWS selection criteria. Main interest seems to be common amphibians and areas of plantation woodland.

### Note

UDP Designations SWS: Site of Wildlife Significance & SSI: Site of Scientific Interest

### Appendix 3 Summary of the West Yorkshire Local Site Selection Criteria Relevant to the Kirklees Local Wildlife Sites

Table 3: Summary of Habitat Guidelines Relevant to Kirklees

Habitat	Criteria Reference	Primary habitat
Grassland	Gr1	<p>Areas of semi-natural neutral and calcareous grasslands of at least 0.1 ha in size, or a road verge of at least 50m in length (area unquantified), that support stands of one or more of the following NVC community types:</p> <p>MG4 <i>Alopecurus pratensis-Sanguisorba officinalis</i>            MG5 <i>Cynosurus cristatus-Centaurea nigra</i>            MG8 <i>Cynosurus cristatus-Caltha palustris</i>            CG2 <i>Festuca ovina – Avenula pratensis</i>            CG3 <i>Bromus erectus</i>            CG4 <i>Brachypodium pinnatum</i>            CG5 <i>Bromus erectus - Brachypodium pinnatum</i></p>
	Gr3	<p>Areas of long-established semi-natural acid to neutral or neutral to calcareous grassland of at least 0.25 ha in size, or a road verge at least 50m in length, which lie outside of the Southern Magnesian Limestone Natural Area, scoring 8 or more from the neutral grassland plant species listed in Table 1*; the calcareous grassland species listed in Table 2*; or the acid grassland list in Table 3*.</p>
	Gr4	<p>a) Areas of lowland acid grassland typically below 250m of at least 0.25ha in size, or a road verge at least 50m in length, that score 8 or more from the acid grassland plant species list in Table 3*.</p> <p>or</p> <p>b) Areas of enclosed upland acid grassland typically above 250m, but below the moorland line, of at least 0.5ha in size, which score 12 or more from the acid grassland list in Table 3* and have less than 25% heath cover.</p>
	Gr5	<p>Areas of semi-natural grassland, which adjoin or lie within 500 metres of an existing grassland management unit of a Local Site or Site of Special Scientific Interest with grassland interest which meets the criteria in Gr1 to Gr4 above and have a score or size within 20% of the thresholds listed in the other Gr Guidelines.</p>

<b>Woodland</b>	Wd1	Ancient semi-natural woodland of 0.5ha or more in size.
	Wd3	Woodland sites of 0.5ha or more that support field evidence of features of ancient or long standing woodland. Field evidence includes: (a) If it is an acidic woodland a score of 8 or more derived from the species listed on Table 4*. (b) If it is a neutral to calcareous woodland a score of 12 or more from the species listed in Table 5*. (c) If it is a wet woodland or scrub community a score of 10 or more derived from the species listed in Table 6*.
	Wd5	Bluebell woodlands greater than 0.5 ha with a NVC random quadrat constancy for bluebell of III or over and a ground cover by bluebells of 40% or greater in at least 10% of the woodland area.
	Wd6	Semi-natural woodlands of 0.5 ha or more that have a score from Tables 4*, 5* or 6* within 20% of the thresholds for any of the different woodland types and which adjoins, or lies within half a kilometre of an existing woodland statutory designated site or Local Wildlife Site.
<b>Fens, Lowland Mires, Springs &amp; Flushes</b>	Fe3	Rich-fen sites greater than 0.25ha scoring 10 or more from the species listed in Table 7*.
<b>Mixed Habitat &amp; Structural Mosaics</b>	Mh2	Sites of 5ha or more in size that support a mosaic of the semi-natural habitats listed in Table 15 that collectively have a habitat diversity score of 7 or more <i>and</i> either <ul style="list-style-type: none"> <li>• make a significant contribution to the local biodiversity value of the Natural Area in which they are situated;</li> <li>or</li> <li>• have a high value for the appreciation of nature and learning.</li> </ul>
<b>Value for the Appreciation of Nature &amp; Learning</b>	Vanl2	Any site designated as a statutory Local Nature Reserve (LNR).

\*Table listed in the West Yorkshire Local Site Selection Criteria (2011)

Table 4: Summary of Species Guidelines Relevant to Kirklees

Species	Criteria Reference	Primary Species
<b>Vascular Plants</b>	VP3	Any site that supports a population of a county rare species.



## Appendix 4 Kirklees Local Geological Sites

Site No.	Site Address	Site Size (ha)	Educational Value	Historic Value	Aesthetic Value	Scientific Value	Date Approved by West Yorkshire Local Sites Partnership
LGS1	Caulms Wood, Dewsbury	2.53	This quarry is suitable for all types of groups. For junior children, there is easy access to sandstones, with features of weathering, rock textures and the coal seam. At GCSE level, the rock types and structures can be used and this is an example of a coal cyclothem. At A-level stratigraphic logging can be undertaken, leading to a discussion of environments of deposition in the Upper Carboniferous period.	Used for building stones, with the waste being crushed for aggregate.	The site is part of Festival Park, Crackenedge, Dewsbury, which is a landscaped quarry site, with flowers beds, sculptures and footpaths. The quarry face is hidden behind trees planted on quarry tip and is very much spoilt by graffiti. There are good views over Dewsbury town centre and to the west.	The Thornhill Rock is of Upper Carboniferous, Duckmantian (Middle Coal Measures) age.	11/06/2011
LGS2	Castle Hill	3.29	This is a unique site for educational and recreational visits, where	Castle Hill, with its triple system of ramparts and ditches, is a fine example	Castle Hill is an excellent viewpoint with panoramic	The summit plateau of Castle Hill forms a small outlier of the highest leaf of Greenmoor Rock. The	11/06/2011

			<p>geology, geomorphology and archaeology combine to form a distinctive landmark in the Huddersfield district.</p>	<p>of a Northern British hillfort. A series of excavations completed in 1972 identified 3 periods of occupation; Neolithic, Iron Age and medieval. Victoria Tower, constructed on the summit plateau in 1899, commemorates the Diamond Jubilee of Queen Victoria. On the top of Victoria Tower is a brass directional dial erected by the family of Charles Thomas Clough, who was born and brought up in Huddersfield and became a noted geologist. He was employed by the British Geological Survey from 1875 – 1916, largely in the Highlands of Scotland and in northern England. He died in an accident while studying the rocks in a narrow railway cutting near Edinburgh.</p>	<p>views of both Millstone Grit and Coal Measures landscapes. The wooded areas in the valleys around Castle Hill provide sanctuary to flora and fauna.</p>	<p>extensive Newsome plateau has formed where resistant Stanningley Rock (formerly called Hard Bed Band Rock) outcrops between softer shales. A similar sequence of deposits (80 Yard Rock sandstone, with mudstone above and below) forms the higher Hall Bower plateau. The almost horizontal sandstone plateaux reflect the regional dip of approximately 5° to the ESE. The Elland Flags (as now defined) are dying out southwards here. The old map gives the wrong impression - the final wedge of Elland Flags dies out on the slopes below and to the north of Castle Hill. The site demonstrates how the differential weathering of different rock types over time has produced this distinctive landform on the slopes of the Holme Valley.</p>	
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LGS3	Lepton Great Wood	1.13	Educational value for lifelong learning			Scientific value as this is a good exposure of Thick Stone, which is not exposed elsewhere in an accessible position	18/10/2012
LGS4	Beaumont Park, Huddersfield	2.22	<p>Easily accessible for large groups of students to observe sedimentary rocks containing a range of structures and weathering features.</p> <p>Active Friends of Beaumont Park Group, with a visitor centre near to the gatehouse, which is open at weekends and is also available for educational groups during the week.</p> <p>There are two geological interpretation boards on site, one close to the gatehouse which explains the features of the Holme Valley, and one at the main cliff face next to the pond at the east end of the park which gives greater detail and a</p>	<p>There is an excellent photo of the view from Beaumont Park towards Castle Hill in the Huddersfield and Halifax memoir 1930). This memoir also mentions that this exposure was quarried and was laid out as public gardens which were opened in 1883. In July 1999 Beaumont Park was listed by English Heritage on the Register of Parks and Gardens of Special Historic Interest.</p>	<p>Excellent views over the Holme Valley towards the Coal Measures escarpment of Castle Hill. The park is well tended with little graffiti on the rock faces. The paths are in need of repair in places.</p>	<p>At SE 1278 1458, which is on the upper path above the old Refreshment Rooms, Rough Rock is seen resting erosively on Rough Rock Flags. The section starts immediately below road level (Beaumont Park Road is a few metres above this exposure): c.5.0m sandstone very coarse, granular, cross-bedded, with erosive base (Rough Rock), on c.4.5m sandstone medium to fine, some cross-bedding, some ripple lamination, some siltstone bands (Rough Rock Flags).</p> <p>Below, Rough Rock Flags continue down (with gaps) to the section in old railway cutting and make up most of the quarry faces. Other exposures display weathering features where poorly cemented iron rich sediments have been eroded to form cavities in the rock. The slopes below the old railway cutting, right down to river level,</p>	11/06/2011

			geological cross-section through the hillside.			are a good example of landslip topography.	
LGS5	Johnson Wellfield Quarries	0.31	The face shows plenty of features which illustrate the sedimentary environment during which the Rough Rock was deposited during the Namurian epoch.	The quarries on Crosland Hill are mentioned in the Huddersfield and Halifax memoir 1930. At the time there were a large number of important quarries which formed one of the main centres of stone quarrying in West Yorkshire. There are 12 named quarries, shown as working in 1930. These are mentioned in local trade directories from the 1900s onwards under various names. The memoir mentions that the buildings in Huddersfield and the nearby villages are very largely built of Crosland Hill stone, which appears to weather well.	Wellfield Quarry is subject to a planning application for site restoration which includes further landfilling with quarry waste. After that, it will be landscaped and a footpath will go close to the face so that the rocks and structures will be visible.	The present quarries have a great variety of stone being removed at present, from massive 2/3m beds of freestone in Airfield Quarry to finely bedded flaggy stone, ideal for delving to produce natural flags, in Waterholes Quarry. The variety of types of sandstone, silstones and shales shows the changing environments of deltaic and fluvial deposition. A log given in the Huddersfield and Halifax memoir (1930) gives an idea of the range of rocks found in the quarries at present. The memoir mentions that the beds are Rough Rock, but are even-grained freestone, rather than a true gritstone. There are several photos in the Kirklees archive taken by the Geological Survey at the time.  The 1930 memoir gives this section of a working face in the main quarries, which is recorded here to show the typical complexity of the geology of the Crosland Hill quarries, as follows:	11/06/2011

					<p>7. Baring, weathered grit, sand, etc up to 12 feet</p> <p>6. Grit up to 18 feet</p> <p>5. Top Ashlar or freestone up to 50 feet</p> <p>4. Tiger and mares..average 2feet in places up to 40 feet</p> <p>3. Flat-bedded ashlar or bottom freestone up to 15 feet</p> <p>2. Tiger and mares, sometimes absent up to 12 feet</p> <p>1. Flatstone or flag-rock up to 12 feet</p> <p>Resting on bluish-grey shaly mudstone Bed 1 is the representative of the Rough Rock Flags and was worked for flagstones. Beds 2, 4 and 6 were too tough to work because they consist of coarse grained gritstone. The best building stone came from Bed 5 and this and Bed 3 were worked for freestone.</p> <p>The mares are the mare-balls, which are spherical, iron-rich, concretionary masses and if they are too frequent, the bed has to be abandoned. Where the overburden</p>	
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						<p>proved too thick and expensive to remove, mining on a small-scale took place.</p> <p>Quarrying at present uses very modern technology, so the beds are working differently nowadays. However, at present, Waterholes Quarry has delvers working the best flagstones by hand.</p>	
LGS6	Old Lindley Moor, Huddersfield	1.27	<p>Suitable for small groups of sixth-form geology students to study the rock structures at close quarters. Also a suitable site for primary and secondary school students to study the geographical aspect of the view from Old Lindley Moor Edge.</p>	<p>Overlooks a rural landscape with an industrial heritage of stone and shale quarries, coal seams, brickworks, shafts, and drilling sites, with tracks and footpaths which originated to give access to these old working sites. A small stone monument records the enclosure of this common land in Victorian times, its purchase and later its donation to Huddersfield Corporation.</p>	<p>The old quarry is backed by a section of heather-covered moor and a fenced-in cricket field. This piece of Old Lindley Moor has public access and has extensive views of the Upper Carboniferous landscapes as far as Bolsworth Hill to the north. The Millstone Grit landscape with Huddersfield White Rock and Rough Rock sandstones is seen to the north and west; the Elland Flags escarpment of</p>	<p>The 6inch Huddersfield geological survey maps 246NW and 246SW are annotated with descriptions of rock types, coal seams, fossil sites, marine bands and boreholes.</p> <p>The chapters on the Coal Measures (Westphalian) in successive Regional Guides of The Pennines and Adjacent Areas (typically chapter 6 in the 1st (1936), 2nd (1948), 3rd (1954) and 4th (2002) editions) trace the developing ideas of the formation of the local geology; while chapters in these editions on Economic Products or Geology and Man (typically chapter 10) trace the changing use and extraction of available mineral resources.</p>	11/06/2011

					<p>the Coal Measures (Westphalian) to the east, and in the far distance to the Midgeley Grits and Kinderscout Grits are seen up the Calderdale Valley. The geographical landscape is related to the underlying geological structures, with man's imprint on the landscape, from the hilltop and ridge villages of Old Lindley, Greetland and Southowram to Halifax New Town on the Rough Rock platform, dipping gently below the Elland Flags escarpment.</p>		
LGS7	Butterley Cutting, Marsden (mostly in the Peak	0.54	This cutting is on a public track and could be used to teach basic geology with links to the construction of Butterley	The cutting was produced when the Butterley Reservoir was built between 1891 and 1906. The photo below shows	There are good views of the Wessenden valley, Marsden and the surrounding	This is the type area for the Butterly Marine Band (note that the spelling of the Butterly marine band is not the same as the present spelling of the	11/06/2011

	Park)		Dam. At a higher level, the site is excellent for stratigraphic logging as there is access to the whole sequence of rocks.	the junction between Upper Kinderscout Grit and the mudstones below, dipping at a gentle angle.	moorlands.	geographical locality). The Butterfly band is used as a marker to separate the Upper Kinderscout Grit from the Lower Kinderscout Grit, and both these beds are in exposed in the cutting. The marine band contains <i>Lingula</i> , <i>Orbiculoidea</i> , and bivalves such as <i>Posidonia</i> and <i>Sanguinolites</i> , but no goniatites - see the Holmfirth/Glossop memoir for a good fossil list. The 1933 memoir has noted 'a single record of <i>Reticuloceras...</i> ' only. <i>Carbonicola</i> is also unlikely - the bivalves are all marine types as listed in the memoir.	
LGS8	Pule Hill, Marsden	0.7	Excellent site demonstrating the quarrying of stone, with interesting structures in the quarry face. It is often used for guided geological walks which include 'Goniatite Gully' and the geology of Marsden. The summit of Pule Hill has good views of the local landscape and	The quarry produced large quantities of building stones and flag stones. The site has industrial archaeological interest, containing the remains of a loading bay for the inclined plane used to transport quarried stone down to the road. The quarrying is referred to in the Holmfirth and	There are excellent views over Marsden Moor to Buckstones.	The rock is a coarse grained, arkose sandstone containing angular feldspar grains. The distinct orange colour of the rock is due to the presence of iron.  The lower 15m of the exposure exhibits massive bedding with very few bedding planes. Flaggy bedding develops towards the top of the quarry face.  The quarry face exhibits joint sets,	11/06/2011



			geology, especially looking east to the Rough Rock of Shooters Nab and south to the moors which are made of Kinderscout Grits. Nearby at SE 033 102 is the fossil site at 'Goniatite Gully'.	Glossop memoir. It was recorded in 1933 that the quarries (called Pule Edge Quarries) were actively producing paving stones, setts and building stone. Adjacent to the site are spoil tips containing material removed during the construction of the Standedge tunnels.		cross bedding and numerous curved joints within the face, likely to be related to the way the stone was exploited by quarrymen. In places, the sandstone is weathered out into circular depressions, because of the weak iron cement along some horizons.  The cutting of two quarry faces at right angles reveals the apparent and true dip of the strata.	
LGS9	March Haigh and Buckstones	46.26	Buckstones is an excellent vantage point to study South Pennine geology and landscape, particularly the landslips at March Haigh which are not easy to access. The geology map can easily be related to the landscape.	The Holmfirth and Glossop memoir records that March Hill has proved to be one of the most prolific sites along the whole of the Pennines for finding worked flints. 500 appear to show evidence of being worked out of the 6000 which have been found.	Extensive views toward Pule Hill and across the South Pennines.		11/06/2011
LGS10	Clough Quarry, Slaithwaite	0.15	Clough Head Primary School is positioned on the top of the quarry, so any work on making the site accessible might be useful for teaching.	This was exploited for freestone, with the waste being crushed for use for local roads and tracks. The Huddersfield and Halifax	Excellent views along the Colne Valley toward Marsden and 'steps and benches' can be seen along the slopes of the	Rock is fine to medium-grained, cemented with iron oxides and cross-bedded with sets dipping to the NW. An adjacent face has intersecting troughs showing migration of large linguoid ripples	11/06/2011

				memoir records that the quarry was working in 1930.	valley.	downstream. The current direction is towards the NW and it is suggested by A.J. Benfield that the beds were deposited in inner distributary mouth bar channels.	
LGS11	Cliffe Woods Park Quarry, Clayton West	0.06	Educational value for lifelong learning,			Scientific value as this is a good exposure of sandstones and siltstones, not otherwise represented	18/10/2012
LGS12	Longwood Edge Quarry, Huddersfield	0.41	This is an excellent teaching site for beginners, with a variety of bedding, weathering features and fresh sandstones.	Probably quarrying finished around the 1920s/1930s. Records of working start from at least the 1860s, according to local trade directories. The Huddersfield and Halifax memoir 1930 mentions that the Rough Rock Flags on Longwood Edge were being worked on a small scale, although this was not the only quarry on Longwood Edge.		<p>The quarry face has exposures of Upper Carboniferous Namurian (Millstone Grit) Rough Rock and Rough Rock Flags, which demonstrate massive and flaggy bedding.</p> <p>The rock is medium to coarse grained sandstone, with quartz grains and some feldspar. Some quartz pebbles are very rounded and about 1cm long (not frequent). Some areas of the sandstones are very badly cemented and so are weathered out. Liesegang rings are found in some places.</p> <p>There is massive bedding up to 1m, with flaggy bedding forming the top of the quarry. Joints are well spaced out and are irregular. The bedding planes have a gentle dip to</p>	11/06/2011

						the east. Cross-bedding at various scales is seen. There are plant fossils of three different species, up to 30-40cms in size.	
LGS13	Brockholes & Round Wood, Brockholes	0.45	This site has been used to show young people some fossils in shales and could be used to teach sandstones, using the building stones in Brockholes and in the headstones in the churchyard. The sites can be connected together to show Carboniferous environments of deposition during this period.	Tor Rocks may have been quarried between 1876 and 1894. There are records in the local trade directories of Moss Bros. quarrying in Brockholes. In Round Wood there is a concrete post, close to the railway bridge and the footpath, marking the site of a coal shaft.	The area behind the village is hilly and wooded, with several footpaths cutting through. The higher paths have good views west into the Holme valley.	The shale gullies in Round Wood expose marine bands. One at (SE 158 106) is probably G4 and L (See Glossop BGS map). This locality is at the Honley Marine Band horizon and usually contains <i>Lingula</i> only. However <i>Gastrioceras carbonarium</i> and <i>G. listeri</i> have also been found. Also found <i>Lingula</i> sp. and <i>Dunbarella</i> sp. Also ganister plant fossils are found in loose blocks in stream beds and banks nearby. The source of goniatites and <i>Dunbarella</i> is the next marine band up - the <i>Listeri</i> Marine Band in the roof of the Hard Bed Coal. The fossils are in a shale tip from a day-eye (adit) to the coal at SE 1593 1057. Ganister is probably from below the Hard Bed Coal and was also worked in some places. Downstream in the same gully as the marine bands, at SE 1580 1066: 0.1 m Soft Bed Coal (bottom part	11/06/2011

						<p>only) resting on:  0.9 m rooty mudstone seatearth,  on  --- Soft Bed Flags - micaceous fine  sandstone  In the next gully at SE 1583 1078,  there is a small section in Middle  Band Rock:  2.0 m very fine-grained sandstone,  rooty, on 1.0 m siltstone, with  sandstone bands, all rooty  A marine band was encountered  during a boring for water at Rock  Mills, alongside the River Holme in  Brockholes. In addition to the  shells, a fragmentary jaw of a  shark-like fish with some of the  teeth attached, was found. This is  described in the 1933 Memoir. The  detailed reference for this fossil is  found in A. S. Woodward 1916-  1917. The fossil is kept in the  British Geological Survey  headquarters, Keyworth,  Nottinghamshire.</p>	
LGS14	Folly Dolly Mills, Meltham	0.32	Small groups of adults or students will see one of the few well-exposed faults in West Yorkshire. It has many of the	This site was a spectacular waterfall, as shown in a 1922 photo from the Kirklees Photo Archive,	The little valley is largely shaded by trees which have grown up since the 1920s. Although the	The marine band exposed at Folly Dolly Falls is the <i>Cancellatum</i> Marine Band, and most of the goniatites likely to be collected there will be <i>C. cancellatum</i> .	11/06/2011

			<p>characteristics of fault exposures, such as gouge in a fault gully, mineralisation and drag folding.</p>	<p>and was visited by the general public who used the halt on the Meltham railway line. The railway served the Meltham Brick and Fireclay Company works, which closed in 1985. As the Falls were also used for recreation during Victorian times and probably up to the 1930s there is an interesting social history to be discovered. The name has been changed over the years and the falls were referred to as Dolly Folly Falls in Kendall and Wroot 1924.</p>	<p>falls are not as spectacular as they would have been in earlier times, because water has been diverted from the stream into Blackmoorfoot Reservoir, the site is still delightful and the geology is interesting.</p>	<p><i>Bilinguites superbilinguis</i>, though recorded here by Bisat (1924, p.61), is not likely to be a common element of the fauna in this band. It is characteristic of the <i>Bilinguites superbilinguis</i> Marine Band, which lies BELOW the Huddersfield White Rock. <i>Cancelloceras cancellatum</i> and <i>Bilinguites superbilinguis</i> were recorded here by Bisat in shales on the downthrow side of the fault. These shales lie above the Huddersfield White Rock (though this is not exposed on the downthrow side, only on the upthrow side). <i>Cancelloceras cancellatum</i> was originally called <i>Gastrioceras cancellatum</i> by Bisat (1924). <i>Bilinguites superbilinguis</i> was originally called <i>Reticuloceras reticulatum mutation gamma</i> by Bisat (1924, p.61) or alternatively (p.51) <i>Reticuloceras super-bilingue</i>. In later publications this lost its hyphen and was <i>Reticuloceras superbilingue</i>, but changed to <i>Bilinguites superbilinguis</i> a few years ago.</p>	
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						<p>The fault trending 342o throws Huddersfield White Rock against shales with the downthrow to the NE. The shales dip at 38o NE, with a strike of 140o. The steep dip of the shales suggests displacement by drag at the fault.</p> <p>Kendall and Wroot (1924) record that slickensides were visible on the fault plane (p905). The Memoir of the Geological Survey (1933) records that the Upper Meltham Coal is well-exposed at Dolly Folly Falls(sic), although there is no sign of it at present.</p>	
LGS15	Digley Quarries, Holmbridge	3.4	These three localities are ideal to use as a geological trail, to study different types of sandstones and their structures and to interpret sedimentary environments. The general public would find the relationship of the geology to the landscape and the economic use of the building stone of	Bingley Quarry was operating at least from 1881 - 1894, with no records after 1894. Proprietors Frederick and Joseph Marsden probably provided wall stone and some building stone for the local area. Bingley and Alison Quarries are recorded in the 1933 Memoir (see reference below) as being actively	Digley Reservoir is part of the Peak District National Park. The footpaths in the area have excellent views of Holme Moss and the high Pennines.	Digley Road Turnaround has a 4m rock face with massive bedding and jointing although there are no other sedimentary structures. The lithology is the Upper Kinderscout Grit which is a very coarse sandstone with some rounded quartz pebbles up to 1cm long. It has a feldspar-rich composition. Bingley Quarry exposes Readycon Dean Flags of medium to coarse sandstone with some silty beds. The face of the quarry is about 10m high, possibly unsafe at the	11/06/2011

			interest.	<p>worked for flagstones. Drill holes are obvious on many beds, especially in Alison Quarry, as the rock is well bedded and easy to work. The quarries were also used in the 1940s to exploit building stone for building Digley Dam and associated buildings and walls.</p>		<p>south end of the east face. The basal 8m is strongly cross bedded, with a roughly northerly direction with many truncated sets.</p> <p>However, at the south end of the east face, there is a 1m bed with both bottom and top set beds. This complete bedding set is very unusual in West Yorkshire.</p> <p>The bedding planes are irregular and very few have a flat planar surface. At the base of the cliff, one very strongly erosional base of a massive bed suggests scouring. There is some trough bedding, which suggests current direction changes. The top 2-3m of quarry shows flat bedded, almost flaggy sandstones. There are some silty bands up to 30cm thick, with muscovite flakes, all wedging out at south end of the cliff. Bioturbation features are shown as casts on the lower surfaces of many bedding planes.</p> <p>There are at least three very</p>	
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						<p>weathered major joints, with possible displacement, so minor faulting may have occurred.</p> <p>The boulders in the quarry provide fresh specimens of sandstone.</p> <p>Alison Quarry The lithology is Readycon Dean Flags but slightly higher in the sequence than Bingley Quarry so the bedding appears very different from that in Bingley Quarry.</p> <p>The rock is a coarse to medium sandstone, which is well bedded with beds 30-60cm thick.</p>	
LGS16	Scar Hole Quarry, Jackson Bridge	0.36	The quarry is suitable for more advanced groups to study depositional environments.	The slopes below are made from Coal Measures shales and silts and have some coal seams that were productive until the 1950s. There are capped shafts and spoil heaps in the fields nearby, which can be reached by footpaths below Scar Hole quarry.	There are fine views over the Upper Holme Valley toward Holme Moss, with views to the north over the Huddersfield district. The quarry face is sometimes subject to rubbish tipping and to graffiti.	<p>Exposures of Greenmoor Rock are revealed in a quarried exposure exhibiting a range of sedimentary features including channel sandstones, sheet sandstones and mudflat facies. The buttresses adjacent to the main quarry face reveal a 12m deep sandstone filled channel cutting through argillaceous facies into the underlying massive sandstones.</p> <p>The site contains large ferruginous nodules, with a particularly fine eroded specimen at ground level. Sedimentary structures include</p>	11/06/2011



						ripple marks, jointing, pebble horizons and some trace fossils.	
LGS17	Burton Dene Quarry, Kirkburton	0.51	Educational value for lifelong learning,			Scientific Value as this is the type section for the Kirkburton Rock	18/10/2012
LGS18	Hartley Bank Quarry	0.25	This is a suitable site for students to study sedimentary environments and sandstone structures.		The site lies in a wooded vale, typical of Coal Measures landscapes in West Yorkshire.		11/06/2011
LGS19	Upper & Lower Stone Wood, Stocksmoor	16.87	The site has limited value for school groups because there are steep and muddy footpaths in the woods and access to the stream bed is not easy. However for small groups of adults, there are interesting and varied exposures along the stream on either side of the Stone Wood Lane bridge.	Fireclay workings are recorded in the Holmfirth Memoir written in 1933 and at least one old quarry is clearly seen at (SE 1840 1018). There are several walled tracks which lead into the wood and may have been tracks for hauling fireclay or flagstones, which are exposed in the stream bed in the upper section of Stocksmoor.	This is a deciduous woodland area with mature beeches, bluebells, wood anemones and an interesting flora and fauna. It has been given SSI status for its biological importance.	This LGS covers a steep-sided clough cut by Stone Wood Dike, which rises near Fulstone and joins Shepley Dike in Thunderbridge. The clough is cut into Lower Coal Measures, passes through the succession of Lower Coal Measure shales at the base of the valley, through Greenmoor Rock to Grenoside Sandstone, which forms the top of the valley sides.  Greenmoor Rock is exposed in the stream bed between the bridges at (179 101) (Fulstone Road) and (184 104) (Stone Wood Lane). It is undercut by the river and up to 10m of laminated silts, shales and flaggy sandstones are shown. There is a gentle regional dip of	11/06/2011

						<p>4/5° to the north-east which forms the dip-slope of Grenoside Sandstone from here to Shepley.</p> <p>These beds are deformed into minor plunging anticlines in the bottom of the valley, with dips as steep as 55° in shales and 30° in sandstones.</p> <p>A thin fireclay at the top of the Greenmoor cycle is exposed in the undercut banks of the river at (1848 1052) and in several other places on the SE hill slope. The SE slope is made up of about 15m of shales and silts, which are not exposed but form a steep slope with springs at the base in places. 3m of Grenoside Rock is exposed on the bend at the top of Stone Wood Lane and forms the top of the valley and the dip slope towards Shepley to the SE.</p> <p>This area has been surveyed in 1981 and 1997 by the BGS and a measured section taken from the stream bed (SE 1848 1052) to Stone Wood Lane (SE 1862 1048) in 1981. The section has been overgrown since.</p>	
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## Appendix 5 Kirklees Biodiversity Opportunity Zones: Tables

Tables: Habitats and Species of Principal Importance occurring within each Zone

These tables should be used in conjunction with the Biodiversity Opportunity Zones Map, available at [www.kirklees.gov.uk/biodiversity](http://www.kirklees.gov.uk/biodiversity)

How to use the Tables:

- Each table represents one of the Biodiversity Opportunity Zones described in the accompanying document.
- Within each of these tables are the Habitats and Species of Principal Importance (identified through the UK Biodiversity Action Plan process) that occur within that particular zone.
- Cells coloured green indicates that the species feeds or breeds in that particular habitat. Cells coloured orange refer the user to the relevant Kirklees Species Action Plan (this is for species of particular concern or species with particular requirements).

**Table 1: Uplands**

Habitats and Species of Principal Importance occurring within the Uplands Biodiversity Opportunity Zone				
Habitats	Blanket Bog	Upland Flushes, Fens & Swamps	Upland Heathland	Upland Oak (also incl. Upland Mixed Ashwoods)
Species				
<b>Birds</b>				
Common Linnet				
Red Grouse				
European Nightjar			Not thought to be present	
Common Cuckoo				
Yellowhammer				
Reed bunting			Wet heath	
Eurasian Curlew				
Black Grouse			No longer present - would require reintroduction	
Ring Ouzel				
Twite	See Twite Species Action Plan (Kirklees BAP)			
<b>Reptiles &amp; Amphibians</b>				
Common Lizard				
<b>Terrestrial Mammals</b>				
West European Hedgehog				
Mountain Hare				
Brown Hare				
Water Vole	See Water Vole Species Action Plan (Kirklees BAP)			

**Table 2 Mid-Altitudinal Grasslands**

Habitats and Species of Principal Importance occurring within the Mid-Altitudinal Grasslands Biodiversity Opportunity Zone			
Habitats	Hay Meadows	Scrub	Other Semi-natural Grasslands
Species			
<b>Birds</b>			
Skylark			
Common Linnet			
Yellow Wagtail			
Corn Crane	No longer present		
Common Cuckoo			
Yellowhammer			
Reed Bunting	Wet or marshy areas		Wet or marshy areas
Eurasian Curlew			
House Sparrow	Occurs around buildings		
Eurasian Tree Sparrow			
Grey Partridge			
Common Starling			
Northern Lapwing			
Twite	Only present adjacent to Upland zone. See Twite Species Action Plan (Kirklees BAP)		
<b>Invertebrates</b>			
Wall Brown Butterfly			
<b>Terrestrial Mammals</b>			
Bats			
West European Hedgehog			
Brown Hare			
Water Vole	See Water Vole Species Action Plan (Kirklees BAP)		

**Table 3 Valley Slopes**

Habitats and Species of Principal Importance occurring within the Valley Slopes Biodiversity Opportunity Zone							
Habitats	Inland Rock Outcrop & Scree Habitats	Lowland Dry Acid Grassland	Lowland Heathland	Lowland Mixed Deciduous Woodland	Upland Oak Woodland/ Upland Mixed Ashwoods	Wood Pasture and Parkland	Scrub
<b>Species</b>							
<b>Birds</b>							
Common Linnet							
Lesser Redpoll							
Wood Warbler							
Hedge Accentor (Duncock)							
European Nightjar		Not thought to be present					
Tree Pipit							
Hawfinch							
Common Cuckoo							

Yellowhammer							
House Sparrow	Occurs around buildings						
Spotted Flycatcher							
Willow Tit							
Common Bullfinch							
Common Starling							
Song Thrush							
Twite	Only present adjacent to Upland zone. See Twite Species Action Plan (Kirklees BAP)						
<b>Invertebrates</b>							
Small Heath Butterfly							
Wall Brown Butterfly							
Northern Wood Ant	See Northern Wood Ant Species Action Plan (Kirklees BAP)						
<b>Reptiles and Amphibians</b>							
Common Toad							

Common Lizard		Not thought to be present					
Great-crested Newt	See Great-crested Newt Species Action Plan (Kirklees BAP)						
<b>Terrestrial Mammals</b>							
Bats	Possible roost sites						
Water Vole	See Water Vole Species Action Plan (Kirklees BAP)						
Otter	All habitats adjacent to or near waterbodies						
West European Hedgehog							
Brown Hare							



**Table 4 Flood Plains and Riverine**

Habitats and Species of Principal Importance occurring within the Flood Plains and Riverine Habitats Biodiversity Opportunity Zone								
Species	Habitats	Open Mosaics on Previously Developed Land	Ponds	Reedbeds	Rivers	Wet Woodland	Scrub	Other Semi Natural Grassland (West/rush pasture, rough grassland)
<b>Birds</b>								
Skylark								
Common Linnet								
Yellow Wagtail								
Common Grasshopper Warbler								
Hedge Accentor (Dunnock)								
Great Bittern				Not Present				
Common Cuckoo								
Reed Bunting								

Eurasian Curlew							
House Sparrow	Occurs around buildings						
<b>Invertebrates</b>							
Wall Brown Butterfly							
<b>Aquatic Species</b>							
European Eel				Fish passage generally blocked by weirs therefore few or none present			
River Lamprey							
Brook Lamprey							
Atlantic Salmon							
Brown/Sea Trout							
White-clawed Crayfish	See White-clawed Crayfish Species Action Plan (Kirklees BAP)						
<b>Reptiles and Amphibians</b>							
Common Toad							
<b>Terrestrial Mammals</b>							
Bats							
Water Vole	See Water Vole Species Action Plan (Kirklees BAP)						

Otter	All habitats adjacent to or near waterbodies						
West European Hedgehog							
Brown Hare							
<b>Plant Species</b>							
Floating Water Plantain	See Floating Water Plantain Species Action Plan (Kirklees BAP)						

**Table 5 Pennine Foothills**

Habitats and Species of Principal Importance occurring within the Pennine Foothills Biodiversity Opportunity Zone									
Habitats	Arable Field Margins	Hedgerows	Hay Meadows	Lowland Mixed Deciduous Woodland	Ponds	Traditional Orchards	Wood Pasture and Parklands	Scrub	Other Semi-natural Grasslands
<b>Species</b>									
<b>Birds</b>									
Skylark	Will nest away from trees & hedgerows								
Common Linnet									
Lesser Redpoll									
Corn Bunting	Probably no longer present								
Yellow Wagtail									
Common Grasshopper Warbler									
Hedge Accentor (Dunnock)									
European Nightjar				Not present					
Tree Pipit									

Hawfinch									
Common Cuckoo									
Yellowhammer									
Reed Bunting	Wet/marshy areas							Wet/marshy areas	
House Sparrow	Occurs around buildings								
Eurasian Tree Sparrow									
Spotted Flycatcher		Hedgerows with high structural diversity							
Willow Tit									
Grey Partridge									
Common Bullfinch									
European Turtle Dove	No longer present								
Common Starling				Nesting					
Song Thrush									
Northern Lapwing	Will nest away from trees &								

	hedgerows								
<b>Invertebrates</b>									
White-letter Hairstreak Butterfly									
Wall Brown Butterfly									
Northern Wood Ant	See Northern Wood Ant Species Action Plan (Kirklees BAP)								
<b>Reptiles and Amphibians</b>									
Great-crested Newt	See Great-crested Newt Species Action Plan (Kirklees BAP)								
Common Toad									
<b>Terrestrial Mammals</b>									
Bats									
Water Vole	See Water Vole Species Action Plan (Kirklees BAP)								
Otter	All habitats adjacent to or near waterbodies								
West European Hedgehog									
Brown Hare									

**Table 6 Urban Areas**

Habitats and Species of Principal Importance occurring within the Urban Areas Biodiversity Opportunity Zone		
Habitats	Open Mosaics on Previously Developed Land (including gardens)	Ponds
<b>Species</b>		
<b>Birds</b>		
Hedge Accentor (Dunnock)		
House Sparrow		
Common Bullfinch		
Common Starling		
Song Thrush		
<b>Aquatic Species</b>		
White-clawed Crayfish	See White-clawed Crayfish Species Action Plan	
<b>Reptiles and Amphibians</b>		
Common Toad		
<b>Terrestrial Mammals</b>		
Bats		
Water Voles	See Water Vole Species Action Plan	
Otter	All habitats adjacent to or near waterbodies	
West European Hedgehog		

## Appendix 6 Definitions and Functions of the Kirklees Strategic Green Infrastructure Networks

### R2 – Calder

The Calder corridor comprises both the River Calder and, linking with the North West region, the Rochdale Canal. Regionally important, it runs from Todmorden in the west to Castleford in the east where it joins the Aire. Passing Halifax, Dewsbury and Wakefield along its course, the corridor is relatively narrow, being largely contained within the steep sided valley, with wider sections – especially on meanders – taking in riverside greenspaces such as Cromwell Bottom, Atlas Mills and Clifton Lagoons which provide valuable refuges for wildlife. Running along the corridor, parallel to the river, is the Calder and Hebble navigation. This and the greenway along the towpath are important recreational features. British Waterways has plans to create a linear park alongside the canal. Flooding is an important issue within this corridor so green infrastructure investment may include providing new greenspaces in the valley bottom to help ameliorate flooding. There is potential within the floodplain for some wetland development. Vastly improving water quality is increasing biodiversity and recreation opportunities within the corridor. There is also potential for small scale hydro schemes. At Copley and Sowerby Bridge, regeneration initiatives will include flood alleviation and green infrastructure improvement. South Dewsbury has been identified as being in need of regeneration to support housing renewal and development together with new and improved green infrastructure. To the east of Wakefield, the valley offers scope for major greenspace improvements on the Parkhill, Welbeck, Ashfields and Southern Washlands sites: this is an important opportunity for Growth Point investment in green infrastructure.

Function	Indicator
Open space	Gargrave Village Green. Horse Close and Greatwood Recreation grounds, Skipton. Skipton Wood. Aireville Park. Glusburn Park. Sutton Park. Vicki Cartman Millennium Green. Alder Carr Wood. Holden Park. Victoria Park. St Ives Estate. Gilstead Moor Edge. Prince of Wales Park. Myrtle Park. Roberts Park. Hirst Wood. Baildon Green. Marstons Nature Reserve. Buck Woods. Spring Woods. Calverley Wood. Kirkstall Valley. Bramley Fall. Gott's Park. Rothwell Country Park. Swillington Park. Chapel Haddlesey Doorstep Green. Beast Fair Amenity Land. Saffron Garth. Brierley Close Amenity Land.
Biodiversity	Malham Tarn NNR & Ramsar. Craven Limestone Complex SAC. Malham Arncliffe SSSI. Haw Crag Quarry SSSI. Bingley South Bog SSSI. Trench Meadows SSSI. Leeds-Liverpool Canal SEGI/SSSI. Rodley Nature Reserve. Mickletown Ings SSSI. Townclose Hills SSSI & LNR. Letchmire Pastures LNR. Fairburn & Newton Ings SSSI. Fairburn Ings LNR. Skipton Wood SINC. Bradford Wildlife Areas (third tier sites) at Holden Beck, Low Wood, Elam Wood, Beechcliffe Ox Bow Lake, Stockbridge Nature Reserve, Riddlesden Hospital site, Marley Sewage Works, Hollin Plantation, Prince of Wales Park, Dowley Gap Sewage works, Rye Loaf Hill, Nab Wood, Milnerfields, Baildon Green, Thackley Wood, Marstons Nature Reserve, Tong Park, St Leonards Esholt, Lamb Springs, Nan Wood, Langholme,



	Buck Wood, Spring Wood , Gill Wood, Millman Bridge Ox Bow and West Wood. Beechcliffe Ings SEGI. Marley Bog SEGI. Hirst Wood SEGI. Tong Park SEGI. Willow Garths Nature Reserve, Knottingley. Many BAP habitats including Blanket Bog, Lowland Calcareous Grassland, Upland Calcareous Grassland, Deciduous Woodland, Upland Heath, Coastal & Floodplain Grazing Marsh, Purple Moor Grass and Rush Pasture, Fen and Reedbed. Many areas of ancient woodland. Large site at St Aidans where open cast mining is being remediated to create new wildlife habitats. Various UKBAP species such as otter, brown trout, salmon and european eel. These all require installation of fish passes or removal of weirs to enhance the watercourse. Leeds City Council is encouraging fish passes on weirs for this purpose.
Landscape	Area around Malham. Saltaire WHS. Wooded areas around Newlay and Rodley. The setting of Kirkstall Abbey and the wetlands of the Lower Aire Valley. Carlton Marsh and Ings at Eggborough.
Products from the land	Agricultural land throughout the corridor – especially west of Keighley and east of Knottingley. Allotments at Skipton, Cononley, Glusburn, Sutton-in-Craven, Low Utley, Riddlesden, Crossflatts, Bingley, Cottingley, Baildon, Kirkstall, Great Preston, Kippax and Allerton Bywater.
Flood risk	Flooding is an issue along the whole corridor – especially in built up areas where river flow is restricted. Undeveloped valley bottom provides washland function in many areas. Potential for wetland creation/restoration to retain flood water and reduce flooding down the catchment.
Climate Change	Potential to use biomass at Eggborough and Ferrybridge power stations. Many areas of woodland which could be managed for fuel and/or carbon sequestration. Several areas of peatland which could be managed for carbon sequestration. Opportunities to link grey and green infrastructure with potential hydropower on weirs.
Health	Areas of poor health in Skipton, Keighley, north Bradford, east Leeds, Castleford, Knottingley and the south of Selby district.
Accessibility	National Cycle Routes 62, 66, 67, 68 and 69. Trans Pennine Trail. Pennine Way. Yorkshire Dales Cycleway. West Yorkshire Cycle Route. Airedale Greenway. Airedale Way. Millennium Way. Leeds Country Way. Leeds Liverpool Canal Towpath. Many other footpaths and bridleways
Recreation	Skipton Golf Course and Aireville Park Pitch and Putt. Keighley Golf Course. Riddlesden Golf Course. Fardew Golf Club – Riddlesden. Rawdon Golf Course. Camblesforth Golf Course. Sports pitches at Gargrave, Skipton, Carleton, Cononley, Crossflatts, Keighley, Riddlesden, Shipley, Esholt, Apperley Bridge, Bramley, Kirkstall, Armley, Allerton Bywater, Fairburn and Brotherton. Football grounds at Gargrave, Skipton, Glusburn, Silsden, Aireworth, Saltaire, Woodlesford, Brotherton and Beal. Cricket grounds at Gargrave, Skipton, Glusburn, Sutton, Silsden, Stockbridge, Riddlesden, Bingley, Cottingley, Saltaire, Shipley, Rodley, Allerton Bywater and Carlton. Rugby grounds at Skipton, Keighley, Cottingley and Kirkstall. Promoted access routes. Open Access land at Rombalds Moor, east of Skipton. Fishing in Aire and along canal.
Education	Malham Tarn Field Centre. North Yorkshire County Council „Stepping Stones 2“ project nurseries (Aireville Park). St Leonard“s

	Farm Park, Esholt. ND Marstons Nature Reserve, Baildon. Rodley Nature Reserve. Skelton Grange Environment Centre. Fairburn Ings.
Cultural	Saltaire World Heritage Site. Medieval Monastic Wayside Cross Base SM. Settlement on Prior Rakes SM. Enclosure & hut Circles on Prior Rakes SM. Rectangular House Sites on Malham Ings SM. Farm sites on Malham Lings SM. Sheriff Hill Round Cairn SM. Lynchets N of Malham village SM. Lower Colgarth Hill Round Cairn SM. Roman Villa at Kirk Sink SM. Park Hill Earthwork SM. Subcircular Enclosed Settlement on Horse Close SM. Black Hill Round Cairn SM. Kildwick Bridge SM. Ore Hearth Smeltpool and Wood Drying Kiln in Lume Clough Wood SM. Late Prehistoric Enclosed Settlement in Crosley Wood SM. Cup Marked Rock in Calverley Wood SM. Kirkstall Abbey & Precinct SM. Length of Grim's Ditch SM. Fairburn Ings (Newton Abbey) Moat SM. Ferrybridge near Knottingley SM. Roman Fort at Kellington SM. Castle Hill Moated Site SM. Skipton Castle. East Riddlesden Hall. Leeds-Liverpool Canal. Armley Mills. Thwaite Mills. Cowick Hall. Conservation Areas at Gargrave, Skipton, Bradley, Cowling, Kildwick, Farnhill, Sutton, Utley, Bingley, Snaith and Rawcliffe.
Tourism	Malham. Skipton. Leeds-Liverpool Canal. Saltaire WHS. Kirkstall Abbey. Armley Mills. Royal Armouries. Thwaite Mills. Fairburn Ings.
Poor Quality Environments	Airedale Masterplan provides opportunities to improve industrial areas as part of the regeneration of the valley. Lower Aire Valley Project (Leeds – Castleford) is remediating ex-industrial mining areas to create new greenspaces in the Aire Valley. Industrial areas surrounding power stations at Eggborough and Drax.
Land/Property Values	Lower Aire Valley Project (Leeds – Castleford) regeneration of the area will increase the desirability of the area.
Economic Growth	Renaissance Market Town initiative in Skipton. Skipton Investment Corridor. Skipton Town Centre Business Improvement District. Installation of fish passes would increase angling potential on the river, as salmon and trout have been found on the Aire upstream of Leeds and Bradford. Airedale Masterplan regards the Aire corridor in north Bradford district as major focus for economic growth. Urban Eco Settlement proposals to create jobs and homes in the Aire Valley in the future.

#### R4 The River Dearne Corridor

The Dearne corridor starts as the fields and greenspaces around the headwaters of the river in Kirklees. It connects Denby Dale, Clayton West, Barnsley, Darfield, Bolton upon Dearne, Wath upon Dearne and Mexborough before joining the Don corridor at Conisbrough, near Doncaster. Regionally significant, it provides green infrastructure linkages through Barnsley and the Dearne Towns area. The corridor encompasses a number of important sites including the Yorkshire Sculpture Park, Dearne Valley Country Park, Monk Bretton Priory and the RSPB Wetland Centre at Old Moor. In the south of the corridor, a variety of projects are being undertaken to regenerate the area following the decline of the mining industry and to improve the environment including the Dearne Valley Eco-Vision, which sees a quality natural setting as key to economic and social progress, and the Dearne Valley Green Heart Project. Delivery of these projects will provide a model for achievement on other waterway corridors in terms of the proposals and partnership delivery models. This area has received considerable investment over recent years and is still a focus for developer interest. Opportunities include addressing accessible greenspace deficit, landscape and historic environment enhancement, biomass production and flood management opportunities.

Function	Indicator
Open space	Longfields Doorstep Green. Clayton West Millennium Green. Cliffe Wood Park. Yorkshire Sculpture Park. Dearne Valley Park. Brooklands Park. Melton Park.
Biodiversity	Part of Denaby Ings SSSI. Bretton Country Park LNR. Dearne Valley Park LNR. Turpin Hill SSI. Denby Delf SSI. Upper Dearne Woods. Wither Wood Site of Wildlife Significance. RSPB Old Moor Wetland Centre. Manvers Lake & Nature Trail. Cadeby Riddings. Melton Park. BAP habitats including Deciduous Woodland, Lowland Dry Acid Grassland and Coastal & Floodplain Grazing Marsh.
Landscape	Moorland fringe around Upper Cumberworth. Wooded landscape of Upper Dearne woodlands. Bagden Hall Park. Yorkshire Sculpture Park is set in a Capability Brown landscaped parkland. The landscape of much of the Dearne Valley has been considerably changed in recent years through reclamation from a history of intensive industry and redevelopment. The resulting landscape is in good condition and should be maintained – an example being the landscape around the restored Manvers Quarry. The River Dearne itself provides a significant feature.
Products from the land	Agricultural land throughout the corridor
Flood risk	Flooding is an issue along the whole river with several urban areas at risk from flooding. There is potential to use green infrastructure to reduce the effects of flooding by minimising flood run off and slowing water through the catchment.
Climate Change	Large areas of woodland could be managed for fuel and/or carbon sequestration. Opportunities to increase the area of energy crops within the corridor.
Health	Areas of poor health throughout the corridor – especially north of Barnsley town centre, Darfield and Bolton upon Dearne. M1 corridor is an Air Quality Management Area.

Accessibility	Dearne Way. Kirklees Way. Barnsley Boundary Walk. Trans Pennine Trail. National Cycle Network routes 62 and 67. West Yorkshire Cycle Route. Numerous other footpaths, bridleways and cycleways connecting along and across the corridor.
Recreation	Cricket Grounds at Denby Dale, Clayton West, Kexbrough, Darfield and Adwick upon Dearne. Playing Fields at Clayton West, Barnsley, Darfield and Wath upon Dearne. Recreation Grounds at Clayton West and Darton. Sports Ground in Barnsley. Manvers Golf Course. Wath Manvers Lake British Canoe Union Centre. Promoted access routes.
Education	Dearne Valley Park. Bretton Country Park. RSPB Old Moor Wetland Centre.
Cultural	Monk Bretton Priory. Yorkshire Sculpture Park. East Gawber Hall Colliery Tanhouse SM.
Tourism	Kirklees Light Railway. Yorkshire Sculpture Park. Monk Bretton Priory. Old Moor Wetland Centre.
Poor Quality Environments	The collapse of coal mining and its associated industries in the 1980"s led to large scale dereliction, unemployment and social problems. Parts of the Dearne Valley have benefited from City Challenge Funding, derelict land grants as well as other funding from Central Government and The European Union. It was designated as an Enterprise Zone in 1995; and the Dearne Valley Strategic Economic Zone under the EU Objective 1 programme of funding in 2000. Building upon these foundations, Dearne Valley Eco-Vision and Dearne Valley Green Heart projects are both improving the landscape and environmental quality of brownfield land left over from coal mining.
Land/Property Values	The allocation of suitable land for new economic development was the key ingredient in the adopted Unitary Development Plan (1999) regeneration strategy. Complementary policies and proposals in the UDP were intended to ensure the provision of supporting infrastructure, an attractive environment, good housing and a wide range of shopping, social and community facilities. In taking these ambitions forward, Dearne Valley Eco-Vision and Dearne Valley Green Heart projects are increasing the desirability of the area which is resulting in increasing house prices.
Economic Growth	Potential for local business growth due to concentration of businesses in Denby Dale, Clayton West and Scissett and good motorway links. Strategic Employment Area identified at Clayton West. The sites created as a result of the reclamation of derelict and despoiled land, were well located in relation to transport links and most importantly well located in relation to the communities where unemployment problems were greatest. Dearne Valley Eco-Vision and Dearne Valley Green Heart projects are, in improving the environment of the area, increasing the desirability of the area which is resulting in new investment in the area

## S6 - Colne

The subregional Colne corridor runs from the edge of the moors above Marsden. Here it follows the steep-sided and narrow valley through Slaithwaite and Linthwaite, broadening into a flood plain below Huddersfield and joining the Calder to the east. The headwaters are an important water resource consisting of a network of reservoirs. The Upper Colne is dominated by architecture from the heyday of the textile industry. The parallel canal system is designated as a SSI for the important range of aquatic and emergent species that it supports as well as being a cross-Pennine link with recreational opportunities. Water quality within the corridor is improving with a related improvement in biodiversity. This corridor has a good mosaic of habitats supporting 8 species of bat along the valley and for Twite in the upper reaches. The flood plain below Huddersfield has been largely developed for industrial use and now forms part of the Kirklees Strategic Economic Zone.

Function	Indicator
Open space	Marsden Park. Slaithwaite Spa Park. Coronation Park.
Biodiversity	South Pennine Moors SPA. Park Clough SSSI. Dalton Bank LNR. Drop Clough SSI. Merrydale Clough SSI. Huddersfield Canal SSI. Lowestwood Pond SSI.
Landscape	Steep valley slopes supporting upland farming with a patchwork of small pasture fields. Canals, packhorse trails and historic villages form a strong cultural landscape.
Flood risk	Most of the floodplain east of Huddersfield has been developed for industrial use. It is important to protect these areas from flooding. Managing run off and controlling flow through the valley would reduce severity of flooding.
Health	Areas of relative poor health north east of Huddersfield.
Accessibility	National Cycle Network Route 66. West Yorkshire Cycle Route. Kirklees Way. Colne Valley Circular Walk. Station to Station Walk. Standedge Trail.
Recreation	Marsden Golf Course. Longley Park Golf Course. Cricket Grounds in Slaithwaite, Linthwaite and Huddersfield. Playing fields in Slaithwaite, Linthwaite, Milnsbridge and at Leeds Road. Promoted access routes.
Education	Standedge Visitor Centre.
Cultural	Close Gate Bridge SM. Turn Bridge Quay Street SM. Conservation Areas in Marsden, Slaithwaite, Golcar, Wellhouse, Clough and Milnsbridge.
Tourism	Standedge Tunnel. Huddersfield Narrow Canal, Marden & Slaithwaite. Galpharm Stadium. Huddersfield Broad Canal. Pennine walking. Industrial heritage throughout the valley.
Poor Quality Environments	Many opportunities in the area to improve environmental quality – particularly in the Kirklees Strategic Economic Zone where large scale regeneration aims to improve landscape, air quality and sustainable transport linkages to residential areas to attract

	investment.
Land/Property Values	Environmental, landscaping and sustainable transport improvements carried out as part of the Kirklees Strategic Economic Zone regeneration are likely to positively affect property values in the area.
Economic Growth	Marsden and Slaithwaite are benefiting from regeneration activity as part of Yorkshire Forward's Renaissance Market Town Programme. Strategic Employment Areas identified in Marsden and Slaithwaite. Kirklees Strategic Economic Zone will be regenerated with opportunities to improve environmental quality and appearance of the area. This will encourage new investment in the area.

## S26 Spen Valley Greenway & Canal Road

This corridor forms a subregionally important link between the Calder at Ravensthorpe to the south and the Aire at Shipley to the north, passing through central Bradford. National Cycle Network Route 66 provides the spine of the corridor, as it runs parallel to Canal Road and then becomes the Spen Valley Greenway – which runs along a disused railway line with cuttings and embankments forming a linear greenspace. North of Bradford the corridor contains the proposed Bradford Canal extension which will link the Leeds-Liverpool Canal at Shipley with central Bradford. This will be a major regeneration initiative with significant potential to improve green infrastructure. Within Bradford, a project to regenerate the city centre by creating a new park will provide an important link in the corridor where there is currently little greenspace. South of Bradford, the corridor is characterised by a mix of industry, farmland and residential land uses. This part of the corridor contains Bradford’s only Local Nature Reserve at Railway Terrace – part of a network of greenspaces linked by the Spen Valley Greenway. At the very south of the corridor is an extensive former landfill site – now remediated to be a country park. Poor water quality is a problem here but should be improved by the imminent closure of the adjacent sewage treatment works. This will have a positive impact on biodiversity in the area. The main possibilities for green infrastructure in this corridor lie in urban regeneration. There are also opportunities to increase and improve habitat networks for the benefit of wildlife.

Function	Indicator
Open space	Undercliffe Cemetery. Peel Park. Lister Park. Boars Well Nature Reserve. Bowling Park. Railway Terrace LNR. Toad Holes Beck. Victoria Park. Moor End Recreation Ground. Spen Bottoms Recreation Ground. Cleckheaton Memorial Park. Millbridge Park. Green Park. Firth Park. Cawley Lane Recreation Ground. Crow Nest Park. Field Lane Allotments. Dewsbury Cemetery. Crawshaw Park. Holroyd Park.
Biodiversity	Railway Terrace LNR. Lower Spen Wildlife Area LNR. Boars Well. Toad Holes Beck. Multiple Deciduous Woodland BAP sites in Bradford.
Products from the land	Agricultural land within the corridor – mainly within Kirklees.
Flood risk	Canal Road is prone to flooding. Parts of the area adjacent the River Spen are high risk flood areas. Controlling surface drainage and floodwater in this corridor is therefore important. This could be achieved with green infrastructure.
Health	Canal Road, parts of south Bradford, Liversedge, Heckmondwike and Dewsbury have poor health. Air Quality Management Area at Scout Hill, Dewsbury.
Accessibility	National Cycle Network Route 66. Spen Valley Greenway. Spen Ringway. Numerous footpaths and bridleways within the corridor.
Recreation	South Bradford Golf Club. Cleckheaton & District Golf Club. Playing fields at Shipley, Frizinghall, East Bowling, Bierley and

	Oakenshaw. Rugby grounds at Cleckheaton, Liversedge and Dewsbury Moor. Football grounds at Cleckheaton and Norristhorpe. Promoted access routes.
Education	Safe routes to school on Spen Ringway, Liversedge to Heckmondwike.
Cultural	Conservation Areas in Manningham/Frizinghall and Bradford city centre. Bradford (Undercliffe) and Bowling Cemeteries.
Tourism	National Media Museum, Peace Museum, Colour Museum, Lister Park. Spen Valley Greenway.
Poor Quality Environments	Opportunities exist throughout the corridor, within older housing and industrial areas, to improve environmental quality through regeneration initiatives. Urban deprivation in central wards of Bradford suggests a particular demand for environmental quality to be improved.
Land/Property Values	Potential regeneration regeneration within the Canal Road area through both the Bradford Canal project and proposed eco town developments. Regeneration opportunities exist throughout the corridor in older housing and industrial areas where there may be potential to improve the attractiveness of the area and increase property values.
Economic Growth	Canal Road corridor – potential regeneration focus for both the Bradford Canal project and eco town proposals. Potential to capitalise on the corridor’s strategic location to benefit from economic opportunities arising from the Leeds City Region. Strategic Employment Area identified around M606 in south Bradford and junction 26 of the M62 motorway at Cleckheaton.



## D29 Fenay Beck

Fenay Beck rises in the rolling pastoral countryside of Kirkburton ward. Of district importance, the corridor is characterised by farmland (including significant areas of attractive estate land), woodland and villages. These have been greatly added to by modern housing development in the latter 20th century. Its biodiversity interest lies in the network of hedgerows, woodlands and, where they still exist, species-rich grasslands. In the lower reaches, where there is an identifiable floodplain with potential for wetland development, it is increasingly residential, until finally, as it joins the River Colne in Huddersfield, the Beck itself is culverted under extensive industrial premises within the Kirklees Strategic Economic Zone. Potential for greenway development has been identified but is dependent upon funding and partnership working.

Function	Indicator
Open space	Woodsome Hall Golf Course. Disused Kirkburton rail corridor.
Biodiversity	Upper & Lovers Stones Wood SSI. Hartley Bank Quarry SSI. Myers Wood. BAP habitats including Deciduous Woodland. Networks of hedges connecting ancient woodland and grassland.
Products from the land	Agricultural land in the corridor – mainly to the south.
Flood risk	Flooding is an issue at the confluence of the Fenay Beck with the River Colne. As this area is heavily developed, it is important to protect these areas from flooding. Reducing run off and controlling flow within the Holme would reduce the severity of flooding.
Climate Change	Large areas of woodland which could be managed for fuel and/or carbon sequestration.
Health	North of the corridor is an area of relative poor health and low sports participation.
Accessibility	Network of many footpaths within the corridor.
Recreation	Woodsome Hall Golf Course.
Poor Quality Environments	Opportunities to improve environmental quality in the north of the corridor as part of the Kirklees Strategic Economic Zone and new housing development.
Land/Property Values	Opportunities to improve environmental quality in the north of the corridor as part of the Kirklees Strategic Economic Zone and new housing development are likely to affect property values in the area.

## D40 – Holme Valley

The Holme Valley corridor connects important blanket bog habitat above Holmbridge and the moorland above Hepworth through steep-sided, narrow valleys converging at Holmfirth. Passing northwards to Honley and onwards to Huddersfield, it joins the Colne south of Huddersfield Town Centre. The headwaters are an important water resource consisting of a network of reservoirs. Valley sides are heavily wooded, incorporating settlements characterised by a mix of both cottage and textile industry buildings. The woodlands and upland habitats are important biodiversity resources. Identified potential for greenway development is dependent upon partnership work with private landowners. There is potential to increase the recreational use of the area. This corridor is of district significance.

Function	Indicator
Open space	Beaumont Park. Upper Park Wood. Digley, Yateholme and Ramsden Reservoirs.
Biodiversity	Rake Dike SSSI. Honley Station Cutting SSSI. Upper Park Wood LNR. Deciduous Woodland, Upland Heath, Lowland Dry Acid Grassland and Rush Pasture BAP habitats.
Landscape	Castle Hill is a particularly visible feature within the corridor with historic and cultural associations.
Products from the land	Agricultural land within the corridor – especially to the south.
Flood risk	Flooding is an issue at the confluence of the River Holme with the River Colne. As this area is largely developed, it is important to protect these areas from flooding. Reducing run off and controlling flow within the Holme would reduce the severity of flooding.
Climate Change	Many areas of woodland within the corridor that could be managed for fuel and/or carbon sequestration.
Recreation	Playing fields, cricket grounds and recreation ground throughout the corridor. Variety of walking and cycling routes.
Cultural	Old Bull Ring late prehistoric settlement SM, Castle Hill SM, Conservation areas in Hinchcliffe, Hepworth, Holmfirth, Honley.
Tourism	Holmfirth is an important centre for tourism based on its setting for the television series „Last of the Summer Wine“. Last of the Summer Wine Museum. Variety of walking and cycling routes.
Economic Growth	Potential for growth in local businesses/investors and visitors based on attractiveness of the place and countryside recreation activities.