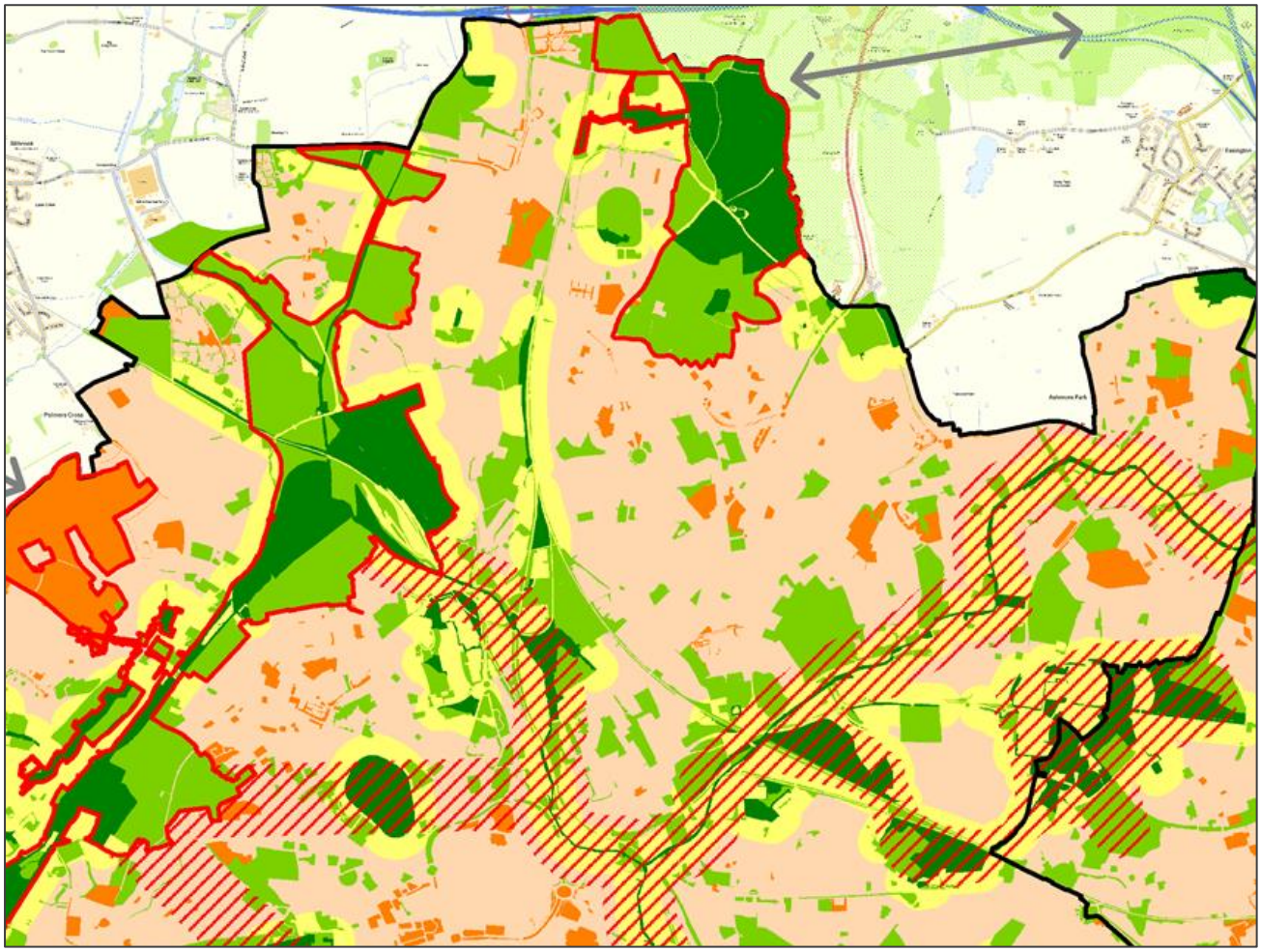
Birmingham & Black Country Wildlife Trust

EcoRecord

Black Country

Local Nature Recovery map and strategy: an emerging approach



March 2022

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1. Introduction

1. The Wildlife Trust for Birmingham and the Black Country and EcoRecord (the Local Environmental Record Centre for Birmingham and the Black Country) have been commissioned by the four Black Country local authorities (Dudley MBC, Sandwell MBC, Walsall MBC and Wolverhampton City Council, supported by the Black Country Consortium) to undertake an analysis of evidence to produce a draft Local Nature Recovery map and develop a Local Nature Recovery Strategy (LNRS) approach for the Black Country.

2. The commission comprised of three broad tasks:

   Task 1: Development of a habitat baseline for the Black Country

   Task 2: Produce a draft Nature Recovery Map for the Black Country

   Task 3a: Produce a draft Black Country Local Nature Recovery Opportunity Map

   Task 3b: Develop draft Priority Biodiversity Actions (Statement of Biodiversity Priorities)

3. In this report are presented the methodology developed to date, as well as a series of map images and tabulated outputs that represent the approach and direction taken. It is proposed, however, that the Local Nature Recovery Strategy should not comprise a static document, rather this should be a 'live' digital (map-based) freely accessible resource that can be utilised to guide action and investment in nature's recovery.

4. A maintained online portal will provide local planning authorities, the West Midlands Combined Authority, developers, government agencies, health providers, farmers, community groups and others with the information they need to help them understand how transport, housing, employment, open space, agricultural and green investment decisions can be maximised to deliver a range of biodiversity and socio-environmental benefits.

5. Examples of how the portal will aid the planning of investment in nature's recovery and deliver ecosystem services benefits include:

   - Targeted investment in habitat creation and enhancement, helping to create a coherent ecological network across the whole of the Black Country landscape.
   - Planning tree planting where it will best mitigate the impacts of climate change, flooding and poor air quality.
   - Identifying deficits and investment opportunities in accessible natural green space to support the delivery of improvements to the health and wellbeing of those communities most in need.
   - Providing guidance on urban green infrastructure needs and supporting investment in the regeneration of built-up areas.

6. It is proposed that data should be regularly updated and mapped to reflect changes to the habitats and species populations of the Black Country, enabling monitoring and reporting on both positive and negative change.

7. The Local Nature Recovery Strategy could additionally support the Black Country in achieving the best outcomes from the mandatory requirement for 10% biodiversity gain from development schemes. The Environment Act (2021) makes provision for a register of biodiversity gain sites, and for the purchasing of biodiversity credits for the purpose of meeting the biodiversity gain objective. It is proposed that the map portal could be utilised as both the repository/database of the registry, and to target the investment of biodiversity credits to maximise delivery of LNRS objectives and biodiversity priorities.

1.1 The Nature Recovery Network

8. The development of a Nature Recovery Network (NRN) covering the whole of England is a major commitment in the Government's 25 Year Environment Plan (2018). The plan states that the development of the NRN will provide 500,000 hectares of additional wildlife habitat, more effectively linking existing protected sites and landscapes, as well as urban green and blue infrastructure; and that as well as helping wildlife thrive, the NRN could be designed to bring a wide range of additional benefits: greater public enjoyment; pollination; carbon capture; water quality improvements and flood management.

9. The Nature Recovery Network will help restore many ecosystem functions and improve the services upon which society depends; benefitting nature, people and the economy. Such a network will deliver on the recommendations from Professor Sir John Lawton in Making Space for Nature (Lawton et al. 2010) that recovering wildlife will require more habitat; in better condition; in bigger patches that are more closely connected.

10. Making Space for Nature recommended the development of a 'coherent ecological network in England to help counter habitat loss and fragmentation, and declining habitat quality as a result of a range of pressures including land use change, the intensification of agricultural management, disturbance, pollution, nutrient enrichment and climate change'.

11. The government have stated that establishing the NRN will help deal with three of the biggest challenges society faces: biodiversity loss, climate change and wellbeing (Defra, 2020), and will:

    - Enhance sites designated for nature conservation and other wildlife-rich places - newly created and restored wildlife-rich habitats, corridors and stepping stones will help wildlife populations to grow and move.
    - Improve the landscape's resilience to climate change, providing natural solutions to reduce carbon and manage flood risk, and sustaining vital ecosystems such as improved soil, clean water and clean air.
    - Reinforce the natural and cultural diversity of our landscapes, and protect our historic natural environment.
    - Enable us to enjoy and connect with nature where we live, work and play - benefiting our health and wellbeing.

1.2 Local Nature Recovery Strategies

12. The Environment Act 2021 made Local Nature Recovery Strategies mandatory in England. Together the strategies are to cover the whole of the country, and the Secretary of State is to determine the areas within England to which individual Local Nature Recovery Strategies are to relate.

13. A Local Nature Recovery Strategy is to be prepared and published by the responsible authority as appointed by the Secretary of State, and is such one of the following:

    - A local authority whose area is, or is within, the strategy area
    - The Mayor of London
    - The mayor for the area of a combined authority established under section 103 of the Local Democracy, Economic Development and Construction Act 2009
    - A National Park authority in England
    - The Broads Authority
    - Natural England.

14. The Act states that a LNRS relating to an area ("the strategy area") is to include:

    A statement of biodiversity priorities for the strategy area, and a local habitat map for the whole strategy area (or two or more local habitat maps which together cover the whole strategy area).

    The statement of biodiversity priorities is to include:

    - A description of the strategy area and its biodiversity
    - A description of the opportunities for recovering or enhancing biodiversity, in terms of habitats and species, in the strategy area
    - The priorities, in terms of habitats and species, for recovering or enhancing biodiversity (taking into account the contribution that recovering or enhancing biodiversity can also make to other environmental benefits)
    - Proposals as to potential measures relating to those priorities.

    A local habitat map is a map identifying:

    - National conservation sites in the strategy area
    - Any nature reserves in the strategy area provided under section 21 of the National Parks and Access to the Countryside Act 1949
    - Other areas in the strategy area which in the opinion of the responsible authority:
        - are, or could become, of particular importance for biodiversity, or
        - are areas where the recovery or enhancement of biodiversity could make a particular contribution to other environmental benefits.

1.3 Nature Recovery Network vs. Ecological Networks

15. Whilst an ecological network can be understood as a number of core, well connected, high quality areas of well-functioning ecosystems, together with those parts of the intervening landscape that are 'wildlife-friendly' and which, collectively, allow wildlife to thrive; the Nature Recovery Network should also enhance natural beauty, heritage and conserve geodiversity, and opportunities should be taken to deliver benefits for people, such as flood alleviation, recreational opportunities and provide nature-based solutions to climate change adaptation and mitigation.

16. These joint aims, for nature and people, are at the heart of the Nature Recovery Network and are inter-dependent: networks for wildlife that also deliver benefits for and are valued by people. Thus they are likely to receive greater investment and protection by society, and consequently provide more for nature and be more sustainable in the long-term.

1.4 The principles for planning a Nature Recovery Network

17. A number of underlying principles that are key to the successful creation of a Nature Recovery Network have been identified and are described below (taken from Crick, H. et all, 2020):

    1. Understand the place: Recognise where the nature network will sit, in terms of how the natural characteristics of the area generate conditions for different habitats and how the cultural landscape character has evolved and is valued. Identify what the area is special for, from a national and local perspective, how nature has changed and the potential for its restoration. This assessment should include biodiversity and ecosystem function, geodiversity, landscape and the historical environment. Understand where people live and work and how ecosystems provide benefits to them. This enables us to identify priorities and opportunities, and to be sympathetic to the current character of the landscape, while not being constrained from accommodating what the future might hold.

2. Create a vision: for your nature network and be clear about your objectives: specify what the ultimate goals are for the network, identify the spatial scale, and the environmental and societal aspects that are important.

3. Involve people: People both benefit from and create nature networks: plans should engage and be created with the community; recognising that the landscapes and the ecosystems that support species also provide multiple benefits to people.

4. Create core sites: Core sites are the heart of nature networks; these are places that sustain thriving wildlife populations that may expand across the network. It will often be best to build core areas of nature networks by enlarging, connecting and improving existing high quality wildlife sites, to make well-functioning ecosystems. However, on occasion, it will be appropriate to fill gaps in a network by creating core sites where little wildlife currently remains. Within landscapes, working with functional ecological units will provide the building blocks to support abundant and diverse wildlife and ecosystem services.

5. Build resilience: Enhance the resilience of landscapes, ecosystems and their ecosystem services through restoration that reinstates natural processes, accommodates desirable change, improves low quality habitat and includes areas that provide buffering from the causes of current and potential future environmental degradation. Take opportunities to deliver nature-based solutions to climate change and reduce external pressures (such as diffuse pollution).

6. Embrace dynamism: Remember that in a natural state, ecosystems and landscapes change and are inherently dynamic over short and long time scales; allow natural processes to operate whenever possible, as they will aid restoration of ecosystem function and enhance the sustainability of conservation efforts.

7. Encourage diversity: Nature networks need to include a diverse physical structure, influenced by the underlying geodiversity, to accommodate the widest variety of opportunities (niches) for species. Biological complexity and landscape diversity are important to facilitate resilience. Such diversity is best founded on the restoration of natural environmental processes where this is possible, overlain by vegetation management regimes that encourage further diversity.

8. Think 'networks': Networks need to be planned at multiple spatial scales and address multiple issues. Joined-up actions across adjacent landscapes help to deliver integrated outcomes and ensure that the network acts as a coherent whole for all species (especially for those that live in the wider countryside), ecosystems and people within the area.

9. Start now but plan long-term: Identify the locations that can deliver a coherent nature network, but prioritise those locations that provide the best opportunities for action now, while developing longer term solutions.

10. Monitor progress: evaluate actions and adapt management in the light of results, to achieve long-term aims at local and national scales.

2. Task 1: Creating a habitat baseline for the Black Country

18. Understanding the distribution and condition of habitats is key to understanding the current state of the natural environment and the status of the services that the environment is able to provide to society.

19. The available evidence should be as current and comprehensive as possible, and this evidence forms the baseline against which future improvements/change will be measured.

20. Prior to this work, evidence on habitats in the Black Country was limited to a small proportion of its landscape, and current data on habitat extent and condition was only available for a small proportion of designated sites.

21. The most comprehensive habitat data set previously available for the Black Country was collated c. 30 years ago (West Midlands County Council & Urban Wildlife Trust, 1982-1988), and even then, a significant proportion of the more heavily built-up parts of the landscape were not included in the survey.

22. The use of satellite imagery in conjunction with existing habitat data generated from field survey has enabled us to achieve a comprehensive map of the vegetation cover present in the Black Country, thus ensuring a reasonable baseline to use as a means of measuring future change. These data are also key in assessing habitat connectivity.

23. In time the satellite derived habitat data set will be further processed, complemented by field survey data and updated, as we deliver on the commitment to the LNRS vision of making more space for nature in the conurbation.

24. The work undertaken as part of this commission builds on previous work carried out by EcoRecord and Spottitt in 2019 (Kennedy L. et al. (2020). Following that work, a number of possible improvements were identified, which required improvements to the algorithm and original analysis. These have not only helped to increase the accuracy of some of the classes, but also enabled the identification of a heathland/scrub class which is of particular significance in parts of the Black Country that support ecologically valuable lowland heathland habitat. Post processing of these data is currently progressing as this is a large, complex data set and their processing and analysis is time consuming.

25. The UK Habitat Classification (UKHab) (Butcher, B. *et al.*, 2020) classes that the satellite-derived habitat data set has identified are shown in Table 1.

Table 1: UKHab classes identified by the satellite-derived habitat analysis

Level 2 Code	Level 2 label	Level 3 code	Level 3 label
g	Grassland		
w	Woodland and forest	w1	Broadleaved mixed and yew woodland
w	Woodland and forest	w2	Coniferous woodland
h	Heathland and shrub		
c	Cropland		
u	Urban		
s	Sparsely vegetated land		
r	Rivers and Lakes	r1	

The most recently produced satellite derived habitat data set is shown in Figure 1.

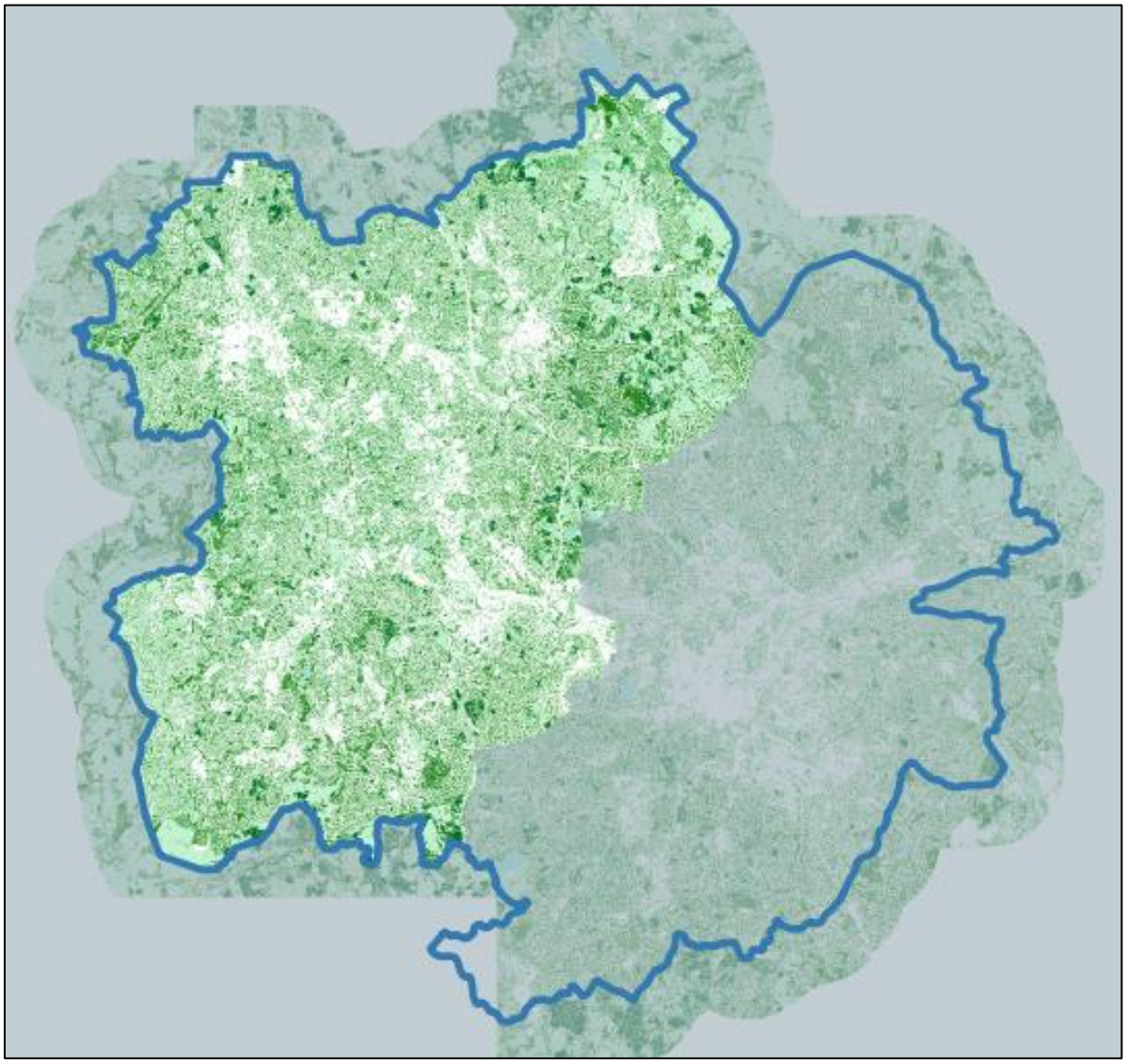

Figure 1. Map showing Satellite derived habitat classification results (habitat/vegetation classes shown in green/blue; built up areas in white).

3. Task 2: Produce a draft Nature Recovery Map for the Black Country

26. The task of producing a starting point for a Black Country-wide Nature Recovery Network map involved the following stages:

    1. An ecological evaluation of the Black Country landscape was produced, based on the methodology described in chapter 3.1.

    2. An analysis of habitat connectivity was carried out using Condatis v1.1, a software designed to assist with the planning of habitat restoration (Wallis, D.; Hodgson, J. 2021) as described in chapter 3.2.

    3. A review of available NRN guidance, national data sets and tools was carried out as summarised in chapter 3.3.

    4. Using all the available evidence and guidance, a Nature Recovery Map for the Black Country was produced (approach described in chapter 3.4).

3.1 Black Country-wide ecological evaluation

27. In 2012 Birmingham and the Black Country was declared a Nature Improvement Area (NIA) by the Department for Environment, Food & Rural Affairs (Defra). The Birmingham and Black Country NIA Ecological Strategy (The Wildlife Trust for Birmingham and the Black Country & EcoRecord, 2017) identifies the conurbation's Core Ecological Areas, Ecological Linking Areas and Ecological Opportunity Areas. This approach was informed by that described in the Making Space for Nature report (Lawton, 2010). The NIA ecological strategy was developed through the use of ecological network mapping which utilised a combination of botanical data, mapped on a 1km x 1km grid (monad) scale, and statutory and locally-designated wildlife sites mapped on a 250m x 250m grid (quarter monad) scale.

28. The NIA ecological strategy has proven a useful and influential tool in targeting available resources for the restoration, enhancement and creation of semi-natural habitats. The development of the strategy meant that valuable ecological areas had begun to be identified at a landscape scale, but due to the resolution of the data used, it was difficult to relate this to individual landscape units.

29. The information that exists for the network of existing statutory (SAC, SSSI, LNR) and locally-designated wildlife sites (SINC, SLINC) enables an assessment of the ecological value of these individual sites to be made. However, that assessment was proven more difficult for the wider landscape. The methodology described below was developed to utilise the best available evidence to more comprehensively describe the relative ecological value of the wider landscape across the Black Country.

3.1.1 Ecological Evaluation Methodology

30. The methodology used for undertaking an ecological evaluation of the Black Country area is based on attributing a relative value to individual landscape units using a range of currently available data sets that are relevant, systematic and comprehensively collected for the whole of the study area. A total of seven data sets were used in the assessment and the rationale for using each individual data set is presented and discussed below. Each landscape unit was assigned a value ranging from 1 (Low Ecological Value) to 5 (Very High Ecological Value) using the different criterion as described below. A base score (from 1 – Low Ecological Value, to 5 – Very High Ecological Value) was devised for each land use as set out in 4.1, and this score was then modified based on a number of parameters and determined by the known influence that those have on increasing ecological value when present.

31. Table 8 (Evaluation Matrix) describes the evaluation process and the rule base used to determine the final value ascribed to each land use unit as follows: 1 – Low Ecological Value; 2 – Medium Low Ecological Value; 3 – Medium High Ecological Value; 4 – High Ecological Value and 5 – Very High Ecological Value.

32. The evaluation was undertaken using GIS software to run a series of queries following the rule base described in Table 8.

33. The final output of this assessment is a GIS layer containing a set of landscape units, each assigned an ecological value based on the application of the rule base developed, using the parameters/criterion as described below.

34. For ease of use, two separate GIS layers have been produced, one for areas of greenspace/undeveloped land and another GIS layer for the built environment.

3.1.1.1 Land Use

35. ***Rationale****: Land use will significantly affect the ecological value of a landscape unit.*

36. As a starting point for the analysis the study area was classified into a series of landscape units, each one relatively uniform in character.

37. The decision to use a land use classification was taken for the following reasons:
    - The habitat data that are currently available for the study area are not comprehensive nor sufficiently up to date, especially for those areas outside designated nature conservation sites.
    - Land use has a significant impact on the likely ecological value of the habitats present.
    - Mapping areas by land use type tends to produce larger landscape units than mapping areas according to habitats. This makes it easier to analyse an area at a landscape scale, rather than at the scale of individual sites or habitat features.

Creating a Land Use Data set

38. The study area was mapped using a combination of Ordnance Survey MasterMap, aerial photography and existing/available open space layers.

39. Each land parcel of the study area was assigned to one of the land use categories shown in Table 2. The land use categories defined were those relevant to the study area. Should a different study area be chosen then additional land use categories will be considered and mapped.

40. The following rules were followed in mapping land parcels:

    - Each mapped land parcel was assigned to a single land use category and merged with any adjoining land parcels of the same type to form larger landscape units.
    - Any associated buildings were included within the wider landscape unit.
    - Land parcels of the same type separated by a road were not merged.
    - Roads, active railway lines and roadside footpaths were not mapped.
    - There was no minimum mappable unit set, as some of the land parcels within certain land use categories may be naturally quite small, such as individual detached gardens surrounded by other land use types or a small canal section dissected by roads.
    - Ponds/Lakes were only classified separately if they were not clearly contained within another defined wider land use unit (e.g. Golf Course, School Ground etc.).
    - Woodland and Semi-natural Habitat Mosaic land parcels that appeared significantly distinct from the wider land use unit were mapped as a separate unit unless they would normally be expected to be a component feature within that wider land use type (e.g. Golf Course).
    - Land parcels in the following categories were classified in the 'Semi-natural Habitat Mosaic' category if they formed part of a wider landscape unit of that type:
        - Pond/Lake
        - Woodland
        - Meadow

Table 2: Land use categories

Land Use Category	Notes
FARMLAND	
Arable	Areas that appear from aerial photography to be under cultivation for crops. This includes fields cut for silage and those under an arable/pasture rotation.
Pasture	Areas that appear from aerial photography to be permanent pasture. Google Earth has aerial images dating back to 1999 which have been used to help determine this category. Areas under an arable/pasture rotation regime are included in the Arable category.
Meadow	Grassland under a hay meadow management regime. It is difficult to identify hay meadows from aerial photography alone. Local Wildlife Site (SINC/SLINC) survey reports and citations were used to help assign land parcels to this category.
Farmyard	Farm buildings and yard.
PARKLAND/OPEN SPACE	
Allotment	Allotment gardens.
Amenity Grassland	This category includes land parcels that are predominantly close-mown amenity grassland with few other features, and which don't form part of a wider land unit of another category (e.g. Parkland, Golf Course). This category does not include playing fields, which are instead mapped in the '**Playing Fields**' category.
Canal	Canals, including any associated towpaths and banks
Cemetery	Cemeteries
Crematorium	Crematoriums and their surrounding grounds
Churchyard - historic	Churchyard dating from before 1840.
Churchyard - other	Churchyard dating from after 1840.
Golf Course	Golf Course, Including areas of woodland, pond etc. within the course.
Hospital Grounds	Hospitals and their surrounding grounds
Orchard	Areas populated with fruit or nut-bearing trees.
Park or Open Space – formal	Publicly-accessible areas with a high level of formal management. These are characterised by being mostly comprised of intensely-mown grassland with scattered trees, with more 'semi-natural habitats' being largely absent. Other features such as boating lakes and formal flowerbeds may also be present.
Park or Open Space – informal	Publicly-accessible areas with a mixed management regime, which may include areas of grassland subject to a lower intensity of mowing. This category includes sites that appear to be partly managed for amenity but include some areas of 'semi-natural habitat' (e.g. woodland, tall herb, hedgerows, scrub or ponds) If the mixture of habitats is more 'semi-natural' in character (i.e. most of the grassland is left to grow long) then the site would instead be placed in the '**Semi-natural Habitat Mosaic**' category.
Parkland - historic	This category includes sites included on the Wood-pasture & Parkland Natural England habitat inventory unless their land-use has changed to another specific type e.g. Golf Course.
Playing Field	Includes public playing fields, private playing fields, school playing fields, sports grounds
Pond/Lake	Land parcels are only mapped in this category if not clearly contained within another wider land use unit and will mostly be mapped as part of a wider landscape unit (e.g. Pasture or Semi-natural Habitat Mosaic).

Land Use Category	Notes
School Grounds	Excludes large school playing fields as these are mapped in the **Playing Field** category
University/College Grounds	Excludes playing fields as these are mapped in the **Playing Field** category
Semi-natural Habitat Mosaic	Areas containing semi-natural habitats including ponds, woodland, scrub, tall herb, grassland, stream corridors etc. These habitats may exist as a matrix. This category may include both areas that appear to be managed for wildlife, or which appear subject to no management at all.
Woodland	Land parcels are only mapped in this category if not clearly contained within another wider land use unit. Areas of woodland that exist in a mosaic with other semi-natural habitats are mapped as Semi-natural Habitat Mosaic.
GARDENS	
Garden - large, mature	Large detached, semi-detached houses. Many of these will have mature trees and possibly ponds.
Garden – other	Smaller gardens
UTILITIES, COMMERCIAL & INDUSTRIAL	
Building Site	Previously-developed sites that have recently been cleared and consist of predominantly bare ground or are sites in the process of being built upon.
Caravan Park	Caravan parks.
Open Mosaic Habitat	Sites, that have been cleared or disturbed fairly-recently, but are now developing a mix of primary successional species/habitats.
Premises	Areas that are predominantly hard-standing and contain little or no semi-natural features, e.g. car-parks, commercial premises, industrial buildings.
Premises with Parkland	Areas of landscaped grounds surrounding private premises. This category may include gardens/landscaping associated with apartment blocks, public houses, sections of industrial estate. This category can include buildings but if the amount of hard-standing area (buildings, car parks etc.) comprises a significant amount of the land unit (say, over 50%), then this element should be mapped separately in the Premises category.
Quarry – active	Quarries in active use.
Quarry – Inactive	Quarries that have been inactive for a long-enough period of time for natural vegetation to develop are included in the relevant land use category.
Railway Bank	Banks of active railways or tramways. Banks of disused railways are included in the 'Semi-natural Habitat Mosaic' category.
Sewage Works	Sewage works.
Telecommunications	Transmitting stations and their associated grounds
Power Plant/Sub Station Grounds	Power plants or electricity sub-stations and their associated grounds
Water Treatment Works	Water Treatment Works and their associated grounds

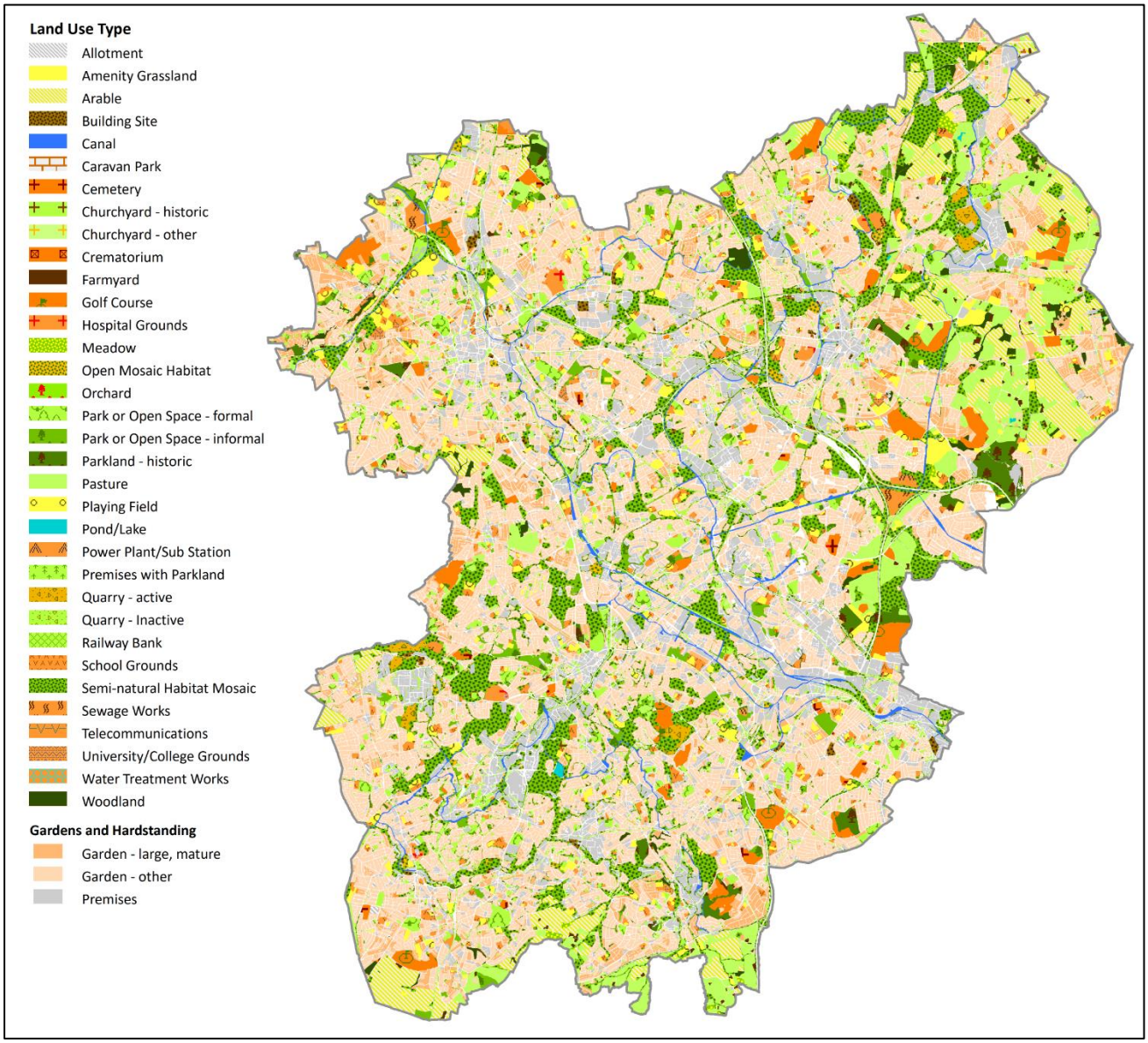

Figure 2. Map showing land use categories

Assigning Ecological Values to each Land Use Category

41. Within each land use category there is likely to be a range in the ecological quality of individual landscape units, depending on what habitat features are present. For example, a golf course with a stream and woodland is likely to be of higher ecological value than a golf course without these features.

42. For each of the land use categories two scores were devised:
    - Minimum Land Use Category (LUC) Score to reflect the likely minimum ecological value of a unit of that land use type.
    - Maximum Land Use Category (LUC) Score to reflect the likely maximum ecological value of that land use type.

43. These scores were assigned based on expert knowledge of the area, including evidence gathered for sites within the current designated site network. The scores for all mapped land use categories are presented in Table 2.

44. ***Rationale***

Table 3: Land use category Value scores

Land Use Category	Min LUC Value	Max LUC Value
FARMLAND		
Arable	1	4
Pasture	2	5
Meadow	3	5
Farmyard	1	3
GARDENS		
Garden - large, mature	2	4
Garden – other	1	2
PARKLAND/OPEN SPACE		
Parkland - formal	2	4
Parkland - informal	1	4
Parkland - historic	2	5
Allotment	2	4
Amenity Grassland	1	2
Canal	3	5
Cemetery	1	4
Churchyard	1	4
Golf Course	1	4
Hospital Grounds	1	4
Playing Field	1	3
Pond/Lake	2	5
School Grounds	1	4
University/College Grounds	1	4
Semi-natural Habitat Mosaic	2	5
Woodland	2	5
UTILITIES, COMMERCIAL & INDUSTRIAL		
Caravan Park	1	2
Premises	1	2
Quarry – active	1	3
Quarry – Inactive	2	4
Railway Bank	2	4
Sewage Works	1	4
Power Plant/Sub Station Grounds	1	4

3.1.1.2 Habitat Features

45. ***Rationale**: Landscape units that contain certain habitat features are likely to have a higher ecological value than those which do not.*

46. Landscape units containing an element of water, including streams, ponds or wetland tend to be of higher ecological value than those which do not contain those features, whilst the presence of woodland and species-rich hedgerows is also considered important.

47. Features used in this assessment:
    - Ponds and lakes
    - Rivers and streams
    - Woodland
    - Species-rich hedgerows

48. EcoRecord currently has a reasonably comprehensive GIS layer containing the first three of these features.

49. For 'Species-rich hedgerows' EcoRecord's habitat coverage is less comprehensive so the 'SLINC-designated hedgerows' data set was used as a proxy for this feature.

3.1.1.3 Nature Conservation Designations

Statutory and Non-Statutory Sites

50. ***Rationale**: Landscape units identified as either Statutory or Locally-designated are those known to be of higher ecological value.*

51. The designated site network, made up of statutory sites (SACs, SSSIs), and non-statutory Local Wildlife Sites (SINCs, SLINCs), represent the individual sites that are of the highest ecological value in Birmingham and the Black Country. These sites are designated for their nature conservation value according to a robust set of standards, using the best available evidence.

52. A score was assigned to each of the four designation types encountered in the study area, reflecting the hierarchical nature of the site designation system (see Table 8).

Ancient Woodland

53. ***Rationale**: Landscape units designated as Ancient Woodland are of high ecological value.*

54. Areas of designated Ancient Woodland represent some of the most valuable habitats present in Birmingham and the Black Country.

55. It was therefore decided that landscape units containing Ancient Woodland would always score 5 (Very High) (see Table 7. Evaluation matrix).

56. In order to be comprehensive, the evaluation used a combination of designated Ancient Woodland sites included on the latest Natural England Ancient Woodland Inventory (Natural England, 2019) and EcoRecord's Inventory of 'Probable' and 'Potential' Ancient Woodlands (EcoRecord, 2009).

Wood Pasture and Parkland

57. ***Rationale****: Landscape units designated as Wood Pasture and Parkland are of higher ecological value*

58. Wood Pasture and Parkland is identified as a Habitat of Principal Importance (NERC act 2006).

59. These sites can be of value for hole-nesting birds, saproxylic invertebrates, lichens, fungi on the trees or in the surrounding grassland (Natural England, 2015).

60. It was decided that the presence of Wood Pasture and Parkland would increase the score of those landscape units that contain it in accordance to the rule base outlined in Table 7.

61. The latest Natural England Wood Pasture and Parkland Inventory (Natural England, 2019) data set was used to identify areas of Wood Pasture and Parkland within the study area.

3.1.1.4 Adjacency

62. ***Rationale****: Landscape units directly adjacent to areas of high value (SAC, SSSI, Ancient Woodland) are likely to be of higher ecological value themselves, namely as buffer areas.*

63. SACs, SSSIs and Ancient Woodland sites are considered to contain some of the most valuable habitats of Birmingham and the Black Country.

64. Landscape units directly adjoining SACs, SSSIs and Ancient Woodland perform an important buffer function and may themselves be of higher value as a result of their proximity to a high-quality site.

65. The score of these adjacent landscape units was increased to reflect this, as described in Table 7.

3.1.1.5 Age of the Landscape – Historic Landscape Characterisation

66. ***Rationale****: Farmland which has had a continuous land use for a longer time will be of a higher ecological value than more recently-enclosed farmland.*

67. Due to the way in which ancient farmland was created and the period of time over which it has evolved, it frequently contains features and a level of structural complexity not found in more recently enclosed-farmland. In addition, ancient farmland will often support a higher number of slow-colonising species. Age is often therefore an important factor in determining the likely ecological value of farmland.

68. Birmingham's Landscape Characterisation (reference) was used to attribute an HLC Type to each farmland landscape unit.

69. This criterion is only applied to the following Land Use Categories:
    - Arable
    - Pasture

70. Values were assigned to the HLC Type farmland categories as shown in Table 4:

Table 4: Values assigned to each HLC category

HLC Type Name	Value
Ancient unenclosed pasture	5 (Very High)
Irregular enclosure	5
Piecemeal enclosure	5
Other enclosed fields	4 (High)
Paddocks & closes	4
Squatter enclosures	4
Planned enclosure	(Medium)

71. The following are the reasons why HLC categories have only been used to modify the score of farmland (land use categories: Arable and Pasture) and not that of other land use types:

    - Where land-use has changed, the HLC type only recognises the most recent change, and not the history before that, e.g. some historic parklands have been assigned the HLC Type of 'Country Park/nature reserve' as they have been designated as such in more recent times (i.e. mid-late 20th century).
    - Most of the land use categories are already defined by some degree by age, e.g. canals and churchyards, and an ecological value has been assigned to take account for this.
    - The Ancient Woodland and Wood-pasture and Parkland inventories were found to be a more useful age-determiner than HLC for other land use categories (see section 0).

3.1.1.6 Position in the Landscape

72. ***Rationale****: Landscape units within areas of higher recorded botanical value are likely to be of higher ecological value than those in areas of lower recorded botanical value.*

73. In addition to the network of sites designated for their conservation value, it is necessary to understand and evaluate the ecological value of the wider landscape.

74. To achieve this, comprehensive survey data that covers the whole area is required.

75. In Birmingham and the Black Country this has been achieved through a comprehensive survey of vascular plant diversity which took place between 1995-2012 for the production of the Flora of Birmingham and the Black Country (Trueman et al., 2013). This data set is especially useful given that there is no comprehensive and current habitat data available for the area.

76. The Flora of Birmingham and the Black Country described and analysed a data set containing 240,000 plant records gathered during systematic recording of the area during the recording period.

77. This set of comprehensive botanical data is referred to here, for ease of reference, as the Flora data set.

78. A list of all the spontaneously present species recorded during the survey period was prepared for every one of the 715 one-kilometre squares ('monads') which make up the recording area – the Birmingham and Black Country (B&BC) conurbation.

79. Many of the 1449 species recorded in the Flora survey are widely distributed in the landscape and are therefore not appropriate markers of biodiversity. Others may be much scarcer but represent recent incursions from cultivation or other forms of introduction and do not characterise vegetation of nature conservation value. Other relatively uncommon species, designated as 'axiophytes', tend to be associated with sites with nature conservation value and constitute a good surrogate for indicating habitat richness.

Axiophyte Analysis

80. The BSBI axiophyte project (http://www.bsbi.org.uk/axiophytes.html) defines axiophytes as the 40% of species that are "indicators of habitat that is considered important for conservation, such as ancient woodlands, clear water and species-rich meadows."

81. Analysis of the Flora data set identified 192 axiophyte species and five associated hybrids which are strongly associated with natural and semi-natural sites in B&BC.

82. In addition, 55 axiophyte species, one hybrid and two subspecies were identified to be associated with important artificial and secondary sites. This includes some aquatic and wetland plants associated with canals, plus a small number associated with cultivation.

83. A coincidence map of axiophyte species showed that axiophyte diversity varies considerably across the conurbation and helped to identify areas with strong focuses of axiophyte diversity.

84. The analysis of the Flora data set in this way provides a valuable proxy for identifying areas of higher habitat quality/value across the entire conurbation, albeit on a 1km^2/monad basis.

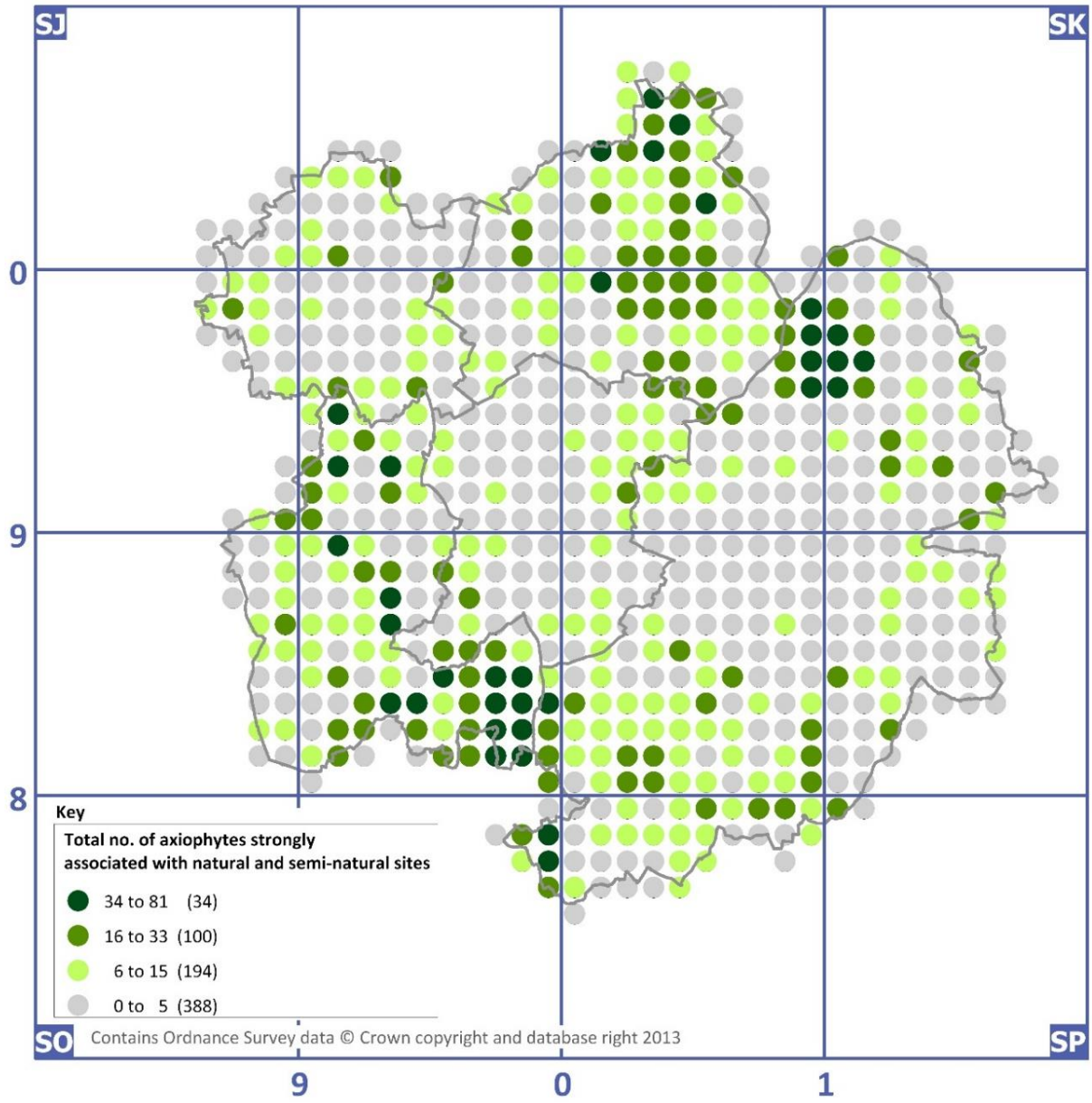

Figure 3. Map showing total no. of axiophytes strongly associated with natural and semi-natural sites

85. This map (Figure 3) is thus a surrogate for habitat richness across the conurbation, albeit at the monad (100 hectares) level (and therefore not every area within the monad will necessarily be equally valuable habitat).

86. The analysis of the number of axiophytes present per monad showed that the majority of monads have relatively low numbers of axiophyte species. Just over 390 monads have 8 axiophytes or less and are considered to be in the Low Axiophytes Range (8 axiophytes or less). At the other extreme, there are 80 monads that have 28 (90th centile) or more axiophyte species, thus these are considered to contain the

most valuable habitats in the area – High Axiophytes Range (28+ axiophytes present). The remaining 245 monads are therefore in the Medium Axiophytes Range (9 to 27 axiophytes present). The axiophyte category (Low, Medium or High Axiophyte Range) of a monad is used to determine the final ecological value of a particular landscape unit as described below (see Table 5).

TWINSPAN Analysis

87. The Flora data set was also analysed to compare each of the 1km squares (monads) in the conurbation with one another, on the basis of all taxa recorded in each of those monads.

88. The analysis was carried out using TWINSPAN (Hill 1979; Hill & Šmilauer 2005) which identifies the strongest numerical trend in different monads and divides them into groups at the average position on the trend (based on how similar the vegetation is when comparing monads with each other). The result is a classification of each monad into one of seven, similar character, ecological divisions – see table and map below taken from pg. 144 of the Flora of Birmingham and the Black Country (Trueman et al., 2013):

Table 5: The principal botanical/ecological divisions of B&BC at the monad level

Name		TWINSPAN groups	No. monads	No. spp. per monad	Description of groups of monads
Suburban	Habitat-poor	000	207	168	Residential and intensive agricultural land use predominates, markedly semi-natural habitats lacking.
	Habitat-rich	001	109	201	Residential and intensive agricultural land use predominates, semi-natural habitats, especially old woodlands, present.
Industrial	Industrial/Suburban	010	164	185	Industry a predominant feature in the flora, species-rich open water habitats absent.
	Industrial/Open-water	011	73	170	Industry a predominant feature in the flora, moderately species-rich open water habitats (usually canals) present.
Rich Semi-natural	Heath & Mire	11	12	212	Significant amounts of rich semi-natural vegetation present, typically with a species-rich flora of wet and dry heaths and often of more mesotrophic mires and wet grassland.
	Open-water Semi-natural	100	53	224	Significant amounts of rich semi-natural vegetation present, characteristically species-rich open water flora (typically canal flora).
	Wooded Semi-natural	101	37	253	Significant amounts of rich semi-natural vegetation present, typically species-rich woodland flora.

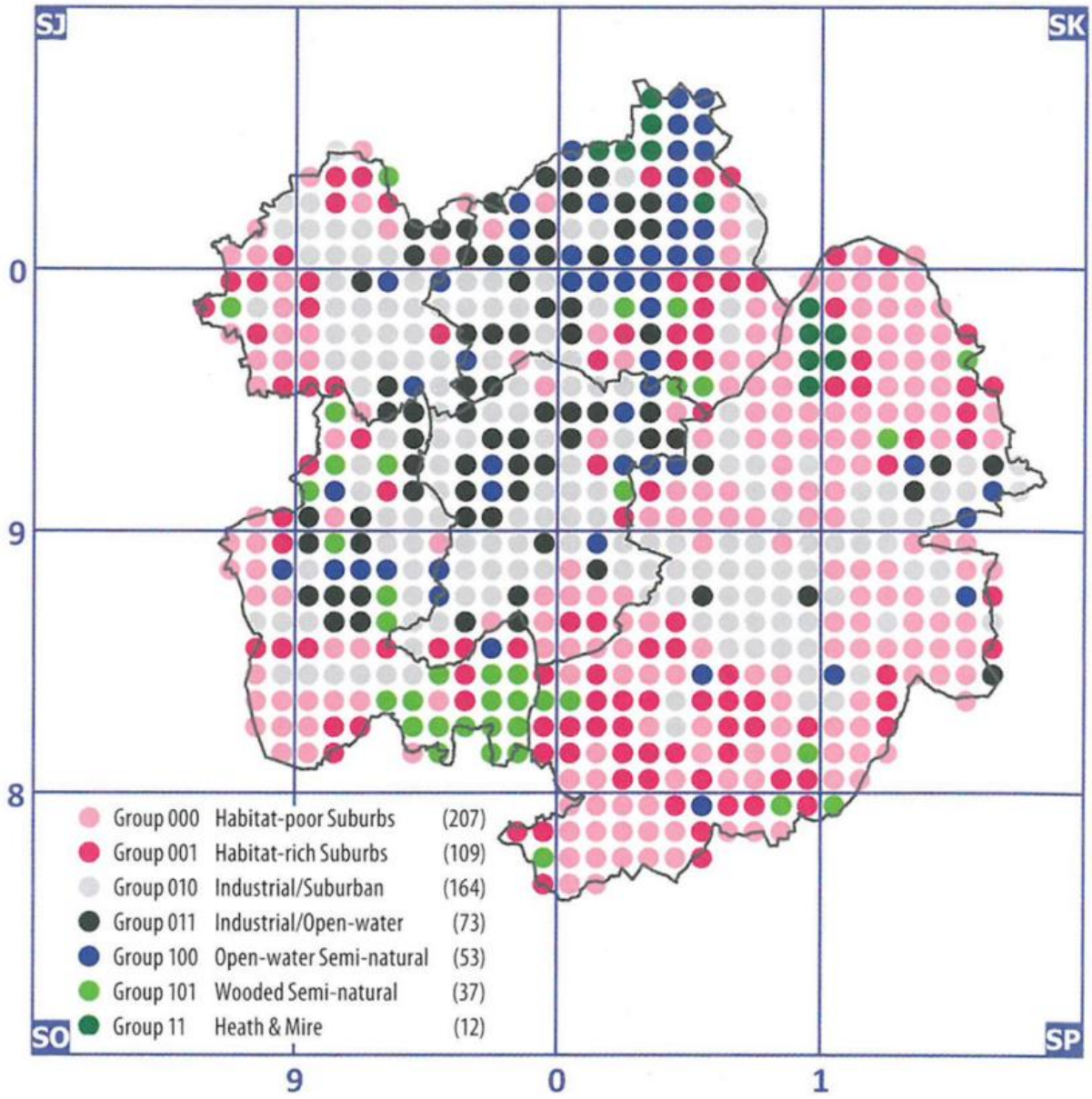

Figure 4: Division of the B&BC monads into seven TWINSPAN groups: monads classified in the Rich Semi-natural category (TWINSPAN groups 100, 101 and 11) represent the areas in B&BC with the highest ecological value.

Combination of Axiophyte and TWINSPAN analysis

89. The numbers of axiophytes recorded in a particular monad have a positive correlation with the intrinsic richness of the ecological division or TWINSPAN group in which that monad has been classified.
90. Whilst the TWINSPAN analysis provides a description of the overall ecological character of each monad (defined by the TWINSPAN group), the number of axiophytes (defined by the Axiophyte Range) indicates the degree to which valuable habitats are present in that monad.
91. Therefore, by considering the combination of the TWINSPAN and Axiophyte categories a relative evaluation/score (Twinspan-Axiophyte Value – TAV) for each individual monad can be arrived at.

Assigning an Twinspan-Axiophyte Value (TAV) score to each monad

92. The TAV value score was used in modifying the values of individual landscape units as described in Table 8.
93. A score from 1 – Low Ecological Value to 5 – High Ecological Value was derived from the combination of the TWINSPAN group and number of axiophyte species recorded for each monad as outlined in Table 5.
94. Monads classified in a 'Rich Semi-natural' category (TWINSPAN groups 100, 101, 11) and with a high number of axiophytes or were considered to be those of the highest ecological value.
95. This combined score (TAV) was therefore used to modify the score of individual landscape units according to the TAV value of the overlapping monad following the rule base described in Table 6.

Table 6: Table showing show the TAV values were assigned

TWINSPAN group	Axiophyte Range	TAV Value
000 (Habitat-poor Suburbs)	28+ 9-27 1-8	* 2 1
001 (Habitat-rich Suburbs)	28+ 9-27 1-8	4 3 2
010 (Industrial/Suburban)	28+ 9-27 1-8	3 2 1
011 (Industrial/Open-water)	28+ 9-27 1-8	* 3 2
100 (Open Water Semi-natural	28+ 9-27 1-8	5 4 *
101 (Wooded Semi-natural)	28+ 9-27 1-8	5 4 *
11 (Heath & Mire)	28+ 9-27 1-8	5 * *

* = there were no monads in this TWINSPAN group that fell into this axiophyte range

- Part Monads - i.e. those which were only partly in B&BC - weren't included in the original TWINSPAN analysis. These part monads inherited the TAV value of the adjacent monad(s).
- Each landscape unit inherited the TAV value of the monad that contained it.
- Where a landscape unit overlapped more than one monad, it inherited the highest TAV value of the overlapping monads.

3.1.1.7 Farmland Birds

96. ***Rationale**: Arable fields in tetrads (2km x 2km squares) with a higher number of recorded breeding farmland bird species, are likely to be important for these species.*

97. A number of bird species are dependent on arable land, to a greater or lesser extent. This makes them particularly good indicators of the value of this type of land use, which is one whose ecological value isn't especially well described by botanical interest alone (as is generally the case with other land use types). Some species of farmland birds have shown very significant declines in the UK since the 1970s. With species, like Grey Partridge, Tree Sparrow and Corn Bunting declining by 90% over this period (Newton, 2017).

98. Table 6 shows the species of farmland birds considered in the study, with those species currently declining in the UK (Eaton et al., 2015) identified by their current UK conservation concern status, published in the most recent Birds of Conservation Concern (BoCC4) (December 2015). Eight out of the 11 species considered are currently on the Red List of Birds of Conservation Concern (Eaton et al., 2015). One other species, Little Owl, despite not being currently listed has suffered declines of over 50% between 1970 and 2013, according to data from the British Trust for Ornithology (BTO) (Newton, 2017).

99. To better reflect the ecological value of arable land the Breeding Bird Survey (Clements, 2003) data set was used. This was a systematic survey carried out from 1998 to 2003 that recorded all birds breeding/seen in each tetrad (2km x 2km square) of Birmingham and the Black Country.

100. A coincidence map of farmland bird species, which are particularly dependant on arable fields for breeding habitat, was produced to identify those areas of which contain arable fields of greater ecological value on the basis of the presence of these indicator species.

Table 7: List of 11 farmland bird species used in the analysis:

Farmland Birds
Red-legged Partridge
Grey Partridge
Lapwing
Skylark
Corn Bunting
Yellow Wagtail
Barn Owl
Tree Sparrow
Little Owl
Linnet
Yellowhammer

- Arable landscape units within higher-scoring breeding farmland bird tetrads were scored more highly than those in lower scoring tetrads (see Table 7).

3.1.1.8 Assigning a Final Combined Ecological Value

101. The rule base used to calculate the final ecological value score for each landscape unit based on the various criteria is described in Table 7 – The Evaluation Matrix.

102. The criteria used:

- Land Use Type
- Habitat Features
- Nature Conservation Designation Value
- Adjacency to SACs, SSSIs or Ancient Woodland
- Historic Landscape Characterisation (HLC) Type Value
- Twinspan-Axiophyte Value (TAV)
- Breeding Farmland Birds Value

103. In broad terms, the application of the rule base is as follows:

- A landscape unit is first assigned an ecological value based on a combination of the land use category/habitat features and where that unit is located in the landscape (TAV categories) (Table 7, Part 1).
- This ecological value may then be modified upwards (but not downwards) if the landscape unit qualifies against any of the criteria in parts 2, 3 or 4 (Table 7, Parts 2, 3 & 4).
- If the landscape unit qualifies against multiple criteria it will inherit the highest of the possible values.

Table 8: Evaluation Matrix

LAND USE

Land Use Category	Condition	TAV1	TAV2	TAV3	TAV4	TAV5
Allotments	All	2	2	3	4	4
Amenity Grassland	With stream	2	2	2	2	2
	1+ features	1	1	2	2	2
	No features	1	1	1	1	1
Arable	SLINC hedge and HLC5 or HLC4	2	2	2	3	4
	1+ features and HLC5 or HLC4	2	2	2	3	4
	SLINC hedge and HLC3	1	2	2	3	3
	No features and HLC5 or HLC4	1	2	2	2	3
	1+ features and HLC 3	1	2	2	2	3
	No features and HLC3	1	1	1	1	1
Canal	All	3	3	3	4	5
Caravan Park	With stream	2	2	2	2	2
	1+ features	1	1	2	2	2
	No features	1	1	1	1	1
Cemetery	With stream	2	2	3	3	4
	1+ features	2	2	2	3	4
	No features	1	1	1	2	3
Churchyard - other	With stream	2	2	3	3	4
	1+ features	2	2	2	3	4

Land Use Category	Condition	TAV1	TAV2	TAV3	TAV4	TAV5
	No features	1	1	1	2	3
Churchyard - historic	With stream	2	2	3	3	4
	1+ features	2	2	2	3	4
	No features	2	2	2	3	3
Crematorium	With stream	2	2	3	3	4
	1+ features	1	1	2	3	3
	No features	1	1	1	2	3
Building Site	No features	1	1	1	1	1
Farmyard	With stream	2	2	2	3	3
	1+ features	2	2	2	2	2
	No features	1	1	1	2	2
Garden – Large, Mature	With stream	2	2	2	3	3
	1+ features	1	1	2	3	3
	No features	1	1	1	2	2
Garden - Other	With stream	2	2	2	2	2
	No stream	1	1	1	2	2
Golf Course	With stream	2	2	3	4	4
	1+ features	2	2	3	3	4
	No features	1	1	1	2	3
Hospital Grounds	With stream	2	2	3	3	4
	1+ features	1	1	2	3	3
	No features	1	1	1	2	3
Meadow	All	3	3	3	4	5
Open Mosaic Habitat	With stream	2	2	3	3	4
	1+ features	2	2	2	3	4
	No features	2	2	2	3	3
Orchard	All	2	2	3	3	4
Park or Open Space - formal	With stream	2	2	3	3	4
	1+ features	2	2	2	3	3
	No features	1	1	1	2	3
Park or Open Space - informal	With stream	2	2	3	4	4
	1+ features	2	2	2	3	4
	No features	2	2	2	2	3
Parkland - historic	All	2	3	3	4	5
Pasture	HLC4&5 plus Stream or Standing Water	3	3	3	5	5
	HLC4&5 plus SLINC hedge	2	2	3	4	4
	HLC4&5 plus Woodland	2	2	3	3	4
	HLC4&5 with no features	2	2	3	3	3
	HLC<=3 plus Stream or Standing water	3	3	3	3	4
	HLC<=3 plus SLINC hedge	2	2	3	3	3
	HLC<=3 plus Woodland	2	2	2	3	3
	HLC<=3 with no features	2	2	2	3	3

Land Use Category	Condition	TAV1	TAV2	TAV3	TAV4	TAV5
Playing Field	With stream	2	2	2	3	3
	1+ features	1	1	2	2	2
	No features	1	1	1	2	2
Pond/Lake	All	2	3	3	4	5
Power Plant/Sub Station Grounds	With stream	2	2	3	3	4
	1+ features	2	2	2	3	3
	No features	1	1	1	2	3
Premises	With stream	2	2	2	2	2
	No stream	1	1	1	1	1
Premises with Parkland	With stream	2	2	3	3	4
	1+ features	1	1	2	3	3
	No features	1	1	1	2	3
Quarry - active	With stream	2	2	3	3	3
	1+ features	2	2	2	3	3
	No features	1	1	2	2	2
Quarry - inactive	With stream	2	2	3	3	4
	1+ features	2	2	2	3	4
	No features	2	2	2	3	3
Railway Bank	All	2	2	2	3	4
School Grounds	With stream	2	2	3	3	4
	1+ features	1	1	2	3	3
	No features	1	1	1	2	3
Semi-natural Habitat Mosaic	All	2	3	3	4	5
Sewage Works	With stream	2	2	3	3	4
	1+ features	2	2	2	3	3
	No features	1	1	1	2	3
Telecommunications	With stream	2	2	3	3	4
	1+ features	1	1	2	3	3
	No features	1	1	1	2	3
University/College Grounds	With stream	2	2	3	3	4
	1+ features	1	1	2	3	3
	No features	1	1	1	2	3
Water Treatment Works	With stream	2	2	3	3	4
	1+ features	2	2	2	3	3
	No features	1	1	1	2	3
Woodland	All	2	3	3	4	5

DECLINING FARMLAND BIRDS

Land Use Category	Condition	FB1 (0-2sp)	FB2 (3-5 sp)	FB3 (6-8 sp)
Arable	All	1	2	3

DESIGNATIONS

Designation Type	Condition	TAV1	TAV2	TAV3	TAV4	TAV5
SAC	All	5	5	5	5	5
SSSI	All	5	5	5	5	5
SINC	All	3	3	4	5	5
SLINC	All	3	3	3	4	5
Ancient Woodland	Ancient Woodland (and landscape units of other Land Use Categories containing Ancient Woodland)	5	5	5	5	5
Wood pasture and Parkland	Sites on Natural England's Wood pasture and Parkland inventory	2	3	3	4	5

ADJACENCY

Feature	Value Score
Adjacent to SAC or SSSI	Treat as if landscape unit is in TAV 5 but with an upper category cap of 4
Adjacent to Ancient Woodland	Treat as if landscape unit is in TAV 5 but with an upper category cap of 4

3.1.2 Ecological evaluation results

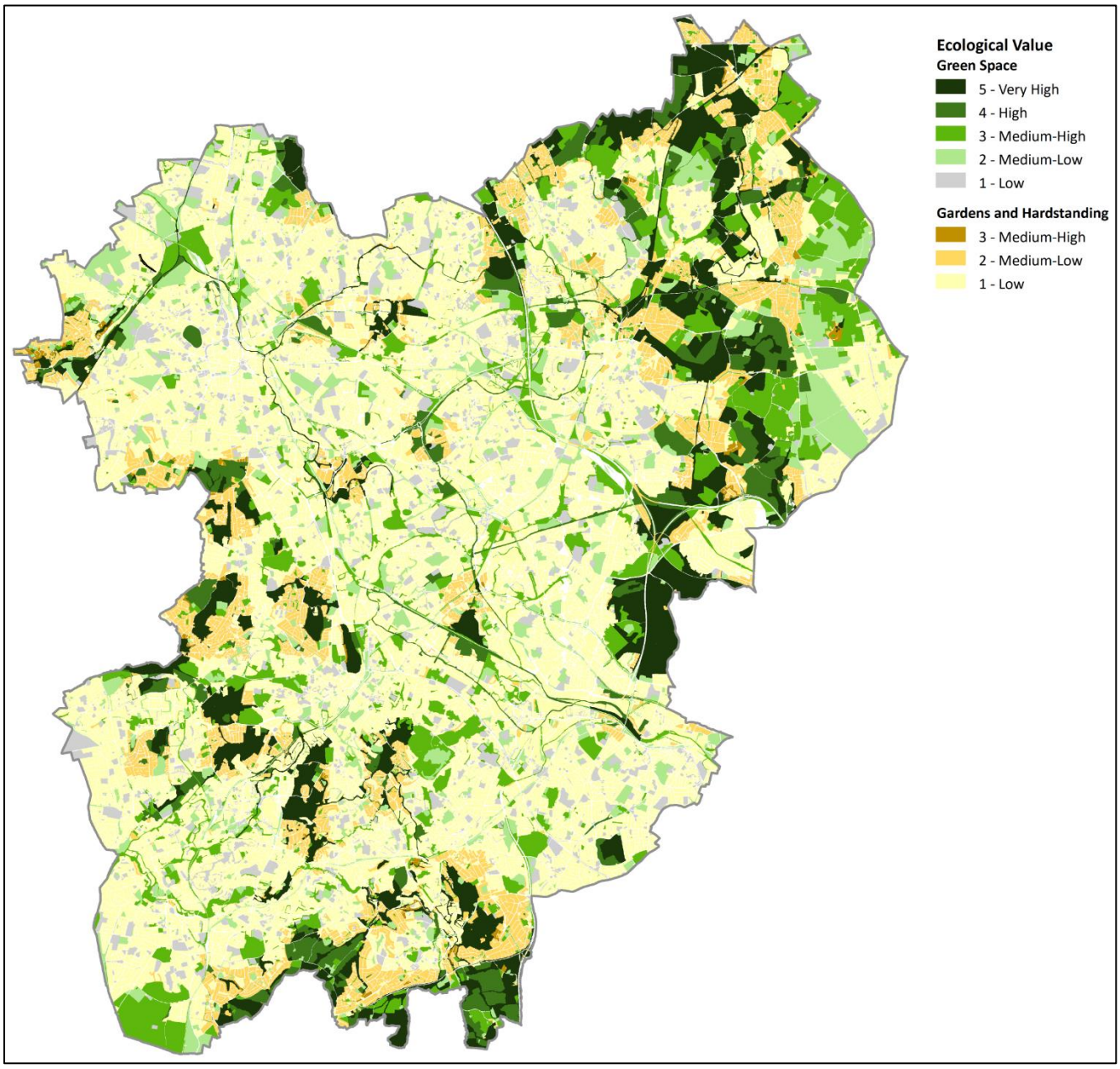

Figure 5. Ecological evaluation of the Black Country results map

3.2 Habitat connectivity analysis

104. A preliminary analysis of woodland habitat connectivity was carried out using the satellite derived habitat data set produced in 2019. A further analysis was carried out using core areas as well as an analysis of heathland connectivity in the Walsall area, as part of a wider ambition of improving/restoring habitat connectivity between Cannock Chase SSSI and Sutton Park SSSI. As previously mentioned Condatis v1.1. was used for this purpose.

105. Condatis is a decision support tool that assists with the identification of the best locations for habitat creation and restoration to help enhance existing habitat networks and increase connectivity across landscapes.

106. As a decision support tool, Condatis:

- Highlights pathways that allow both dispersal and multiplication of species as they cross a landscape
- Pinpoints bottlenecks in the habitat network (where current opportunities for colonisation are being restricted)
- Ranks the feasible sites for habitat creation and restoration to enhance the existing habitat network efficiently
- Allows new habitat to be added to test the impact of habitat creation in precise locations

107. So far this analysis has, for example, enabled the identification of woodland habitat bottleneck areas which, if affected, can have a very significant impact on the permeability of the landscape and a severe negative impact on the ability species have to move through the landscape. An example of such bottleneck areas is shown in Figure 6. The land units that overlap these areas have been identified and included as a key component of the NRN map as described below (see Figure 7). Additional analysis is still being carried out/due for other habitats and the wider area, namely using the more recently available version of the satellite derived habitat data set.

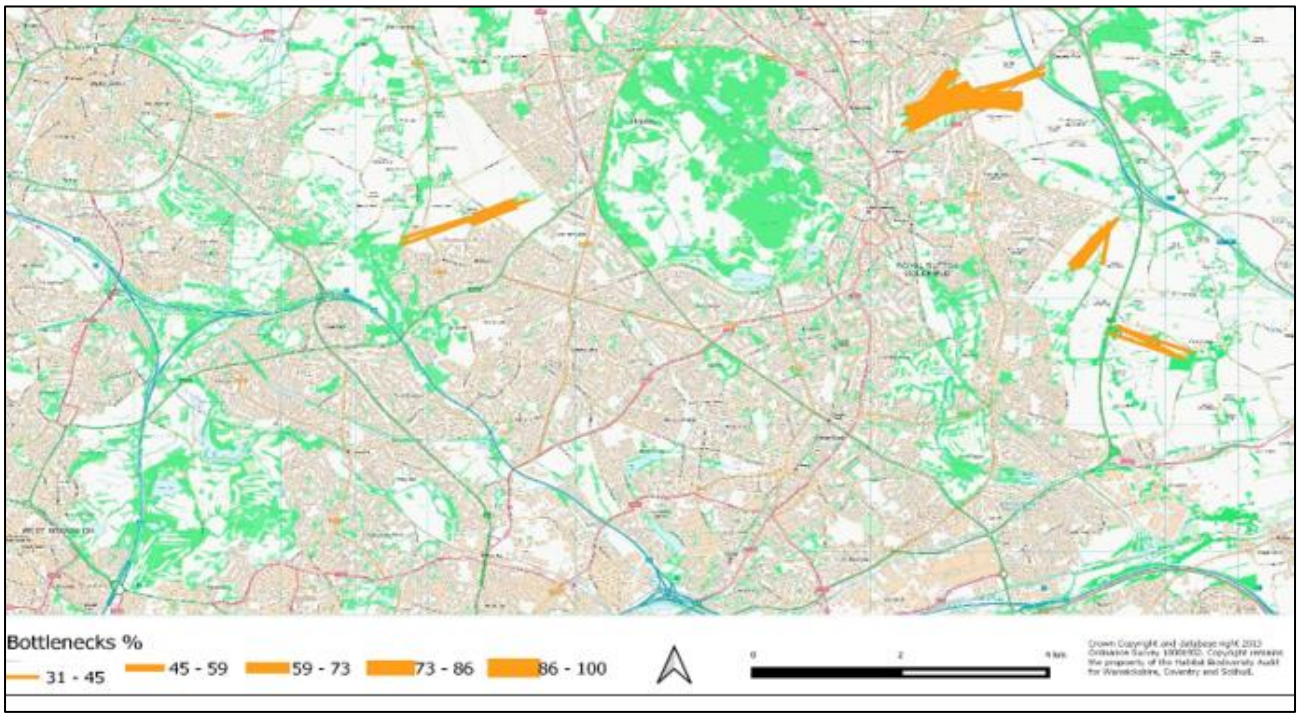

Figure 6. Woodland bottleneck areas

3.3 Review of NRN guidance, national data sets and tools

108. A comprehensive review of the current guidance was carried out. Data and tools available were researched and used as applicable at this stage (main reference used in this work: NE NRN Toolkit V1), namely the England Combined Habitat Networks Data set. This was used not only to identify important habitat/habitat enhancement/restoration within the conurbation but also, and more importantly, to provide the wider network context beyond the Black Country's boundary. This data set describes the geographic extent and location of Habitat Networks for 18 priority habitats based primarily, but not exclusively, on the priority habitat inventory, with additional data added in relation to habitat restoration-creation, restorable habitat, plus fragmentation action, and network enhancement and expansion zones. The maps are created following a standardised process that incorporates a range of data layers and identifies specific locations for a range of actions to help improve the ecological resilience for each of the habitats/habitat networks.

3.4 Producing a Nature Recovery Network Map for the Black Country

109. Guidance on the components of the Nature Recovery Network map are yet to be available. Further guidance from Defra is expected in due-course and will be incorporated in the future development of the Black Country's Nature Recovery Network map.

110. The starting point of the approach taken is the Ecological Evaluation map, which describes the relative ecological value of the Black Country's landscape. The evaluation work was primarily focused in areas of green space, though a broad assessment of residential areas has also been carried out.

3.4.1 Components of the Black Country Nature Recovery Network Map

111. As specific NRN development guidance is not yet available, the approach taken builds on previous approaches and terminology used in ecological network mapping. The description of the components as well as the criteria for land parcels to be assigned to each of these is below:

112. **Core Habitat Zone**
The Core Habitat Zone is comprised of the land use parcels that contain the most ecologically valuable habitats. The zone includes all parcels with an ecological value score of 4 or above (see ecological evaluation methodology); all sites with a nature conservation designation not included in the above (e.g. some Sites of Local Importance for Nature Conservation); and any additional areas identified in Natural England's Combined Habitat Network data set. The Core Habitat Zone is a priority for protection and restoration.

113. **Core Expansion Zone 1**
Core Expansion Zone 1 comprises those land use parcels that are of lower ecological value than those in the Core Habitat Zone but, due to inherent value or location, have the most potential to contribute to a coherent ecological network. These sites are frequently within Core Landscapes and Priority Network Restoration Zones and are a priority for investment in the restoration and creation of new habitats. Included in this zone are all areas of green space scoring 3 in the ecological evaluation; all green space scoring 1 or 2 lying within 150 metres of a Core Habitat Zone; those areas identified as habitat bottlenecks; and vegetated railway cuttings and embankments.

114. **Core Expansion Zone 2**
Core Expansion Zone 2 comprises all areas of greenspace that do not meet the criteria for inclusion in Zone 1. These sites provide an opportunity for the restoration and creation of new habitats but investment in these areas is a lower priority than in Zone 1.

115. **Urban Matrix Recovery Zone 1**
Urban Matrix Recovery Zone 1 comprises all features of the built environment within 150 metres of the Core Habitat Zone, and may include residential and commercial properties, gardens, road verges, street trees and minor watercourses. Due to their proximity to sites of ecological value these features have the most potential of their type to contribute to a coherent ecological network. The protection, enhancement and creation of green infrastructure within these areas is a priority.

116. **Urban Matrix Recovery Zone 2**
Urban Matrix Recovery Zone 2 comprises all features of the built environment outside of Zone 1. These areas provide an opportunity for the protection, enhancement and creation of green infrastructure but investment in these areas is of a lower priority than in Zone 1.

117. **National Habitat Network**
Natural England's Combined Habitat Networks data set (see 3.3).

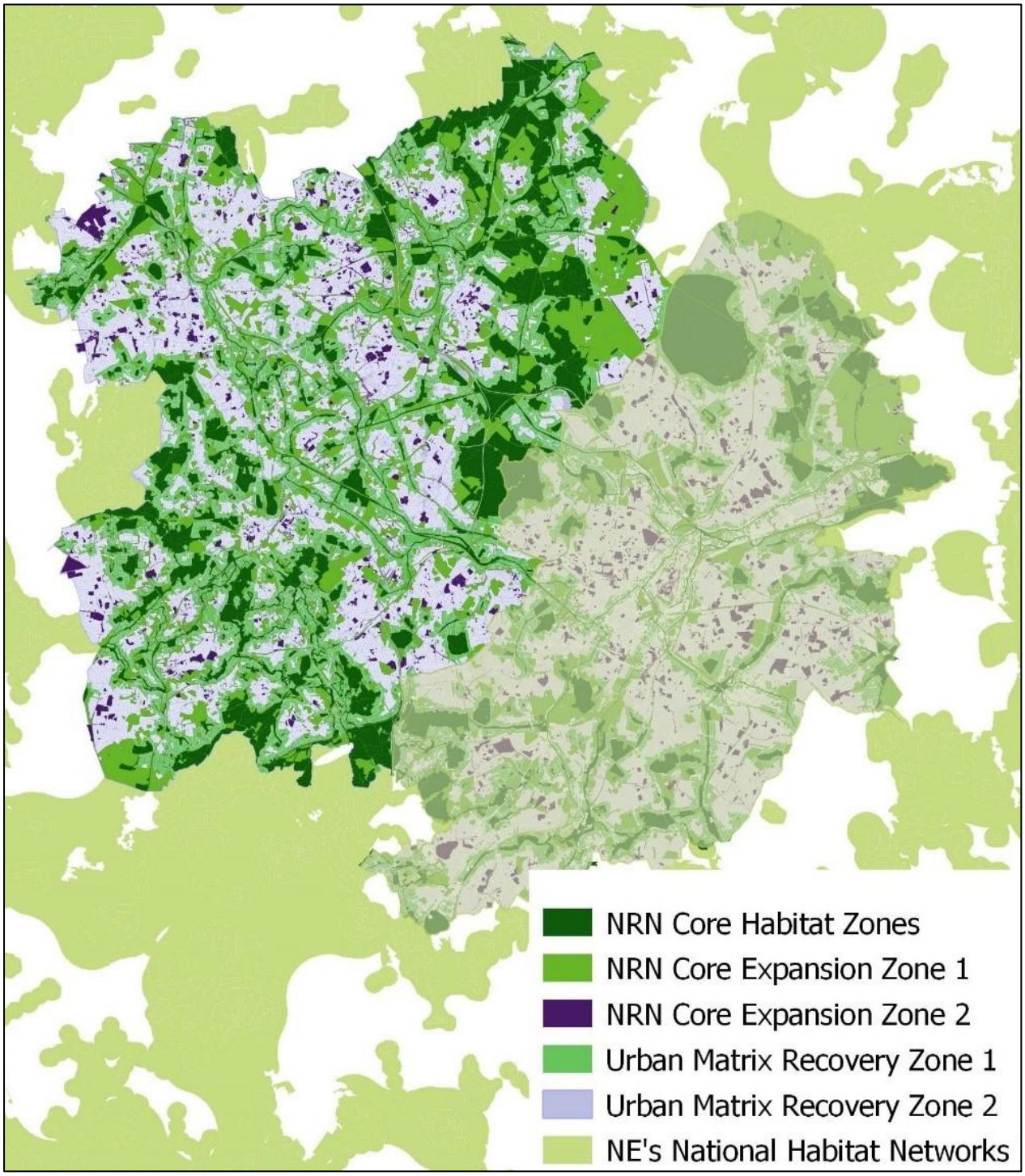

Figure 7. Draft Black Country Nature Recovery Network Map

4. Task 3: Draft Black Country Local Nature Recovery Opportunity Map & Priority Biodiversity Actions

4.1 Background to Local Nature Recovery Strategies

118. LNRSs are a new system of spatial strategies for nature, contained in the government's flagship Environment Bill [made mandatory by the Environment Act, November 2021]. The strategies have been designed to work closely alongside other measures in the Bill [Act]. They will, for example, support delivery of mandatory biodiversity net gain and provide a focus for a strengthened duty on all public authorities to conserve and enhance biodiversity. They will also underpin the Nature Recovery Network, alongside work to develop partnerships and to integrate nature into our [Defra's] incentives and land management activities (Defra, 2021).

119. LNRS are designed as tools to drive more coordinated, practical and focussed action to help nature. Each strategy will, for the area that it covers:

- Map the most valuable existing habitat for nature.
- Map specific proposals for creating or improving habitat for nature and wider environmental goals.
- Agree priorities for nature's recovery (Defra, 2021).

120. The production of each LNRS will be evidence based, locally led and collaborative, to help create a network of shared plans that public, private and voluntary sectors can all help to deliver. This will provide a locally-owned foundation to the developing Nature Recovery Network, identifying the places which, once action has been taken on the ground, will enable the network to grow over time. This is turn will help achieve wider environmental objectives, like carbon sequestration to mitigate climate change or managing flood risk, and contribute to green economic recovery objectives (Defra, 2021).

121. The government anticipates each strategy will cover an area roughly county sized and they will cover the entirety of England with no gaps or overlaps. The Defra Secretary of State will appoint a "responsible authority" to lead production of each strategy from the list of potential public bodies set out in the Bill [Act]. They are public bodies that, by and large, have a strong knowledge of the local area and democratic mandates, ensuring necessary legitimacy and local ownership (Defra, 2021).

122. The core purpose of LNRSs is to help reverse an ongoing decline of nature and biodiversity in England. To do this, a key feature of the strategies is that they will identify areas that are already of importance for nature, along with areas that could become of particular importance and where the recovery or enhancement of biodiversity could make a particular contribution to other environmental benefits. In other words, LNRSs will identify where we should take action for nature's recovery as well as where nature-based solutions can help address wider environmental problems (Defra, 2021).

123. Key examples of environmental issues where LNRSs and nature-based solutions could play a role are:

- Climate change mitigation through tree planting and peat restoration.
- Natural flood management.
- Improved water quality.

(Defra, 2021)

4.2 National LNRS Pilots

124. From August 2020 to May 2021 Defra ran five Local Nature Recovery Strategy (LNRS) pilots to test the preparation process, produce prototype strategies and look at how LNRSs can align with other environmental strategies at a local level. The five pilots were coordinated by Natural England and hosted by Greater Manchester Combined Authority, Buckinghamshire Council, Cornwall Council, Northumberland County Council and Cumbria County Council.

125. The pilots had three main objectives:

- Test a new process for preparing a LNRS based on the requirements set out in the Bill and to share experience to help develop future policy.
- Create prototype LNRSs to demonstrate what an LNRS could look like, to support national rollout.
- Consider how LNRSs will fit with existing spatial planning tools, such as National Park management plans, local plans, river basin management plans, and increasingly bring priorities together into a single strategy over time.

126. The pilots contained the two key LNRS elements, as laid out in the Bill:

- A statement of biodiversity priorities
- A local habitat map

127. The pilot leads worked collaboratively with existing local partnerships and stakeholders to agree the top priorities for nature recovery in their area (statement of biodiversity priorities) and to map where action might be taken to delivery those priorities (local habitat map).

128. The pilots followed a six-step process:

- Step 0: Defra group provides a map of each LNRS area, including habitats and national conservation sites
- Step 1: locally held data is added to the map, including locally identified wildlife sites
- Step 2: description of the LNRS area, including its key habitats and potential opportunities to create or improve them, based on ecological sub-areas
- Step 3: identification of outcomes, achieved through creation or improvement of habitat, and categorisation of those outcomes into priority and other
- Step 4: potential measures for creating or improving habitat to achieve the priority and other outcomes (a statement of biodiversity priorities is produced)
- Step 5: mapping of suitable locations for the delivery of the potential measures onto map of existing habitat (established in Steps 0 and 1) (Defra, 2021)

4.2.1 LNRS Pilots – Lessons Learned

129. Individual pilot prototypes are to be shared online by the local authority leads in due-course and these will be valuable in shaping the next steps of the approach to be taken in the Black Country.

130. In July 2021 Defra published lessons learned grouped into five themes:

Preparation of Local Nature Recovery Strategies

The pilots showed how responsible authorities can best set up for the LNRS process:

- strong leadership and transparency from the responsible authority was crucial in getting others involved from the outset
- establishing good governance quickly was important - all of the pilots had a 'pilot area team' which included Defra group arm's-length bodies, environmental non-governmental organisations, National Parks, Areas of Outstanding Natural Beauty, other local planning authorities and Local Nature Partnership representatives.
- tapping into existing networks was crucial given the time constraints, but LNRSs require a wide range of inputs and no single existing group can provide this

Resources and capacity

LNRSs need to be adequately resourced with appropriate expertise and capacity to have the required impact:

- LNRSs require contributions from different parts of an organisation at different stages - for instance, Natural England and the Environment Agency required input from several different specialist officers
- existing capacity within the responsible authority is important to completing the process quickly and effectively - the pilot areas had existing capacity, but we recognise that this is not likely to be the case everywhere. The skills required included project management, stakeholder engagement as well as technical skills
- responsible authorities have to draw on partners to give them the capacity and expertise they need - they will not have everything they need 'in-house' so will need to draw on others, for instance by bringing in ecology, data analysis and geographic information system expertise
- resource needs will be different between responsible authorities depending on local circumstances like geography or administrative set up

Data and evidence

Good and accessible data is essential to the preparation of LNRSs. There were a number of important lessons here, including:

- national-level habitats information provided to the pilots by Defra and Natural England was too voluminous and hard to use locally - Defra will further consider how best to support responsible authorities with the information it provides to them, including via a national habitat map (a requirement in the Environment Bill [Act])

- there is a need for guidance on what data responsible authorities should ideally be seeking to use to prevent LNRS partnerships spending too long gathering data
- assessing habitat quality was difficult due to a lack of recent data - similarly, trend data for some species and habitat types were hard to ascertain
- presentation of data needs to be accessible enough to empower non-specialists to make informed suggestions about what their priorities are
- data licensing is a significant issue but it is possible to include datasets whilst protecting their commercial value

Collaboration

The pilots took different approaches to collaboration. The main lessons include:

- early engagement of a wide range of people and organisations is crucial to secure genuine engagement - effective collaboration takes time, so it is one of the first things to think about in preparing an LNRS
- there cannot be 'one-size-fits-all' engagement - different stakeholders need to be engaged differently. In particular, land managers' role as stakeholders and key delivery partners must be recognised
- local conveners performed a valuable role in bringing land managers into the LNRS process - aligning LNRSs with future schemes that reward environmental land management would likely require a local convener function
- professional facilitation expertise was brought in in several pilots to support stakeholder engagement workshops and was valuable
- use of stakeholder inputs needs to be transparent so individuals can see their priorities and views reflected
- establishing a common understanding of the purpose of LNRSs and the process with all stakeholder groups is essential to gathering constructive inputs.

Using the products

The end users of the strategies were an important consideration throughout the process:

- the prototypes will appeal to a range of potential end users (including local authorities, Defra group, public bodies, landowners, Local Nature Partnerships, environmental organisations and developers) as they cover a broad set of potential environmental benefits as well as more specific habitats and species requirements
- LNRS products should look to achieve consistency across boundaries to make it easier to use more than one at a time
- certain end users require specific guidance on how to use the LNRS products for their means, such as planners or land managers
- a delivery plan is wanted by stakeholders to set out how to implement the potential measures identified in the LNRS - some pilots are investigating what a delivery plan might entail (Defra, 2021).

4.3 Introduction to the approach taken towards a draft Black Country LNRS

131. The two key elements of a Local Nature Recovery Strategy, as laid out in the Environment Act, are:

- A Statement of Biodiversity Priorities.
- A Local Habitat Map.

132. Most of the work undertaken in the Black Country towards the production of a draft Local Nature Recovery Strategy was undertaken during the period that the five national pilots were running and in lieu of published guidance. The six-step process subsequently published by Defra (outlined in 4.2) has not therefore been followed per se, rather many of the various elements of this have been achieved through a distinct process that seeks to produce similar outcomes.

133. The broad relationship between the process followed in the Black Country and the six-step Defra process is summarised in Table 8.

Table 9: Broad relationship between the process followed in the Black Country and the six-step Defra process

Black Country approach	Defra pilot six-step process
Task 1: Development of a habitat baseline for the Black Country	**Step 0:** Defra group provides a map of each LNRS area, including habitats and national conservation sites **Step 1:** locally held data is added to the map, including locally identified wildlife sites
Task 2: Produce a draft Nature Recovery Map for the Black Country	
Task 3a: Produce a draft Black Country Local Nature Recovery Opportunity Map	**Step 5:** mapping of suitable locations for the delivery of the potential measures onto map of existing habitat
Task 3b: Develop draft priority biodiversity actions (Statement of Biodiversity Priorities)	**Step 2:** description of the LNRS area, including its key habitats and potential opportunities to create or improve them, based on ecological sub-areas **Step 3:** identification of outcomes, achieved through creation or improvement of habitat, and categorisation of those outcomes into priority and other **Step 4:** potential measures for creating or improving habitat to achieve the priority and other outcomes (a statement of biodiversity priorities is produced) **Step 5:** mapping of suitable locations for the delivery of the potential measures onto map of existing habitat

4.4 Task 3a: Draft Black Country Local Nature Recovery Opportunity Map

134. The work undertaken for Tasks 1 and 2 enabled the production of a map (Figure 7. Draft Black Country Nature Recovery Network Map) of the ecological network of the Black Country. This identifies a number of components (3.4.1) that depict the variation in relative ecological value across the landscape. The map also outlines where the prioritisation of investment in nature's recovery would provide the most benefit in ecological network terms.

135. Task 3a seeks to utilise and build upon this output to produce a draft Black Country Local Nature Recovery Opportunity Map. The purpose of this stage of the draft LNRS process is to further understand and depict the nature of the landscape, whilst undertaking an additional stage of investment prioritisation.

4.4.1 Core Landscapes

136. The first stage of this process was to identify the Black Country's Core Landscapes. Core Landscapes are defined as large areas of land comprised of multiple land use parcels that are ecologically coherent, often sharing similar geology, soil types, habitats, landscape character and land-use history. Core Landscapes typically support the highest abundance and diversity of semi-natural and Priority Habitats. They provide significant opportunity and are a priority for investment in ecological recovery (e.g. habitat restoration and creation).

137. A total of 13 Core Landscapes have been identified and mapped. These cover the entire Black Country green belt as well as major river corridors and aggregations of significant areas of undeveloped land within the most urban parts of the conurbation. The 13 Core Landscapes range in size from 1.8 km^2 to 12.4 km^2 and collectively cover an area of 78.3 km^2 - 22 % of the total Black Country area of 357 km^2. The Core Landscapes are shown in Figure 8.

4.4.2 Priority Network Restoration Zones

138. The second stage of the process was to identify Priority Network Restoration Zones. These are those parts of the urban Black Country landscape that contain the highest density of Core Habitat and Core Expansion land use parcels, and which collectively link Core Landscapes. The purpose of Priority Network Restoration Zones is to support the creation of a coherent ecological network across the Black Country landscape, and are where investment in nature's recovery outside of Core Landscapes has been prioritised.

139. Collectively the Priority Network Restoration Zones cover an area of 63.2 km^2, 17.7 % of the total Black Country area of 357 km^2. The Priority Network Restoration Zones are shown in Figure 8.

4.4.3 The Draft Black Country Local Nature Recovery Opportunity Map

140. To produce the Draft Black Country Local Nature Recovery Opportunity Map, the Core Landscapes and Priority Network Restoration Zones (Figure. 8) have been overlain on the components of the Nature Recovery Network Map (3.4.1 and Figure. 7). Locations where the Core Landscapes directly link with the Natural England's National Habitat Network in adjoining local authority areas are indicated as National Habitat Network Connections.

    The Draft Black Country Local Nature Recovery Opportunity Map is shown in Figure 9.

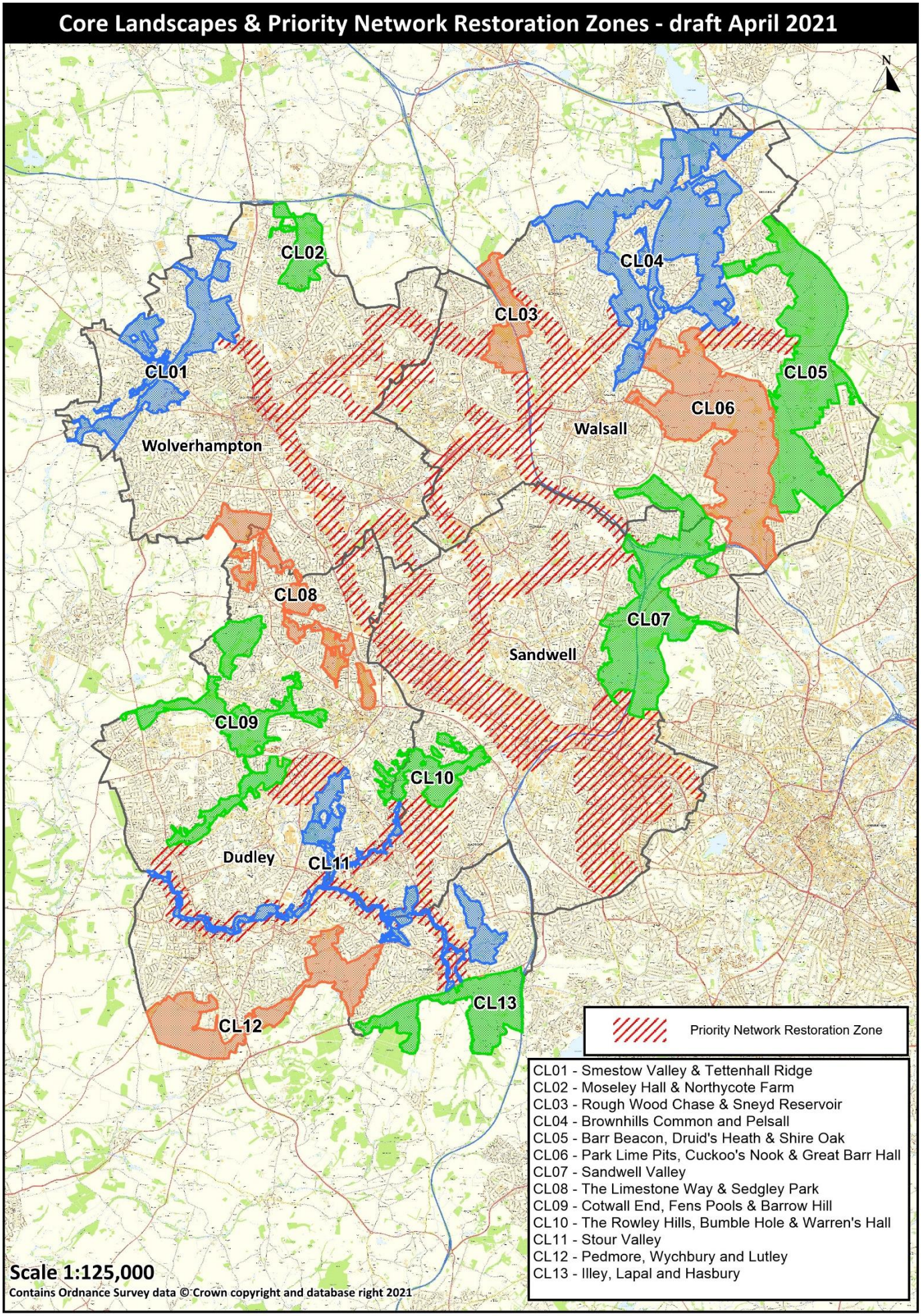

Figure 8. Core Landscapes & Priority Network Restoration Zones

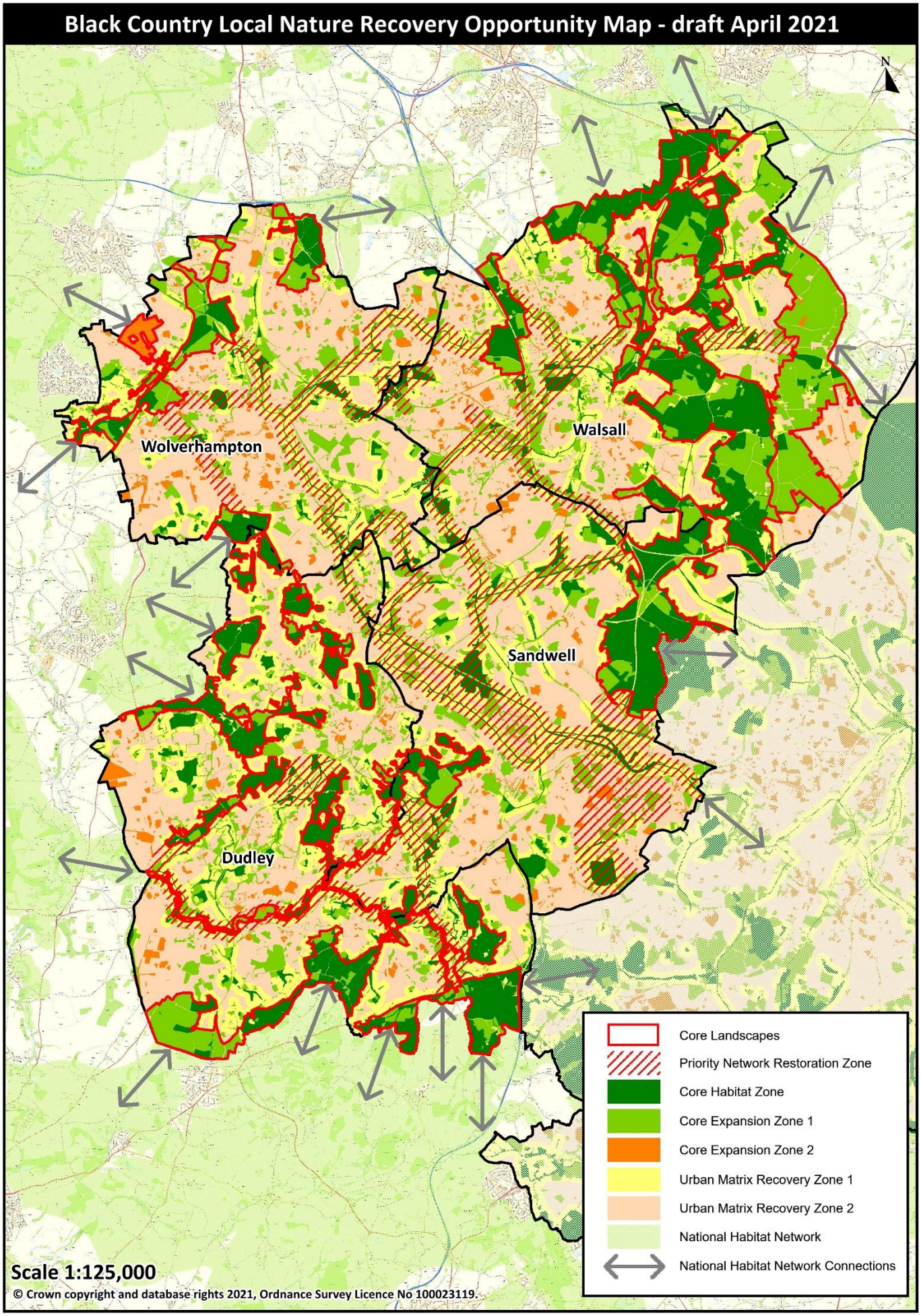

Figure 9. Draft Black Country Local Nature Recovery Opportunity Map

4.5 Task 3b: Draft Black Country Priority Biodiversity Actions

141. The guidance provided by Defra to the five Local Nature Recovery Strategy pilots was drawn upon for the formulation of draft priority biodiversity actions for the Black Country.

4.5.1 Statement of Biodiversity Priorities

141. The Local Nature Recovery Strategy pilots were provided with the following guidance for producing a Statement of Biodiversity Priorities:

I. An overall description of the strategy area – drawing on existing planning documents.

II. A description of ecological sub-areas based on geology, topography and soil type (possibly using National Character Area boundaries), the key habitats and species associated with each sub-area, how their distribution has changed over time and anticipated future changes due to climate change and other known pressures.

III. A broad assessment of the opportunity for linking, increasing or improving the condition of each key habitat, taking into account habitat characteristics and practical constraints.

IV. A description of the wider environmental issues for which the creation or improvement of habitats could help provide a nature-based solution (e.g. climate and flood mitigation).

V. The outcomes – both for nature and the wider natural environment – that the LNRS is seeking to achieve, the identification of which outcomes are considered 'priority' and the process by which these outcomes have been identified. Outcomes can be specific (e.g. X pairs of nightingales) or strategic (e.g. sequester carbon by planting native trees).

VI. The potential measures by which the creation or improvement of key habitats can deliver both priority and other desired outcomes (e.g. rotational coppicing of native woodland to provide nightingale habitat or ditch-blocking to re-wet degraded peat).

4.5.2 Identification of Ecological Sub-areas in the Black Country

142. The 13 Core Landscapes defined and delineated (4.4.1) in the Black Country comprise the main ecological sub-areas that have so far been identified (see 5, Next Steps). These typically support the highest abundance and diversity of semi-natural and Priority Habitats, and provide significant opportunity - and are a priority - for investment in ecological recovery.

4.5.3 Ecological Sub-area Statement of Biodiversity Priorities

143. A Statement of Biodiversity Priorities has been produced for each of the ecological sub-areas (Core Landscapes). These meet many of the Defra guidance points for producing a Statement of Biodiversity Priorities:

- A description of the ecological sub-area based on geology, topography and soil type.
- The key habitats and species associated with each sub-area.
- A broad assessment of the opportunity for linking, increasing or improving the condition of each key habitat.
- The outcomes that the LNRS is seeking to achieve, the identification of which outcomes are considered 'priority', and the process by which these outcomes have been identified.
- The potential measures by which the creation or improvement of key habitats can deliver both priority and other desired outcomes.

4.5.4 Presentation of Ecological Sub-area Statement of Biodiversity Priorities

144. Each of the 13 ecological sub-area Statements of Biodiversity Priorities (for examples see appendices 1-4) contains the following information:

General Information:

Ecological sub-area name, reference code, the National Character Area (NCA) it lies within, the NCA reference code, local authority area and total area in km^2.

Ecological Sub-area Description

I. Overview description
II. Landuse description
III. Topography description
IV. Geology description
V. A list of any UNESCO Black Country Geopark sites
VI. Soils description
VII. An ecological sub-area land use map (see 3.1.1.1).
VIII. Name, reference code and description of the Historic Landscape Character Areas that cover the ecological sub-area.
IX. Name, reference code and description of any Historic Environment Area Designations within the ecological sub-area.
X. Waterbody Catchment information (from the Environment Agency's Catchment Data Explorer):
    a. River Basin District name
    b. Management Catchment name
    c. Waterbody Catchment name
    d. Overall Classification
    e. Ecological Classification
    f. Chemical Classification
XI. Key Habitats:
    a. Broad Habitat type name
    b. Priority Habitat type name (if any)
    c. Habitat type description
XII. Key Species:
    a. Key fauna species recorded since 2000 (birds, amphibians & reptiles, mammals, fish, invertebrates – see appendices notes for details)
    b. Key flora species (Birmingham and Black Country axiophytes) recorded since 1995
XIII. Ecological Connectivity:
    a. A description of ecological sub-area connections to the Local Habitat Network
    b. A description of ecological sub-area connections to the National Habitat Network
XIV. An ecological sub-area Components and Connectivity map showing data from the Draft Black Country LNRS Opportunity Map (Figure 9) at an appropriate scale.

Ecological Sub-area Opportunities

XV. Identification of Focus Habitats with:
    a. A list of actions designed to improve, enhance or create the Focus Habitat
    b. A measure of success for each action

XVI. Identification of Target Species and Species Groups with measures of success.

XVII. Geodiversity site actions and measures of success.

XVIII. Connectivity Opportunities:
    a. Identification of actions to improve Local Habitat Network Connections
    b. Identification of actions to improve National Habitat Network Connections

Information and Data Sources

XIX. Information and data sources are referenced.

5. Next Steps

145. The work described in this document comprises significant progress towards a Local Nature Recovery Strategy for the Black Country.

146. This work has, however, been undertaken by the Wildlife Trust and EcoRecord without the benefit of collaboration with additional stakeholders and partners, and in lieu of published guidance from Defra. There remains significant work that needs to be undertaken to progress further towards a Local Nature Recovery Strategy, and for this to be ready for adoption by the (yet to be determined) responsible authority.

147. Whilst we await the publication of detailed guidance on all aspects of Local Nature Recovery Strategies from Defra, there are a number of important next steps that can be undertaken locally:

- Undertaking consultation with stakeholders, partners and partnerships on the work carried out to date.
- Forming a partnership of organisations that will work in collaboration with the responsible authority on the next stages and ongoing development and management of the LNRS.
- Producing Statements of Biodiversity Priorities for the defined Black Country Priority Network Restoration Zones.
- Defining ecological sub-areas and producing Statements of Biodiversity Priorities for the urban Black Country outside the Core Areas and Priority Network Restoration Zones.
- Undertaking an ecosystem services assessment of the Black Country landscape, understanding the value of the services provided by existing habitats, and identifying deficits in the network and actions to address these.
- Identifying and prescribing generic green infrastructure investment opportunities that will have the most impact in terms of addressing ecosystem services deficits.

Glossary of terms

Ancient Woodland – defined by Natural England as land that has had a continuous woodland cover since at least 1600 AD and may be ancient semi-natural woodland (ASNW), which retains a native tree and shrub cover that has not been planted, although it may have been managed by coppicing or felling and allowed to regenerate naturally, or plantation on ancient woodland sites (PAWS) where the original tree cover has been felled and replaced by planting, often with conifers, and usually over the last century

Axiophyte - Axiophytes are indicators of habitat that is considered important for conservation, such as ancient woodlands, clear water and species-rich meadows. The Botanical Society of Britain and Ireland (BSBI) has attempted to define axiophytes as follows:

- Species 90% restricted to habitats of nature conservation importance
- Species recorded in fewer than 25% of tetrads in a vice-county
- Very rare species should be considered for omission as chance occurrences

See http://bsbi.org/axiophytes for more information.

Bird of Conservation Concern (BoCC4): The list is produced by the UK's leading conservation organisations who worked together to review the status of birds in the UK, Channel Islands and Isle of Man. Criteria is used to assess the historical decline, trends in population and range, population size, localisation and international importance of each species as well as their global and European threat status; and uses up-to-date information on the status of birds in the UK and elsewhere in their ranges, drawing on data collated through the UK's bird monitoring schemes. Species are placed on the Green, Amber or Red list – indicating an increasing level of conservation concern (Red being those of highest concern).

Farmland Birds - Bird indicators based on population trends of wild birds are part of the government's suite of biodiversity indicators and show how the fortunes of birds of farmland, woodland, waterways and wetlands, and marine and coastal areas have fared between 1970 and 2017. Farmland birds are used as an indicator of the general quality of the farmed environment because birds sit near the top of the food chain and trends have been well monitored by the British Trust for Ornithology since 1967. The latest updates in the UK and England were published on 8 November 2018.

Habitat of Principal Importance - The Natural Environment and Rural Communities (NERC) Act came into force on 1st Oct 2006. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. Fifty-six habitats of principal importance are included on the S41 list. These are all the habitats in England that were identified as requiring action in the UK Biodiversity Action Plan (UK BAP) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework. They include terrestrial habitats such as upland hay meadows to lowland mixed deciduous woodland, and freshwater and marine habitats such as ponds and subtidal sands and gravels.

Land Parcel – In this evaluation this refers to individual units of land i.e. individual fields (often defined by OS Mastermap polygons) which were later merged with adjacent land parcels with the same land use type to form larger Landscape Units.

Landscape Unit – In this evaluation these were created by merging adjoining similar Land Parcels to form larger units of the same land use type. It was these units that formed the main basis of the evaluation.

Nature Improvement Area (NIA) - Nature Improvement Areas (NIA) were established to create joined up and resilient ecological networks at a landscape scale. They are run by partnerships of local authorities, local communities and landowners, the private sector and conservation organisations with funding provided by the Department for the Environment, Food and Rural Affairs (Defra) and Natural England. The 12 winning NIA projects were chosen after a competitive process announced in the Natural Environment White Paper.

Nature Recovery Network - A Nature Recovery Network is a joined-up system of places important for wild plants and animals, on land and at sea. It allows plants, animals, seeds, nutrients and water to move from place to place and enables the natural world to adapt to change. It provides plants and animals with places to live, feed and breed. It creates the corridors and areas of habitat they need to move in response to climate change (The Wildlife Trusts, 2018).

Special Area of Conservation (SAC) - This is an area containing habitat types and/or species, which are rare or threatened within a European context. These areas are designated under the European Directive commonly known as the 'Habitats' Directive.

Site of Importance for Nature Conservation (SINC) - Non-statutory designation for sites of Birmingham and the Black Country importance, identified by the Local Sites Partnership.

Site of Local Importance for Nature Conservation (SLINC) - Non-statutory designation for sites of Borough importance, identified by the Local Sites Partnership.

Site of Special Scientific Interest (SSSI) - Statutory designation relating to sites of interest for their flora, fauna, geological, or physiographical features, notified by Natural England.

TWINSPAN - Two Way Indicator Species Analysis is a method for hierarchical divisive classification of communities, based on progressive refinement of a single ordination axis obtained by Correspondence Analysis (CA) or Detrended Correspondence Analysis (DCA) of a (sites × species) data matrix.

Wood-pasture & Parkland - described in Joint Nature Conservation Committee's (JNCC) UK Biodiversity Action Plan (BAP) priority habitat pages as: areas that have been managed by a long established tradition of grazing allowing, where the site is in good condition, the survival of multiple generations of trees, characteristically with at least some veteran trees or shrubs. The tree and shrub component may have been exploited in the past and can occur as scattered individuals, small groups, or as more or less complete canopy cover. Other semi-natural habitats, including grassland, heathland, scrub etc, may occur in mosaic beneath the trees. While oak, beech, alder, birch, ash, hawthorn, hazel or pine are often the dominant tree species, a wide range of other tree and shrub species may occur as part of wood pasture systems.

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[Accessed: 26/02/2021]. © Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right [2021].

Appendices 1 - 4: Example Ecological Sub-area Statements of Biodiversity Priorities

Ecological Sub-area Statement of Biodiversity Priorities – Technical Appendix			
Sub-area name	Smestow Valley & Tettenhall Ridge	**Sub-area ref.**	CL01
Natural Character Area	Mid Severn Sandstone Plateau	**NCA ref.**	66
Local Authority Area	Wolverhampton	**Area km^2**	4.97

Ecological Sub-area Description

Overview

The ecological sub-area comprises a connected network of open spaces in the north-west of Wolverhampton, close to the Black Country's boundary with rural Staffordshire. With the exception of a number of direct connections to Staffordshire via watercourses and canals, suburban settlement surrounds the ecological sub-area including the historic villages of Tettenhall, Tettenhall Wood and Compton (formerly in the Staffordshire parishes of Tettenhall and Bushbury). The ecological sub-area is dominated by open spaces that follow the valley of the Smestow Brook and the canal network of western Wolverhampton, along with the mature woodlands and historic greens of the sandstone Tettenhall Ridge.

Land Use

The valley of the Smestow Brook is dominated by Smestow Valley Local Nature Reserve (LNR) which follows the former Wolverhampton & Kingswinford Railway line for 4.5 kilometres from Aldersley in the north to Wightwick in the south. Covering an area of approximately 51 hectares, the site comprises the dismantled railway line and a number of areas of former farmland with retained field-boundary hedgerows, grassland and recent secondary and plantation woodland. The Staffordshire & Worcestershire Canal follows the valley and forms the boundary to the LNR for much of its length. There are also short lengths of the Birmingham Main Line and Shropshire Union canals. Other areas of open space in the valley include public open space, playing fields, sports grounds, a golf course, a racecourse and a sewage treatment works. The only agricultural land lies in the very south of the ecological sub-area on the boundary with the South Staffordshire countryside and comprises pastures to the north and south of the Smestow Brook.

The south-east facing slopes of Tettenhall Ridge are occupied by mature broad-leaved woodland, parts of which are designated as ancient, whereas others were planted in the 19th century. Tettenhall Upper Green occupies land to the north of Tettenhall village and comprises public open space, with to the north of this Danescourt Cemetery and South Staffordshire Golf Course.

Topography

The Smestow valley lies at an elevation of 100 m in the north, falling away to 90 m in the south, with the surrounding level land at an elevation of 110 to 120 m. The Tettenhall Ridge runs on a north-east – south-west axis with a south-east aspect and is approximately 30 to 40 metres in height, with the villages of Tettenhall and Tettenhall Wood lying to the west at an elevation of 140 – 150 metres.

Geology

The entire ecological sub-area is located on bedrock of sedimentary sandstone and conglomerate, interbedded, formed approximately 200 to 251 million years ago in the Triassic Period. This is partially overlain with superficial deposits of diamicton till formed up to 3 million years ago in the Quaternary Period; undifferentiated river terrace deposits of sand and gravel formed up to 3 million years ago in the Quaternary Period; and in the valley of the Smestow brook, clay, silt and sand alluvium formed up to 2 million years ago in the Quaternary Period.

Geopark Sites

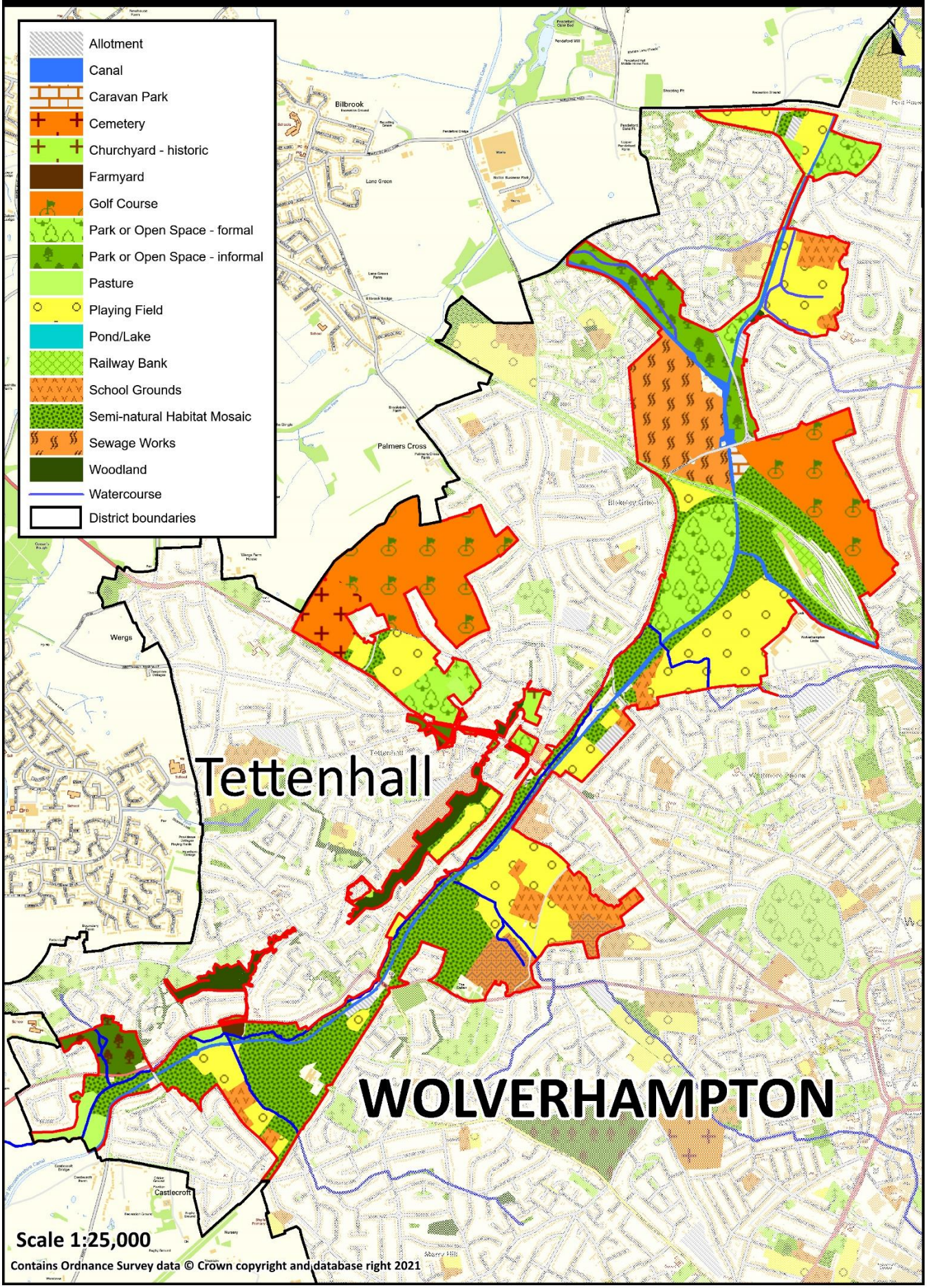
- Compton and Tettenhall Ridge (GR SJ88900013)
- Wightwick Wedge and Smestow Valley Local Nature reserve (GR SO887994)

Soils

The valley of the Smestow Brook is dominated by naturally wet very acid sandy and loamy soils, whilst in the north there are areas of slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, loamy soils

with naturally high groundwater, and freely draining slightly acid loamy soils. The Tettenhall Ridge is comprised of slightly acid loamy and clayey soils with impeded drainage, and freely draining slightly acid loamy soils.

CL01 - Smestow Valley & Tettenhall Ridge - Land Use



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Historic Landscape Character Areas			
Reference	WV02	**Name**	Wolverhampton Outer Western Suburbs
The ecological sub-area is dominated by WV02 Wolverhampton Outer Western Suburbs, which is predominately comprised of 20th century residential development. The Character Area contains the site of the medieval settlements of Tettenhall (first mentioned AD 910), Wightwick, Compton, Wergs and Aldersley. During the medieval period these settlements were likely to have been surrounded by open fields. The settlement of Tettenhall was fairly large, centred around two large greens. The heathland that existed at Tettenhall Wood until the early 19th century had probably been there since the medieval period. Once the heath was enclosed the development of houses soon took over.			
Reference	WV10	**Name**	Pendeford, Fordhouses & Moseley
The northern part of the ecological sub-area lies within WV10 Pendeford, Fordhouses & Moseley. The modern landscape is characterised by late 20th century residential development, industrial sites, public services and recreational facilities (public parks and nature reserves), which also date to the period after 1938. Prior to the 19th century, this area was mainly agricultural with some fields being medieval in origin and with some early settlements located in the west of the Character Area at Pendeford Farm, Pendeford Hall and Barnhurst Farm. Pendeford Aerodrome was opened in 1938 and later became a 1980s housing estate. The Staffordshire and Worcestershire Canal is one of the earliest features in this landscape, constructed in 1770.			

Historic Environment Area Designations [1]			
Reference	APA 28	**Name**	Land adjacent to Smestow Brook
The APA contains part of the route of the Smestow Brook, there is considered to be potential for previously unknown prehistoric activity (including Bronze Age burnt mounds) and environmental evidence present associated with the former water course.			
Reference	AHHLV 22	**Name**	Upper Green Tettenhall
The AHHLV contains Upper Green, an area of surviving common ground associated with the settlement at Tettenhall. Contains an old millpond (now a paddling pool) and a 20th C clock tower. Possible shallow ridge and furrow earthworks to the N of the pool.			
Reference	AHHLV 24	**Name**	Wightwick Wedge and Smestow Valley
The AHHLV contains an area of earthwork ridge and furrow, the remains of a medieval holloway and Wightwick Mill. It is situated within the Smestow Valley which is a major geomorphological feature of the Black Country on its western margin.			
Reference	AHHLV 59	**Name**	Tettenhall Wood
The AHHLV is an area of semi-natural ancient woodland. it has the potential to contains well preserved archaeological remains and features associated with medieval and post-medieval woodland management.			
Reference	APA 83	**Name**	Graveyard of St Michael's and All Angels Church
The APA contains the late 19th century extent of the grave yard associated with the Grade II listed St Michael's and All Angels Church. It has the potential to contain burials and mortuary monuments dating back to the medieval period.			
Reference	AHHTV 129	**Name**	Mount Street, Tettenhall
The AHHTV contains the south side of Mount Street, Tettenhall. The settlement at Tettenhall Wood expanded along Mount Street during the 19th century and the AHHTV contains a range of 19th century buildings associated with this expansion.			
Reference	APA 82	**Name**	Tettenhall Historic Settlement
The APA covers the historic core of Tettenhall as shown on the 1816 Ordnance Surveyors Drawings.			

Waterbody Catchments			
River Basin District	Severn	**Management Catchment**	Severn Middle Worcestershire
Waterbody Catchment	**Overall Classification**	**Ecological**	**Chemical**
Smestow Brook - source to conf Wom-Penn Brook	Moderate (2021)	Moderate (2021)	Fail (2021)
River Basin District	Humber	**Management Catchment**	Trent Valley Staffordshire
Waterbody Catchment	**Overall Classification**	**Ecological**	**Chemical**
Penk from Source to Saredon Brook	Poor (2019)	Poor (2019)	Fail (2019)

Key Habitats [2]			
Broad Habitat Type	Boundary & Linear Features	**Priority Habitat**	Hedgerows
Remnant field boundary hedgerows exist in many of the areas of open space and, less frequently, along roadsides. These are typically Hawthorn-dominated with varying diversity of woody component and field-layer, with some containing mature standards of species including Pedunculate Oak.			
Broad Habitat Type	Standing Open Water and Canals	**Priority Habitat**	Eutrophic Standing Waters
The Staffordshire & Worcestershire Canal runs north-south through the entire ecological sub-area, following the valley of the Smestow Brook for much of its length and linking directly with the Staffordshire countryside at each end. Towards the north of the sub-area are junctions with the Shropshire Union and Birmingham Mainline Canal, the former running west and into the Staffordshire countryside, the latter west into the urban Black Country and on to Birmingham city centre. The canals comprise a significant network of wildlife corridors and are an important component of the ecological network. A variety of habitat types and a number of species of note including Otter and Water Vole are present.			
Broad Habitat Type	Standing Open Water and Canals	**Priority Habitat**	Ponds
In the north of the ecological sub-area within the track of Dunstall Racecourse is a large artificial flood alleviation pond (c. 1.4 ha) associated with the Smestow Brook. This is steep sided and supports little aquatic flora but is well-recorded and notable for a broad-range of passage migrant water and wetland birds. In the south of Smestow Valley LNR there is a former field pond and nearby a recently created pond that support a breeding population of Great Crested Newt.			
Broad Habitat Type	Rivers and Streams	**Priority Habitat**	Rivers
The Pendeford Brook and a tributary of this rise within the north of the ecological sub-area but are entirely within culvert. The Smestow Brook rises to the east of the ecological sub-area but lies within a > 4 kilometre culvert from which it emerges at a notable aqueduct over the Staffordshire & Worcestershire Canal to the south of the racecourse. From here the watercourse flows south within a highly modified channel for several hundred metres, from which point the channel is more natural, though still modified and over-widened. There are two small tributaries of the Smestow Brook: the Graisley Brook which is culverted for its entire length with the exception of a short section (c. 240m) of artificial channel that flows alongside and the canal, and the Finchfield Brook, which emerges from a culvert into a mostly unmodified channel for approximately 450 m before again entering a culvert.			
Broad Habitat Type	Neutral Grassland	**Priority Habitat**	

Periodically cut rank neutral grassland dominates much of the Smestow valley. Species diversification and the implementation of annual management has been undertaken within areas of the LNR, however, to date this has had only limited success in increasing floral diversity.

In the very south of the ecological sub-area there are areas of rank neutral grassland to the north and south of the Smestow Brook which are occasionally grazed.

There are numerous areas of regularly mown amenity grassland throughout, including areas of public open space, golf courses, Dunstall Racecourse, school grounds, sports fields and at the National Trust's Wightwick Manor site in the south of the ecological sub-area.

Broad Habitat Type	Broadleaved, Mixed and Yew Woodland	**Priority Habitat**	

There are numerous blocks of planted trees within the valley of the Smestow Brook and in areas of open space adjoining the canal corridors. These are predominantly comprised of native broadleaved species and date to the latter part of the 20th century. Most of the blocks are typically structurally poor and support a field-layer flora comprised of ubiquitous species, however, in recent years a number of projects have been undertaken to enhance these areas and both these structural and species diversity is increasing.

Recent secondary woodland has colonised a number of formerly developed sites including the 4.5 km length of the dismantled Wolverhampton & Kingswinford Railway line, a former tennis court close to the Tettenhall Road and former railway sidings at Oxley in the north of the ecological sub-area.

There are a number of mature plantation woodlands associated with large 18th and 19th century houses along the Tettenhall Ridge including at the National Trust's Wightwick Manor site in the south of the ecological sub-area. These are typically dominated by UK-native species including Beech and Pedunculate Oak.

Broad Habitat Type	Broadleaved, Mixed and Yew Woodland	**Priority Habitat**	Lowland Mixed Deciduous Woodland

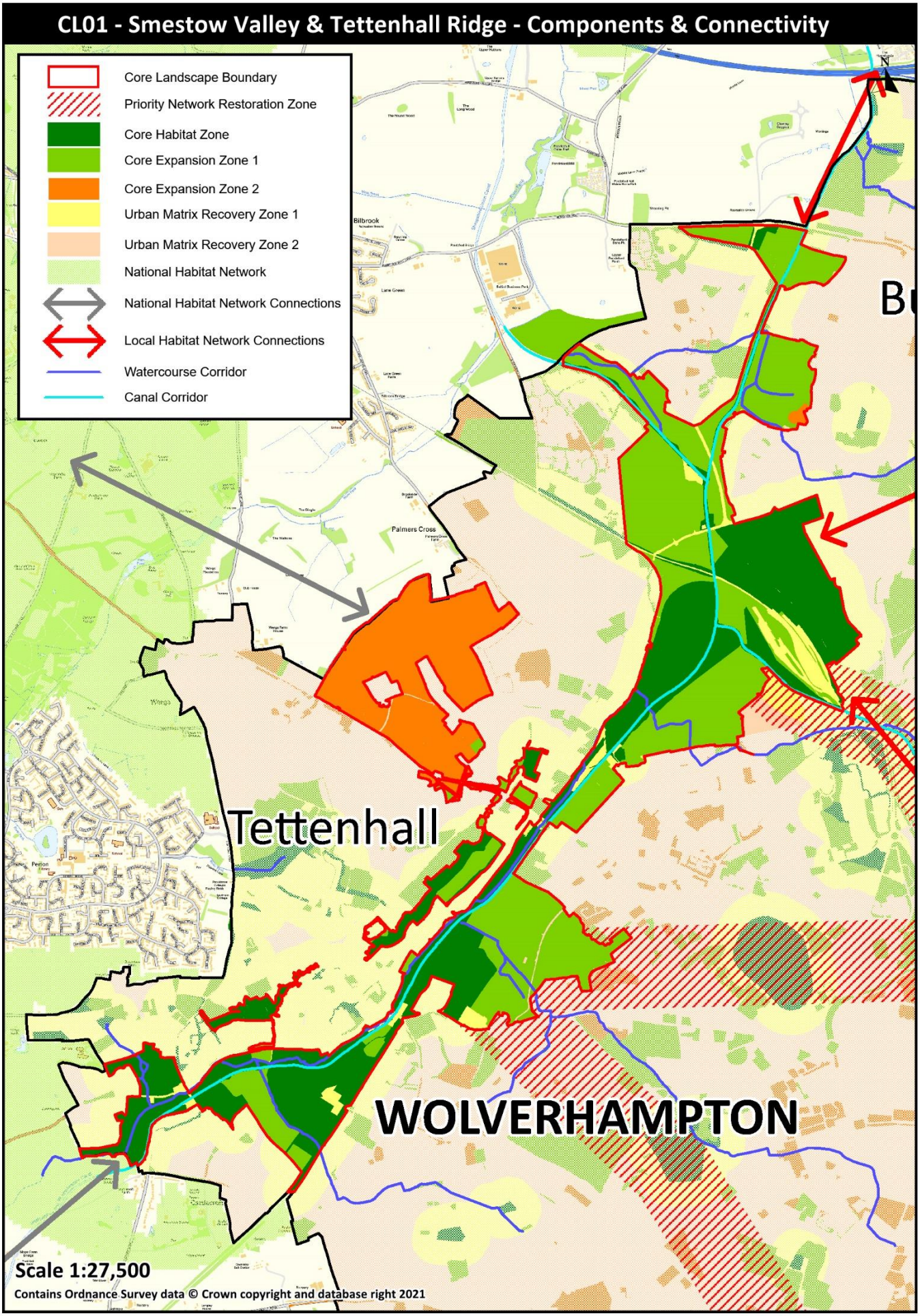
The south-east facing scarp slope of the Tettenhall Ridge is dominated by mature woodland and is a significant feature of the local landscape. Woodland is depicted in this area on maps dating back to 1613 and most of this is recorded on Natural England's ancient woodland inventory as ancient semi-natural woodland. There is a significant planted component to the woodlands and an abundance of introduced ornamental plants, however, and the true extent of ancient semi-natural woodland is not clear.

Key Species [3]	
Bird indicators	
Farmland	Goldfinch, Greenfinch, Jackdaw, Kestrel, Linnet, Rook, Starling, Stock Dove, Whitethroat, Woodpigeon
Woodland	Blackbird, Chiffchaff, Coal Tit, Common Chaffinch, Dunnock, Eurasian Blackcap, Eurasian Blue Tit, Eurasian Bullfinch, Eurasian Nuthatch, Eurasian Wren, European Green Woodpecker, Goldcrest, Great Spotted Woodpecker, Great Tit, Jay, Long-tailed Tit, Robin, Song Thrush, Sparrowhawk, Tawny Owl, Treecreeper, Willow Warbler.
Water & Wetland	Eurasian Coot, Grey Heron, Grey Wagtail, Kingfisher, Little Grebe, Mallard, Moorhen, Mute Swan.
Other	Buzzard, Carrion Crow, Collared Dove, Common House Martin, Eurasian Magpie, House Sparrow, Mistle Thrush, Northern Raven, Swift.
Amphibians & Reptiles	
Amphibians	Common Frog, Common Toad, Great Crested Newt, Smooth Newt.
Reptiles	none
Mammals	
Bats	Brown Long-eared Bat, Common Pipistrelle, Daubenton's Bat, Lesser Horseshoe Bat, Lesser Noctule, Natterer's Bat, Noctule Bat, Soprano Pipistrelle, Whiskered Bat.
Other	Eurasian Badger, European Otter, European Water Vole, West European Hedgehog.

Fish	
Bony Fish	none
Jawless Fish	none
Invertebrates	
Butterflies	
Moths	
Other Invertebrates	
Flora (axiophytes)	
Woodland	*Adoxa moschatellina, Ajuga reptans, Allium ursinum, Anemone nemorosa, Angelica sylvestris, Athyrium filix-femina, Blechnum spicant, Brachypodium sylvaticum, Bromopsis ramosa, Caltha palustris, Carex remota, Carex sylvatica, Chaerophyllum temulum, Chrysosplenium oppositifolium, Deschampsia flexuosa, Dioscorea communis, Epipactis helleborine, Festuca gigantea, Filipendula ulmaria, Fragaria vesca, Frangula alnus, Galium odoratum, Geum rivale, Lysimachia nemorum, Lysimachia vulgaris, Malus sylvestris, Melica uniflora, Mercurialis perennis, Milium effusum, Moehringia trinervia, Oxalis acetosella, Poa nemoralis, Quercus petraea, Solidago virgaurea, Stellaria holostea, Teucrium scorodonia, Tilia cordata, Torilis japonica, Valeriana officinalis, Veronica montana, Viola reichenbachiana.*
Grassland	*Agrostis canina, Ajuga reptans, Alchemilla filicaulis subsp. vestita, Blechnum spicant, Brachypodium sylvaticum, Bromopsis erecta, Caltha palustris, Dactylorhiza praetermissa, Daucus carota subsp. carota, Deschampsia flexuosa, Filipendula ulmaria, Fragaria vesca, Geum rivale, Lathyrus nissolia, Leontodon hispidus, Lotus pedunculatus, Odontites vernus, Persicaria bistorta, Potentilla sterilis, Rhinanthus minor, Sanguisorba officinalis, Silene flos-cuculi, Solidago virgaurea, Stachys officinalis, Stellaria holostea.*
Heathland	*Agrostis canina, Aira praecox, Blechnum spicant, Carex nigra, Deschampsia flexuosa, Teucrium scorodonia.*
Mires	*Agrostis canina, Alchemilla filicaulis subsp. vestita, Angelica sylvestris, Athyrium filix-femina, Caltha palustris, Carex acutiformis, Carex nigra, Carex riparia, Dactylorhiza praetermissa, Filipendula ulmaria, Galium palustre, Geum rivale, Glyceria declinata, Hypericum tetrapterum, Juncus acutiflorus, Lotus pedunculatus, Lysimachia vulgaris, Menyanthes trifoliata, Potentilla palustris, Pulicaria dysenterica, Ranunculus aquatilis, Ranunculus flammula, Silene flos-cuculi, Sparganium emersum, Stachys palustris, Valeriana officinalis, Veronica beccabunga, Veronica scutellata.*
Open Water	*Butomus umbellatus, Carex acutiformis, Carex riparia, Galium palustre, Menyanthes trifoliata, Potamogeton perfoliatus, Ranunculus aquatilis, Sagittaria sagittifolia, Schoenoplectus lacustris, Veronica catenata, Veronica scutellata.*
Post-industrial (water-stressed)	*Aira praecox, Anthyllis vulneraria, Arenaria serpyllifolia, Blechnum spicant, Clematis vitalba, Daucus carota subsp. carota, Deschampsia flexuosa, Erigeron acris, Fragaria vesca, Reseda lutea, Silene vulgaris, Trifolium arvense, Vicia tetrasperma.*
Cultivation	*Vicia tetrasperma.*

Ecological Connectivity
Local Habitat Network
There are no direct links to other ecological sub-areas. The main ecological links to the rest of the Black Country landscape are via identified Priority Network Restoration Zones. Most significant of these is from the junction of the Staffordshire and Worcestershire Canal with the Birmingham Main Line canal which links Smestow Valley & Tettenhall Ridge to the rest of the Black Country's canal network. Further indirect 'stepping-stone' Priority Network Restoration Zones have been mapped which, via areas of green space (including mature parks) and mature gardens, link the ecological sub-area to other parts of the canal network and to Core Landscape 09 Sedgley Park, Sedgley Escarpment & The Limestone Way.

Ecological Connectivity
National Habitat Network
Smestow Valley & Tettenhall Ridge links directly to the national habitat network in rural South Staffordshire via the Smestow Brook and canal corridors at the south of the ecological sub-area. There are indirect connections to the national habitat network in South Staffordshire via South Staffordshire Golf Course, a distance of approximately 1 km. Further ecological connections to rural South Staffordshire via the Staffordshire & Worcestershire Canal and the Shropshire Union Canal corridors in the north of the ecological sub-area.


CL01 - Smestow Valley & Tettenhall Ridge - Components & Connectivity
Core Landscape Boundary
Priority Network Restoration Zone
Core Habitat Zone
Core Expansion Zone 1
Core Expansion Zone 2
Urban Matrix Recovery Zone 1
Urban Matrix Recovery Zone 2
National Habitat Network
National Habitat Network Connections
Local Habitat Network Connections
Watercourse Corridor
Canal Corridor
Billbrook
Palmers Cross
Tettenhall
WOLVERHAMPTON
Scale 1:27,500
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Ecological Sub-area Opportunities

Focus Habitats		
Habitat	**Action**	**Measure**
Hedgerows	Improve management of existing	Habitat in good condition
	Restore through gapping up	Habitat in good condition
	Establish hedgerow trees	Habitat structure improved
Ponds	Restore existing	Habitat in good condition
	Create new	New habitat at existing and new sites
Rivers	Restore hydromorphology (naturalise modified channels)	Improved ecological status
	Reduce artificial inputs	Improved chemical status
Eutrophic Standing Waters	Enhance marginal and emergent vegetation	Increased floral diversity and habitat structure improved
Neutral Grassland	Enhance existing neutral grasslands	Increased floral diversity
	Create new species-rich neutral grasslands	Increased floral diversity and habitat structure improved
Lowland Mixed Deciduous Woodland	Coppice	Habitat structure improved
	Create woodland edge	Habitat structure improved
	Diversify woody component	Habitat structure improved
	Diversify field-layer component of plantations	Increased floral diversity
	Create new	New habitat at existing and new sites

Target Species	
Species/Species Group	**Measure**
Atlantic Salmon	Confirmed recent records
Bats	Increased abundance of confirmed species
Breeding farmland birds (specialists)	Increased species and abundance
Breeding water & wetland birds (specialists)	Increased species and abundance
Breeding woodland birds (specialists)	Increased species and abundance
Brown/Sea Trout	Confirmed recent records
European Otter	Increased signs, confirmed breeding population
European Water Vole	Increased population
Great Crested Newt	Increased abundance and number of breeding ponds
Hedgehog	Confirmed recent records

Geodiversity		
Site	**Action**	**Measure**
n/a		

Connectivity Opportunities	
Local Habitat Network	
Connection	**Action**
Within Core Landscape CL01	Restoration of modified channel of the Smestow Brook and tributaries.
	Species-rich neutral grassland enhancement and creation at sites including areas of public open space, golf courses, school grounds and sports fields.
	Plantation woodland enhancement.
	Creation of new ponds.
	Field boundary hedgerow restoration and creation.
	Planting of standard trees in parks, green spaces and school grounds.
National Habitat Network	
Connection	**Action**
Priority Network Restoration Zone (Birmingham Main Line Canal)	Increased marginal vegetation through the installation of coir roles along hard banks.
	Species-rich neutral grassland enhancement and creation on undeveloped land including parks, green spaces, school grounds and substantial road verges.
	Woodland enhancement and small-scale planting.
	Planting of standard trees (including fruit trees) along canal corridor.

Information and Data Sources		
	Source	**Date**
Landuse	Ecological Evaluation of Birmingham and Black Country GIS data set, EcoRecord.	2021
Topography	OS Terrain 50 GIS data set, Ordnance Survey.	2017
Geology	British Geological Society 1:625,000 bedrock & superficial GIS web map services from BGS website: http://mapapps.bgs.ac.uk/geologyofbritain/home.html	2021
	Black Country UNESCO Global Geopark sites names and location information https://blackcountrygeopark.dudley.gov.uk/bcg/	2021
Soils	Soilscapes, Cranfield Soil & Agricultural Institute website: http://www.landis.org.uk/soilscapes/	2021
Species and Habitats	EcoRecord species and habitat databases.	2021
Ecological Connectivity	EcoRecord, The Wildlife Trust for Birmingham and the Black Country (2021) *Draft Black Country Local Nature Recovery Opportunity Map*	2021
	EcoRecord et al. (2021) *Midlands Heathland Heartland Lowland Heathland Nature Recovery Opportunity Mapping*.	2021
Historic Landscape Character Areas	Wolverhampton City Council (2010) *Black Country Historic Landscape Characterisation* [data-set]. York: Archaeology Data Service [distributor] https://doi.org/10.5284/1000030	2010
Historic Environment Area Designations	Black Country Historic Landscape Characterisation Study, Oxford Archaeology.	2019

[1] HISTORIC ENVIRONMENT AREA DESIGNATIONS

The Black Country Historic Landscape Characterisation Study has divided the Historic Environment Area Designations into four categories:

Archaeological Priority Areas (APA): sites with a high potential for archaeological remains of regional or national significance that have not been considered for designation as scheduled monuments, or where there is insufficient data available about the state or preservation of any remains to justify a designation. APAs are likely to have high archaeological and historic interest.

Areas of High Historic Townscape Value (AHHTV): areas where built heritage makes a significant contribution to local character and distinctiveness. The significance of AHHTVs is likely to be derived primarily from their architectural and historic interests. However, these areas may also have artistic and archaeological interests. Areas of High Historic Townscape Value are not limited to towns or cities, they also include villages, hamlets and areas of industry where the built heritage is considered to make a positive contribution to the historic environment of an area.

Designed Landscapes of High Historic Value (DLHHV): landscape areas that make an important contribution to local historic character but do not meet the criteria for inclusion on the national Register for Parks and Gardens. The significance of these areas is likely to arise from their historic, artistic and architectural interests, although such areas may also contain remains of archaeological interest.

Areas of High Historic Landscape Value (AHHLV): these recognise the quality of the wider landscape and their relative values. The significance of these areas arises from the natural and historic features contained within them (e.g. woodland, watercourses, hedgerows, and archaeological features). The significance of these areas is likely to be derived from their archaeological and historic interests.

[2] KEY HABITATS follows the UK Biodiversity Action Plan (BAP) Broad & Priority Habitat definitions

This is a UK-habitat classification prepared by the UK Biodiversity Group that classifies all terrestrial and freshwater habitats in the UK into 37 broad habitat types. UK BAP Priority Habitats are a range of semi-natural habitat types that were identified as being the most threatened and requiring conservation action. The original Priority Habitat list was created between 1995 and 1999 and revised in 2007. The list of Priority Habitats has been used to help draw up statutory lists of habitats of principal importance for the conservation of biodiversity in England, Scotland, Wales and Northern Ireland. The suite of habitats of principal importance for the conservation of biodiversity (formerly Priority Habitats) nest into the defined Broad Habitat Types.

[3] KEY SPECIES

Bird Indicators: Species listed under UK Biodiversity Indicator C5, Birds of the wider countryside and at sea (JNCC). The indicator shows changes in the breeding population sizes of common native birds of farmland and woodland and of freshwater and marine habitats in the UK.

Amphibians & Reptiles: All amphibian and reptile species native to the UK are included.

Mammals: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Fish: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Invertebrates: Pantheon Assemblage Types Analysis.

Flora (axiophytes): Those included on the Birmingham & the Black Country list of axiophytes (administered by EcoRecord) by four locally defined habitat types.

Ecological Sub-area Statement of Biodiversity Priorities – Technical Appendix			
Sub-area ref.	CL05	**Sub-area name**	Barr Beacon, Druid's Heath and Shire Oak
NCA ref.	67	**Natural Character Area**	Cannock Chase & Cank Wood
Area km^2	10.79	**Local Authority Area**	Walsall

Ecological Sub-area Description

Overview

Barr Beacon, Druid's Heath and Shire Oak comprises the rural eastern part of both the borough of Walsall and of the Black Country, with Staffordshire to the north and east, the Black Country Settlements of Brownhills, Walsall Wood and Aldridge to the north-west, rural parts of Great Barr to the south-west and the modern settlements of Pheasey and Streetly to the south and south-east. Sutton Park (Birmingham) lies approximately 1 km to the south-east beyond Streetly.

Historically parts of the parishes of Shenstone and Aldridge (including the township of Great Barr), the landscape is dominated by rectilinear fields and some plantation woodlands that were enclosed from commons and open fields through Parliamentary Acts in the late 18th and early 19th centuries. Close to historic settlements there are earlier piecemeal and irregular enclosed fields.

Land Use

Predominantly arable agricultural with areas of pasture and dispersed farms. There are smaller areas of woodland and semi-natural mosaic habitat. There are a number of disused sand quarries including those at what are now Shire Oak Park Local Nature Reserve and Pinfold Lane Quarry Local Nature Reserve. Barr Beacon Local Nature Reserve is in the south of the sub-area comprising acid grassland, scrub, plantation woodland and recently created dry heathland. Druid's Heath Golf Course and Streetly Crematorium are also within the sub-area.

Topography

In the south of the sub-area Barr Beacon is the highest point in Walsall at 236 metres. From here the land falls away and levels out to the north and east to 130 metres, before rising again to 180 m at Shire Oak Park.

Geology

Dominated by Triassic Rocks (undifferentiated) Sandstone and Conglomerate, Interbedded sedimentary bedrock formed approximately 200 to 251 million years ago in the Triassic Period. In the north-west of the sub-area are Warwickshire Group Siltstone and Sandstone with Subordinate Mudstone. These sedimentary bedrocks formed approximately 271 to 312 million years ago in the Permian and Carboniferous Periods.

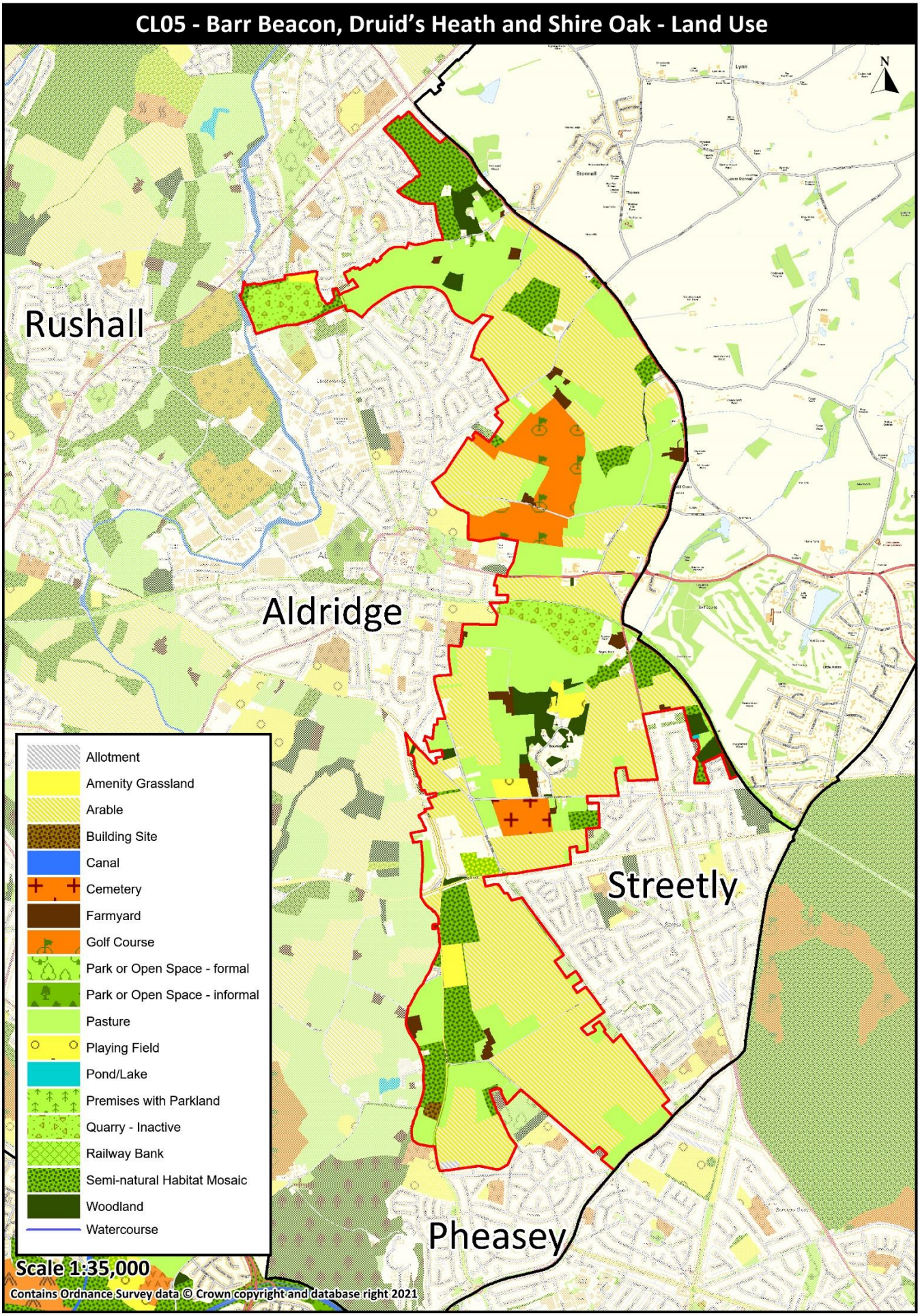
Geopark Sites

- Shire Oak Quarry Local Nature Reserve (GR SK060037)
- Barr Beacon Local Nature Reserve and Pinfold Lane Quarry (GR SP06099723)

Soils

The ecological sub-area is dominated by freely draining slightly acid sandy soils, whilst in the south-west is an area of freely draining very acid sandy and loamy soils. There are also small areas of freely draining slightly acid loamy soils, slightly acid loamy and clayey soils with impeded drainage, and in the east around the Footherley Brook loamy and sandy soils with naturally high groundwater and a peaty surface.

CL05 - Barr Beacon, Druid's Heath and Shire Oak - Land Use



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Historic Landscape Character Areas			
Reference	WL09	**Name**	Barr Beacon & Aldridge Fields
The ecological sub-area is dominated by the eastern part of WL09 Barr Beacon & Aldridge Fields. This Character Area is situated in the east of the borough and is the most rural landscape in Walsall, with field systems covering 66% of its area. It has a mixed geology situated on mudstone and limestone in the west, sandstone, mudstone and conglomerate in the in the centre and sandstone in the east. Rushall Hall in the west lies on coal measures. The modern character of the area is defined largely by agricultural land and dispersed farms. The area also includes modern recreational land (golf courses), woodland, two areas of settlement, and an area of surviving ancient heathland (Barr Beacon). Historically the Character Area was in use as medieval open fields associated with Walsall, Aldridge, Rushall, Stonnal and Great Barr. In the centre of the Character Area there were several medieval moated sites and many of the trackways and roads in this area are likely to be medieval in origin. The earliest settlements in the area are Great Barr, which was mentioned in a charter of AD 957, and Rushall, which was recorded in the Domesday Survey of 1086. The surviving field systems in the Character Area were enclosed by either piecemeal enclosure in the late medieval/ early post-medieval periods from open field or were enclosed out of Aldridge Heath by Parliamentary Act.			

Historic Environment Area Designations [1]			
Reference	AHHLV 19	**Name**	Shire Oak Quarry
A large former sand and gravel extraction site which started as a marl pit in the early 19th century.			
Reference	AHHLV 15	**Name**	Kings Hayes Historic Field System
A well-preserved historic field system, which contains evidence of medieval strip fields and a mixture of cropmark and earthwork ridge and furrow.			
Reference	APA 5	**Name**	Castlefort
A scheduled Iron Age hillfort called Castlefort (NHLE ref: 1017244). The scheduled hillfort covers a 1.5ha area and is set in a naturally defensible position.			
Reference	APA 19	**Name**	Earthwork Mound at Aldridge
A small Tumulus, possibly the remains of a Bronze Age Barrow or a Windmill mound.			
Reference	AHHLV 3	**Name**	Bourne Vale
Was part of the open fields associated with Aldridge during the medieval period. It has a high potential to contain prehistoric remains and contains an area of ancient woodland, eroded ridge and furrow.			
Reference	APA 3	**Name**	Bourne Pool Area
Contains a range of archaeological remains including the site of a medieval iron mill and pool, a 15th-century charcoal burning site, a possible burnt mound and a Mesolithic - Neolithic flint scatter.			
Reference	AHHLV 11	**Name**	Great Barr Beacon
Contains an isolated north-south ridge of Bunter Pebble Beds and is the possible site of an Anglo-Saxon beacon. A number of prehistoric and Roman finds have been recorded within the area and the AHHLV contains the proposed location of an Iron Age Hillfort although no evidence of the hillfort has been discovered here.			
Reference	AHHTV 1	**Name**	Scattered Settlement at Over End
Comprises the remains of a dispersed linear settlement formed from a cluster of buildings probably built in the 18th century.			

Waterbody Catchments			
River Basin District	Humber	**Management Catchment**	Tame, Anker and Mease
Waterbody Catchment	**Overall Classification**	**Ecological**	**Chemical**
Crane Brook - source to Footherley Brook	Poor (2019)	Poor (2019)	Fail (2019)
Footherley Brook from Source to Black-Bourne Brook	Poor (2019)	Poor (2019)	Fail (2019)
Plants Brook Catchment (trib of Tame)	Moderate (2019)	Moderate (2019)	Fail (2019)
Ford Brook from Source to River Tame	Moderate (2019)	Moderate (2019)	Fail (2019)
Tame - conf two arms to R Rea	Moderate (2019)	Moderate (2019)	Fail (2019)

Key Habitats [2]			
Broad Habitat Type	Arable & Horticultural	**Priority Habitat**	
Arable agriculture dominates much of the sub-area. These fields are mostly of 18th and 19th century Parliamentary enclosure origin. No Priority Habitat Arable Field Margins have been recorded.			
Broad Habitat Type	Boundary & Linear Features	**Priority Habitat**	Hedgerows
Numerous field boundary hedgerows throughout the sub-area associated with mostly rectilinear fields created through Parliamentary enclosure, though some may be from earlier piecemeal enclosure in the late medieval/ early post-medieval periods. Only a small proportion of the hedgerows have been assessed against the Local Wildlife Sites selection criteria and of these a number in the central and northern parts of the sub-area have been selected as SLINCs. These are described as having a diverse woody component with mature standards and an acidic field-layer. The designated hedgerows form the boundaries to roads and tracks and are likely to be of more ancient origin than the more numerous rectilinear field boundary hedgerows of 18th and 19th century enclosures.			
Broad Habitat Type	Standing Open Waters	**Priority Habitat**	Ponds
A number of ponds have been recorded within designated SINCs.			
Broad Habitat Type	Rivers and Streams	**Priority Habitat**	Rivers
Two headwater streams have been recorded in the sub-area. These are a tributary of the Anchor Brook which rises in the north-west of the sub-area and flows west, and the Footherley Brook which rises in the centre of the sub-area in Corporation Wood and flows east.			
Broad Habitat Type	Acid Grassland	**Priority Habitat**	Lowland Dry Acid Grassland
Species-poor lowland dry acid grassland is present at Barr Beacon Local Nature Reserve. A small number of pastures within the sub-area are described as unimproved and supporting acid to neutral grassland with a diverse flora. Pastures are frequent throughout the sub-area and further areas of acidic grassland may be present. Some roadside grasslands may also support the Priority Habitat.			
Broad Habitat Type	Neutral Grassland	**Priority Habitat**	
Areas of grazed pastures, roadside grasslands and grasslands of more recent origin - such as at inactive quarries - may be neutral.			
Broad Habitat Type	Dwarf Shrub Heath	**Priority Habitat**	Lowland Heathland
There are small areas of lowland heathland at Barr Beacon Local Nature Reserve which have been created via the strewing of cuttings from nearby semi-natural lowland heathland sites. There are records of Heather and other heathland species at Branton Hill Quarry and Shire Oak Local Nature Reserve.			

Key Habitats [2]			
Broad Habitat Type	Improved Grassland	**Priority Habitat**	Coastal and Floodplain Grazing Marsh
There are potentially areas of coastal and floodplain grazing marsh along the Footherley Brook.			
Broad Habitat Type	Broadleaved, Mixed and Yew Woodland	**Priority Habitat**	
The woodlands in the sub-area are mostly of planted or recent secondary origin and are described as having a botanically poor acidic field-layer. A number of these sites are designated as SLINC.			
Broad Habitat Type	Broadleaved, Mixed and Yew Woodland	**Priority Habitat**	Traditional Orchards
A number of small orchards associated with houses have been recorded on the Traditional Orchards HAP Inventory 2020.			

Key Species [3]	
Bird indicators	
Farmland	Common Reed Bunting, Eurasian Skylark, Goldfinch, Greenfinch, Jackdaw, Kestrel, Lapwing, Linnet, Rook, Starling, Stock Dove, Whitethroat, Woodpigeon, Yellowhammer.
Woodland	Blackbird, Chiffchaff, Coal Tit, Common Chaffinch, Dunnock, Eurasian Blackcap, Eurasian Blue Tit, Eurasian Bullfinch, Eurasian Nuthatch, Eurasian Wren, European Green Woodpecker, Garden Warbler, Goldcrest, Great Spotted Woodpecker, Great Tit, Jay, Lesser Redpoll, Long-tailed Tit, Robin, Siskin, Song Thrush, Sparrowhawk, Treecreeper, Willow Warbler.
Water & Wetland	Common Reed Bunting, Eurasian Coot, Grey Heron, Grey Wagtail, Kingfisher, Lapwing, Little Grebe, Mallard, Moorhen.
Other	Black-headed Gull, Buzzard, Carrion Crow, Collared Dove, Common House Martin, Cuckoo, Eurasian Magpie, Greylag Goose, House Sparrow, Meadow Pipit, Mistle Thrush, Northern Raven, Pied Wagtail, Swallow, Swift, Whinchat.
Amphibians & Reptiles	
Amphibians	*Common Frog, Common Toad, Great Crested Newt, Smooth Newt.*
Reptiles	none
Mammals	
Bats	*Brown Long-eared Bat, Common Pipistrelle, Daubenton's Bat, Lesser Noctule, Natterer's Bat, Noctule Bat, Soprano Pipistrelle, Whiskered/Brandt's Bat.*
Other	*Eurasian Badger, West European Hedgehog.*
Fish	
Bony Fish	none
Jawless Fish	none
Invertebrates	
Assemblage type	
Flora (axiophytes)	
Woodland	*Ajuga reptans, Allium ursinum, Anemone nemorosa, Angelica sylvestris, Athyrium filix-femina, Brachypodium sylvaticum, Bromopsis ramosa, Caltha palustris, Carex paniculata, Carex remota, Carex sylvatica, Chaerophyllum temulum, Deschampsia flexuosa, Dioscorea communis, Equisetum sylvaticum, Equisetum telmateia, Frangula*

	alnus, Lysimachia nemorum, Malus sylvestris, Mercurialis perennis, Moehringia trinervia, Oxalis acetosella, Persicaria hydropiper, Quercus petraea, Stellaria holostea, Teucrium scorodonia.
Grassland	*Achillea ptarmica, Agrimonia eupatoria, Aira caryophyllea, Ajuga reptans, Brachypodium sylvaticum, Caltha palustris, Campanula rotundifolia, Centaurium erythraea, Cerastium semidecandrum, Cirsium dissectum, Cirsium palustre, Dactylorhiza praetermissa, Danthonia decumbens, Daucus carota subsp. carota, Deschampsia flexuosa, Equisetum sylvaticum, Galium saxatile, Isolepis setacea, Leontodon hispidus, Lotus pedunculatus, Nardus stricta, Odontites vernus, Phleum bertolonii, Potentilla erecta, Potentilla sterilis, Rhinanthus minor, Sherardia arvensis, Silene flos-cuculi, Stellaria holostea, Succisa pratensis, Trifolium medium, Trifolium arvense, Trifolium medium, Vicia tetrasperma.*
Heathland	*Aira praecox, Calluna vulgaris, Campanula rotundifolia, Carex nigra, Carex pilulifera, Danthonia decumbens, Deschampsia flexuosa, Erica cinerea, Galium saxatile, Luzula multiflora, Nardus stricta, Potentilla erecta, Salix aurita, Teucrium scorodonia, Ulex gallii.*
Mires	*Achillea ptarmica, Angelica sylvestris, Athyrium filix-femina, Caltha palustris, Carex nigra, Carex panicea, Carex paniculata, Carex viridula subsp. oedocarpa, Cirsium dissectum, Cirsium palustre, Dactylorhiza praetermissa, Dryopteris carthusiana, Eleocharis palustris, Galium palustre, Glyceria declinata, Isolepis setacea, Juncus acutiflorus, Juncus bulbosus, Lotus pedunculatus, Luzula multiflora, Mentha arvensis, Persicaria hydropiper, Pulicaria dysenterica, Ranunculus hederaceus, Silene flos-cuculi, Stellaria alsine, Succisa pratensis, Triglochin palustre, Veronica beccabunga.*
Open Water	*Butomus umbellatus, Carex paniculata, Eleocharis palustris, Galium palustre.*
Post-industrial (water-stressed)	*Agrimonia eupatoria, Aira caryophyllea, Aira praecox, Centaurea scabiosa, Centaurium erythraea, Cerastium semidecandrum, Daucus carota subsp. carota, Deschampsia flexuosa, Filago vulgaris, Jacobaea erucifolia, Reseda lutea, Senecio viscosus, Sherardia arvensis, Trifolium arvense, Trifolium medium, Vicia tetrasperma.*
Cultivation	*Apera spica-venti, Fumaria muralis subsp. boraei, Thlaspi arvense, Vicia tetrasperma.*

Ecological Connectivity

Local Habitat Network

Direct ecological connection to the local habitat network in Core Landscape 04 (Brownhills Common & Pelsall) and Core Landscape 06 (Park Lime Pits, Cuckoo's Nook & Great Barr Hall).

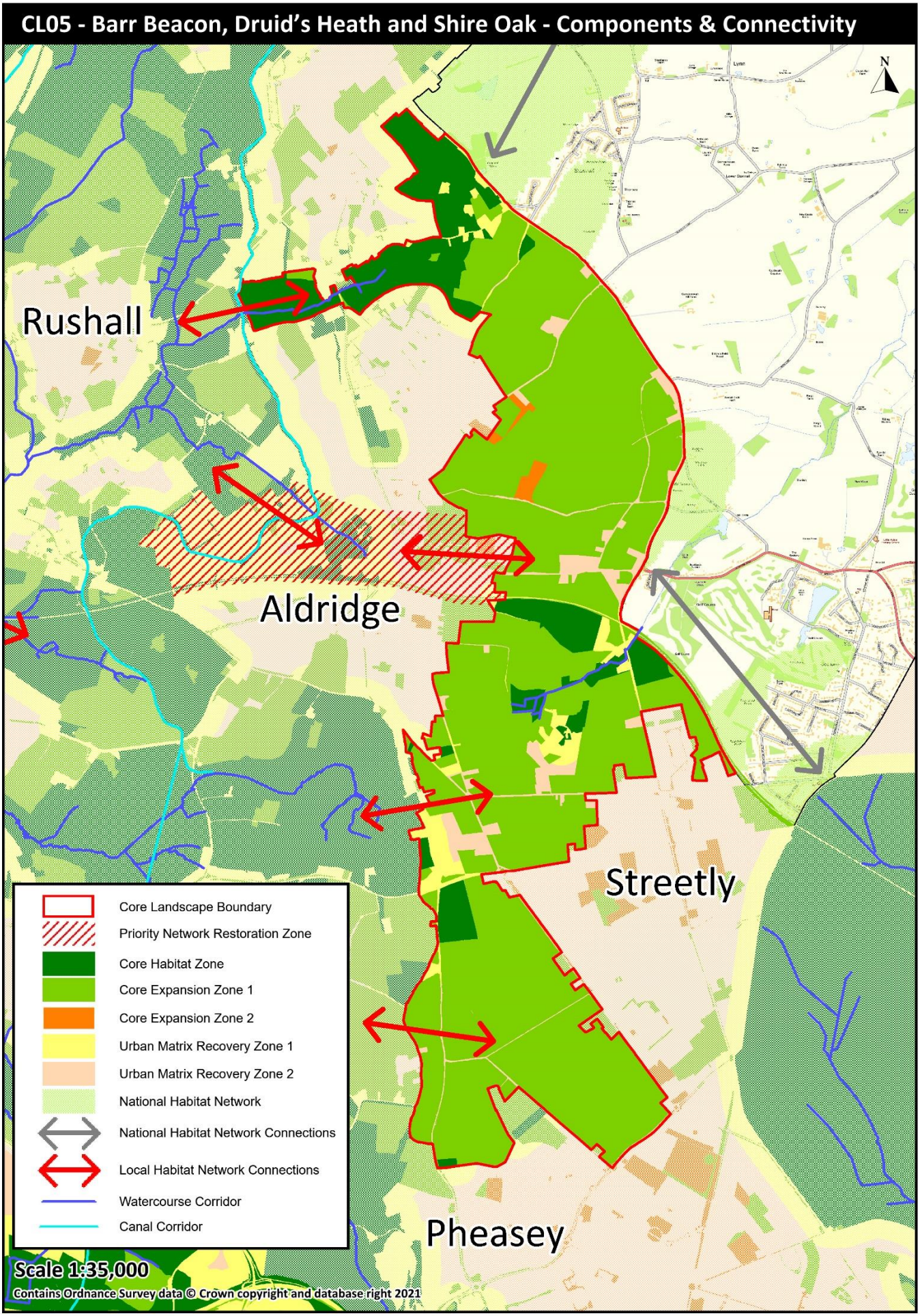
Midlands Heathland Heartland Lowland Heathland Nature Recovery Opportunity Mapping (EcoRecord and Staffordshire Ecological Record, 2021) identifies a heathland connectivity bottleneck between the two main heathland sites within the ecological sub-area (Shire Oak Park and Barr Beacon) which are located at the north and south of the sub-area respectively.

National Habitat Network

Direct ecological connection to the National Habitat Network in rural South Staffordshire.

Indirect connection to Sutton Park NNR (Birmingham) via Little Aston Golf Course and approximately 0.5 km urban development (Garden - large, mature). Midlands Heathland Heartland Lowland Heathland Nature Recovery Opportunity Mapping identifies a heathland connectivity bottleneck between Shire Oak Park and Sutton Park NNR (Birmingham).

Indirect connection to Cannock Chase SAC (Staffordshire) via rural heathland sites in Walsall and Staffordshire (inc. Chasewater and The Southern Staffordshire Coalfield Heaths SSSI) identified in Midlands Heathland Heartland Lowland Heathland Nature Recovery Opportunity Mapping.


CL05 - Barr Beacon, Druid's Heath and Shire Oak - Components & Connectivity
N
Rushall
Aldridge
Streetly
Pheasey
Core Landscape Boundary
Priority Network Restoration Zone
Core Habitat Zone
Core Expansion Zone 1
Core Expansion Zone 2
Urban Matrix Recovery Zone 1
Urban Matrix Recovery Zone 2
National Habitat Network
National Habitat Network Connections
Local Habitat Network Connections
Watercourse Corridor
Canal Corridor
Scale 1:35,000
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Ecological Sub-area Opportunities

Focus Habitats		
Habitat	**Action**	**Measure**
Arable Field Margins	Create new	New habitat
Hedgerows	Improve management of existing	Habitat in good condition
	Restore through gapping up	Habitat in good condition
	Establish hedgerow trees	Habitat structure improved
Lowland Heathland	Improve habitat at existing sites	Habitat in good condition
	Create new	New habitat at existing and new sites
Lowland dry acid grassland	Improve habitat at existing sites	Habitat in good condition
	Create new	New habitat at existing and new sites
Lowland mixed deciduous woodland	Coppice	Habitat structure improved
	Create woodland edge	Habitat structure improved
	Diversify woody component	Habitat structure improved
	Create new	New habitat at existing and new sites
Ponds	Restore existing	Habitat in good condition
	Create new	New habitat at existing and new sites
Rivers	Improve soil management	Reduced silt inputs to watercourses
	Reduce artificial inputs	Improved chemical status
	Restore hydromorphology (naturalise modified channels)	Improved ecological status

Target Species	
Species/Species Group	**Measure**
Adder	Confirmed recent records
Breeding farmland birds (specialists)	Increased species and abundance
Breeding woodland birds (specialists)	Increased species and abundance
Brown Long-eared Bat	Confirmed recent records
Common Lizard	Confirmed recent records
Cuckoo	Confirmed recent records
Great Crested Newt	Increased abundance and number of sites
Heather	Increased abundance and number of sites
Hedgehog	Confirmed recent records
Woodland axiophytes	Recent records and increased abundance
Grassland axiophytes	Recent records and increased abundance
Mires axiophytes	Recent records and increased abundance
Open Water axiophytes	Recent records and increased abundance
Post-industrial axiophytes	Recent records and increased abundance

Geodiversity		
Site	**Action**	**Measure**
Pinfold Lane Quarry	Vegetation removal/alternative Focus Habitat restoration or creation	Improved access to exposures/ alternative Focus Habitat restored or created
Shire Oak Quarry	Vegetation removal/alternative Focus Habitat restoration or creation	Improved access to exposures/ alternative Focus Habitat restored or created

Connectivity Opportunities	
Local Habitat Network	
Connection	**Action**
Within Core Landscape CL05	Heathland associated habitat enhancement and creation at arable and other undeveloped land including golf courses, school grounds and substantial road verges.
	Woodland enhancement and planting on non-grassland or heathland sites.
	Field boundary hedgerow restoration and creation.
Priority Network Restoration Zone linking CL04 and CL05	Species-rich neutral grassland enhancement and creation on undeveloped land including parks, green spaces, school grounds and substantial road verges.
	Woodland enhancement and small-scale planting.
	Planting of street trees along urban roads.
	Planting of standard trees in parks, green spaces and school grounds.
	Creation of new ponds.
	Enhancement of Daw End Branch Canal corridor including increasing extent of adjoining terrestrial habitats.
National Habitat Network	
Staffordshire Heathlands inc. Chasewater and The Southern Staffordshire Coalfield Heaths SSSI	Heathland associated habitat enhancement and creation at arable and other undeveloped land including golf courses, school grounds and substantial road verges.
	Field boundary hedgerow restoration and creation.
	Planting of street trees along urban roads.
	Creation of new ponds and wetlands.
Sutton Park	Heathland associated habitat enhancement and creation at arable and other undeveloped land including golf courses, school grounds and substantial road verges.
	Field boundary hedgerow restoration and creation.
	Planting of street trees along urban roads.
	Creation of new ponds and wetlands.

Information and Data Sources		
	Source	**Date**
Landuse	Ecological Evaluation of Birmingham and Black Country GIS data set, EcoRecord.	2021
Topography	OS Terrain 50 GIS data set, Ordnance Survey.	2021
Geology	British Geological Society 1:625,000 bedrock & superficial GIS web map services from BGS website: http://mapapps.bgs.ac.uk/geologyofbritain/home.html	2021
	Black Country UNESCO Global Geopark sites names and location information https://blackcountrygeopark.dudley.gov.uk/bcg/	2021
Soils	Soilscapes, Cranfield Soil & Agricultural Institute website: http://www.landis.org.uk/soilscapes/	2021
Species and Habitats	EcoRecord species and habitat databases.	2021
Ecological Connectivity	EcoRecord, The Wildlife Trust for Birmingham and the Black Country (2021) *Draft Black Country Local Nature Recovery Opportunity Map*	2021
	EcoRecord et al. (2021) *Midlands Heathland Heartland Lowland Heathland Nature Recovery Opportunity Mapping*.	2021
Historic Landscape Character Areas	Wolverhampton City Council (2010) *Black Country Historic Landscape Characterisation* [data-set]. York: Archaeology Data Service [distributor] https://doi.org/10.5284/1000030	2010
Historic Environment Area Designations	Black Country Historic Landscape Characterisation Study, Oxford Archaeology.	2019

[1] HISTORIC ENVIRONMENT AREA DESIGNATIONS

The Black Country Historic Landscape Characterisation Study has divided the Historic Environment Area Designations into four categories:

Archaeological Priority Areas (APA): sites with a high potential for archaeological remains of regional or national significance that have not been considered for designation as scheduled monuments, or where there is insufficient data available about the state or preservation of any remains to justify a designation. APAs are likely to have high archaeological and historic interest.

Areas of High Historic Townscape Value (AHHTV): areas where built heritage makes a significant contribution to local character and distinctiveness. The significance of AHHTVs is likely to be derived primarily from their architectural and historic interests. However, these areas may also have artistic and archaeological interests. Areas of High Historic Townscape Value are not limited to towns or cities, they also include villages, hamlets and areas of industry where the built heritage is considered to make a positive contribution to the historic environment of an area.

Designed Landscapes of High Historic Value (DLHHV): landscape areas that make an important contribution to local historic character but do not meet the criteria for inclusion on the national Register for Parks and Gardens. The significance of these areas is likely to arise from their historic, artistic and architectural interests, although such areas may also contain remains of archaeological interest.

Areas of High Historic Landscape Value (AHHLV): these recognise the quality of the wider landscape and their relative values. The significance of these areas arises from the natural and historic features contained within them (e.g. woodland, watercourses, hedgerows, and archaeological features). The significance of these areas is likely to be derived from their archaeological and historic interests.

[2] KEY HABITATS follows the UK Biodiversity Action Plan (BAP) Broad & Priority Habitat definitions

This is a UK-habitat classification prepared by the UK Biodiversity Group that classifies all terrestrial and freshwater habitats in the UK into 37 broad habitat types. UK BAP Priority Habitats are a range of semi-natural habitat types that were identified as being the most threatened and requiring conservation action. The original Priority Habitat list was created between 1995 and 1999 and revised in 2007. The list of Priority Habitats has been used to help draw up statutory lists of habitats of principal importance for the conservation of biodiversity in England, Scotland, Wales and Northern Ireland. The suite of habitats of principal importance for the conservation of biodiversity (formerly Priority Habitats) nest into the defined Broad Habitat Types.

[3] KEY SPECIES

Bird Indicators: Species listed under UK Biodiversity Indicator C5, Birds of the wider countryside and at sea (JNCC). The indicator shows changes in the breeding population sizes of common native birds of farmland and woodland and of freshwater and marine habitats in the UK.

Amphibians & Reptiles: All amphibian and reptile species native to the UK are included.

Mammals: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Fish: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Invertebrates: Pantheon Assemblage Types Analysis.

Flora (axiophytes): Those included on the Birmingham & the Black Country list of axiophytes (administered by EcoRecord) by four locally defined habitat types.

Ecological Sub-area Statement of Biodiversity Priorities – Technical Appendix			
Sub-area name	Sandwell Valley	**Sub-area ref.**	CL07
Natural Character Area	Cannock Chase and Cank Wood	**NCA ref.**	67
Local Authority Area	Sandwell and Walsall	**Area km^2**	9.01

Ecological Sub-area Description

Overview

Sandwell Valley comprises a large area of open space at the approximate centre of the Birmingham and Black Country conurbation, and forms part of the Black Country's eastern boundary with Birmingham. The ecological sub-area is bisected by the M5 and M6 motorways, and almost entirely surrounded by urban development. A section of the River Tame flows west-east through the area and there are numerous small tributaries of this. The Tame Valley Canal traverses the northern part of the area (through the M5/M6 motorway junction), as does an active railway line.

The landscape of the ecological sub-area remains dominated by the pre-urban field pattern, though only parts of this remain actively farmed. In the south of the area are the remains of Sandwell Hall country house and earlier Benedictine priory, as well as features such as pools associated with the 18th century designed landscape. Ancillary buildings, stables and parts of a walled garden remain standing and have been restored for use as Sandwell Park Farm visitor centre. To the north of Swan Pool are the remains of Sandwell Park Colliery which was operational in the early 20th century.

A large floodwater storage lake (Forge Mill Lake) was constructed alongside the River Tame in the east of the ecological sub-area in the early 1980s. Part of the lake and the surrounding area are managed as RSPB Sandwell Valley nature reserve.

Land Use

Much of the southern part of Sandwell Valley is accessible open space including at Forge Mill Lake, Priory Woods and Sot's Hole Local Nature Reserves, as well as the more formal Dartmouth Park and King George Playing Fields in the south-west. There are also two golf courses (Sandwell Park and Dartmouth Golf Course) and West Bromwich Crematorium. The remainder of the southern section is farmed, with ley pasture, arable and permanent pasture all present.

Further north is the large triangular junction of the M5 and M6 motorways within which is a sewage treatment works, whilst to the north of the M6 is an electivity sub-station. The remainder of the northern section is comprised of further informal accessible open space, school grounds, Walsall Golf Course and a number of sports pitches, as well as Peak House Farm field system of irregular pre-enclosure fields which are actively farmed (see Historic Environment Area Designations).

Topography

The highest elevations within Sandwell Valley are at the southern and close to the northern end at an elevation of 170 meters. From these points the land slopes gently down to the valley of the River Tame which is at an elevation of 100 metres.

Geology

The southern part of the ecological sub-area is dominated by sedimentary Alveley Member mudstone bedrock formed between 309.5 and 308 million years ago during the Carboniferous period. The northern part is dominated by Coalbrookdale Formation mudstone formed between 433.4 and 427.4 million years ago during the Silurian period, with a small area of Pennine Lower Coal Measures Formation Mudstone, siltstone and sandstone formed between 319 and 318 million years ago during the Carboniferous period. In the central area there is a formation of Pennine Middle Coal Measures Formation mudstone, siltstone and sandstone formed between 318 and 309.5 million years ago during the Carboniferous period.

Parts of the southern area are overlain with superficial deposits of Devensian diamicton till formed between 116 and 11.8 thousand years ago during the Quaternary period, and Mid Pleistocene Diamicton till formed between

860 and 116 thousand years ago during the Quaternary period. Following the course of the River Tame there are river terrace deposits of sand and gravel formed between 2.588 million years ago and the present during the Quaternary period, and more recent alluvial clay, silt, sand and gravel formed between 11.8 thousand years ago and the present.

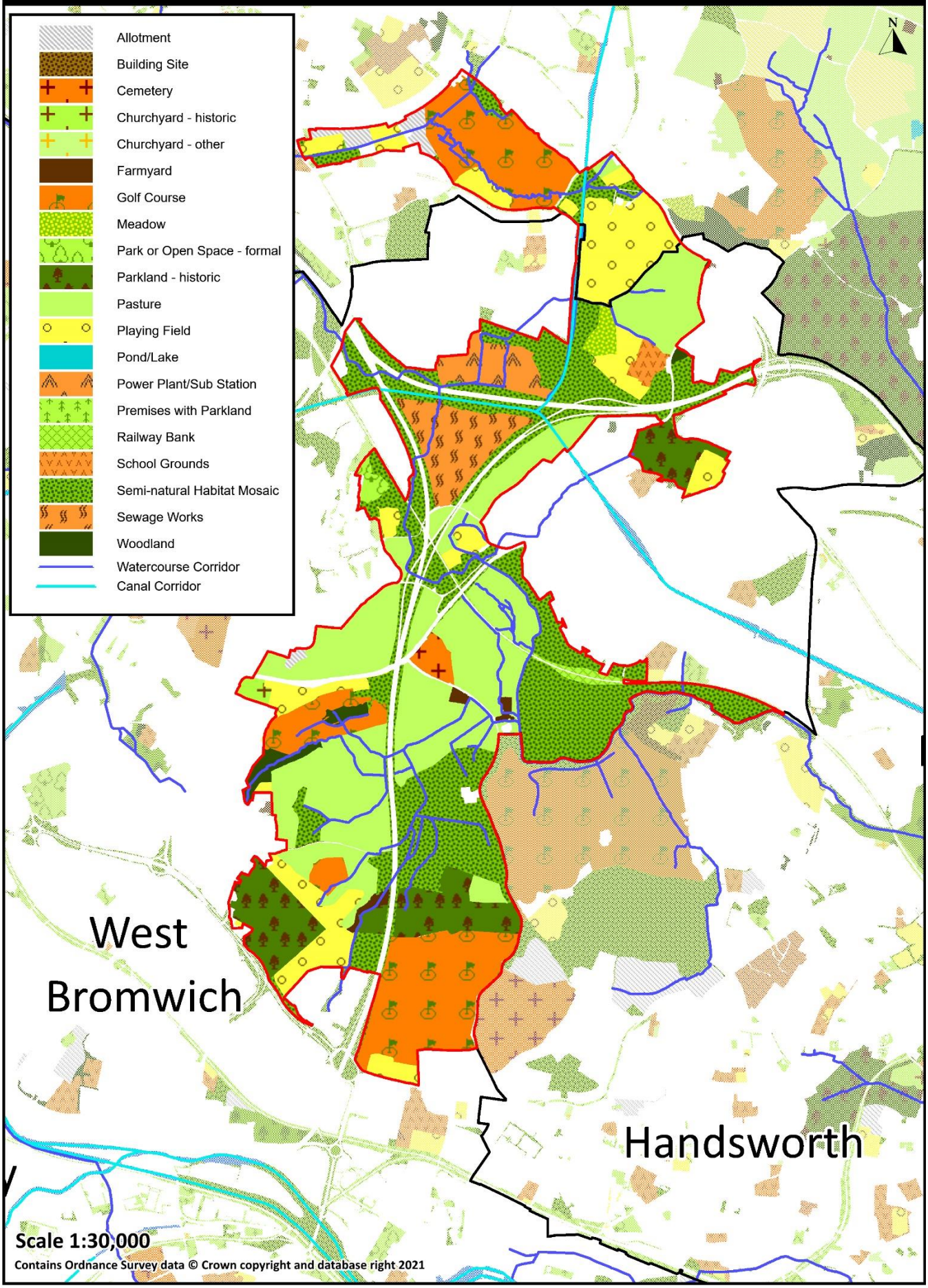
Geopark Sites

- Sandwell Valley Country Park (GR SP01939149)

Soils

The ecological sub-area is dominated by slowly permeable seasonally wet, slightly acid but base-rich loamy and clayey soils with moderate fertility and impeded drainage. In the north the soils are slowly permeable, seasonally wet acid loamy and clayey soils with low fertility and impeded drainage, and in the central area around Forge Mill Lake the soils are naturally wet, very acid sandy and loamy soils with very low fertility.

CL07 - Sandwell Valley - Land Use



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Historic Landscape Character Areas			
Reference	SD07	**Name**	Sandwell Valley
The central and southern part of the ecological sub-area is coterminous with character areas SD07 Sandwell Valley, which is dominated by Sandwell Valley Country Park and agricultural land. The Character Area was originally part of the estate owned by the Earls of Dartmouth from the early 18th century. Sandwell Hall (demolished in 1928) was built by the first Earl on the site of the 12th century Benedictine priory close to the Sand Well spring. The Character Area contains the Registered Park and Garden Dartmouth Park which became public park in 1877.			
Reference	SD02	**Name**	Newton, Hamstead & Great Barr
Lying to the north of Sandwell Valley and comprising the north-eastern part of the ecological sub-area id SD02 Newton, Hamstead & Great Barr. The modern character of the area is dominated by 20th century residential housing, with areas of surviving fields in the north-west of the character area that continue beyond the Borough boundary into Walsall (WL09). Until the 20th century this area was largely agricultural, crossed by the Tame Valley Canal which opened in 1844.			
Reference	SD05	**Name**	Yew Tree
A small part of the ecological sub-area to the north of the M5/M6 junction lies within SD05 Yew Tree. The historic character of the area was defined almost entirely of agricultural land much of it worked from Delves Farm and Yew Tree Farm. Residential development began to cover this area after the First World War. The Tame Valley Canal, on the southern edge of the area, was opened in 1844 and, as such was one of the last Black Country canals.			
Reference	WL11	**Name**	South East Walsall
The northern part of the ecological sub-area lies within WL11 South East Walsall. During the medieval period this area was dominated by open fields with a small manor house or settlement at The Delves. There was also a large deer park to the west of Great Barr, although its extent is unknown. By the mid-18th century a mill had been established at New Mills in the south-west of the area and a country house has been constructed by the Delves. At this time the landscape was still largely agricultural and by the late 18th century- early 19th century woodland had been established in the south-east of the area near Great Barr and two further country houses had been built.			

Historic Environment Area Designations [1]			
Reference	APA 14	**Name**	Shustoke Farm Moated site
The APA contains earthworks remains of a possible medieval moated site. The moat is shown on the 1841 Tithe map. LiDAR shows remnants of the moat to the north and west and its survival was confirmed by a field survey carried out in 2001. There is therefore the potential for archaeological remains associated with the moat and potential medieval and post-medieval buildings. To the north of the moated site are the earthwork remains of three fish ponds linked to the moated site by leats. The moat, fish ponds and leats have the potential to contain waterlogged remains and there is potential for organic preservation.			
Reference	AHHLV 25	**Name**	Peak House Farm Field System
The AHHLV contains a well-preserved example of a pre-enclosure field system. Evidence of ridge and furrow is visible across the site as cropmarks (but no earthworks appear to survive). Prehistoric finds have been recovered within this area and cropmarks indicative of below-ground archaeological remains have also been identified, highlighting the archaeological potential of the area. Many of the field boundaries are marked by drainage ditches linked to the moated site to the south (APA 24) and a number of hedgerows are recorded as ancient hedgerows. LiDAR shows a small mound in the AHHLV (NGR 403764 295377).			
Reference	APA 24	**Name**	Peak House Farm Moated Site
The APA contains the remains of a possible moated site. The Environment Agency LiDAR shows the earthwork remains of a moat and a possible building platform within the APA. There is no building at this location on the 1817 OSD map, or 1st-4th edition OS maps, suggesting that the moated site is of medieval or early post-medieval date. The APA has the potential to contain below-ground archaeological remains associated with the manor house			

Historic Environment Area Designations [1]			
and the moat. The moat may contain waterlogged deposits, which would provide insight into land use in the area during the medieval period.			
Reference	APA 27	**Name**	The River Tame
The APA contains part of the route of the River Tame; there is considered to be potential for previously unknown prehistoric activity (including Bronze Age burnt mounds) and environmental evidence present associated with the former water course. Prior to the industrial revolution the land adjacent to the river would have been utilised for mills and other water-based industries. Accordingly, there is potential for archaeological remains associated with these features to survive. Aerial photographs show a number of tributaries and drainage channels associated with the river, which may be possible mill leats. The APA contains the infilled Old Forge Mill pool. There is potential for archaeological remains associated with the Old Forge and Mill. Part of the area was disturbed during the 19th century by the Grand Union Line Railway. However, the majority of the area remains relatively undisturbed. Some ridge and furrow earthworks are present within the APA.			
Reference	AHHLV 26	**Name**	Wigmore Farm Ridge and Furrow
The AHHLV contains the several areas of surviving earthwork ridge and furrow and a (possibly) medieval holloway. These features are surviving remnants of the open field system within the area. The field system in this area appears to date back to at least the 19th century, and may form part of a pre-enclosure field system that has been subject to some more recent boundary loss. Remnants of a watercourse and two ponds (fish ponds?) of unknown date are present within the AHHLV.			
Reference	APA 25	**Name**	All Saints Church
The APA contains All Saints Church and Graveyard. All Saints Church is situated on the site of a medieval church, elements of the 14th or 15th century tower survive within the present day Church. The church is surrounded by a graveyard, which has the potential to contain human remains dating from the medieval to post-medieval periods.			
Reference	APA 26	**Name**	Sot's Hole Stream
The APA contains the remains of a burnt mound and a stone mound as well as several recorded scatters of prehistoric flints. The APA is situated upon sand and gravel deposits resulting in the formation of natural springs in prehistoric times, which would have made it a focus for activity. The HER records a number of patches of ridge and furrow within the APA although these were not visible on the Environment Agency LiDAR survey of the site. Several drainage channels are evident within the APA and fish ponds and a dam are recorded in the very western part of the area (shown on 1817 Ordnance Survey drawings of the area) near Parsons Farm. The ponds and dams were used to control the flow of water supplied to the dams along the River Tame and its tributaries.			
Reference	AHHLV 48	**Name**	Chambers Wood
The AHHLV is an area of semi-natural ancient woodland. Accordingly, it has the potential to contain well preserved archaeological remains (although none are currently known), and may contain features associated with medieval and post-medieval woodland management. Areas of semi-natural ancient woodland are areas of natural woodland which may have been subject to some previous woodland management and have been in use as woodland since at least the 1600s. Accordingly these areas have the potential to contain well preserved archaeological remains. Areas of ancient woodland represent surviving patches of the historic landscape that date back to the medieval or early post-medieval periods.			
Reference	AHHLV 50	**Name**	Dartmouth Golf Course Wood
The AHHLV is an area of semi-natural ancient woodland. Accordingly, it has the potential to contain well preserved archaeological remains (although none are currently known), and may contain features associated with medieval and post-medieval woodland management. Areas of semi-natural ancient woodland are areas of natural woodland which may have been subject to some previous woodland management and have been in use as woodland since at least the 1600s. Accordingly these areas have the potential to contain well preserved archaeological remains. Areas of ancient woodland represent surviving patches of the historic landscape that date back to the medieval or early post-medieval periods.			
Reference	DLHHV 1	**Name**	Sandwell Park
The DLHHV was originally part of the estate associated with Sandwell Priory. It was later sold to the Earl of Dartmouth, who in turn sold it to West Bromwich Council in 1947. The park today contains remnants of the mid-18th century designed landscape although the original design has been eroded by the construction of later			

Historic Environment Area Designations [1]
transport infrastructure. During the inter-war period, parts of the site were used as a colliery. Several earlier features associated with the parkland including ornamental pools (Swan and Pleasure pools), an ice house and a ha-ha (a bank and ditch used to keep out animals) survive within the present day landscape. Swan Pool started life as a mill pool before being extended twice, firstly to take the extra water from the adjacent mines and secondly as a leisure facility. Earlier archaeological remains such as the scheduled remains of Sandwell Hall and the earlier Benedictine Priory, which is a scheduled monument (NHLE 1017763) and areas of non-designated ridge and furrow are also present, highlighting various land uses within the park over time. A number of archaeological features including a prehistoric burnt mound have been recorded within the site, further highlighting the archaeological interest of the area. The scheduled monument has a high level of archaeological interest, and could be directly impacted by unsympathetic development e.g. ground works.

Waterbody Catchments			
River Basin District	Humber	**Management Catchment**	Tame Anker and Mease
Waterbody Catchment	**Overall Classification**	**Ecological**	**Chemical**
Tame - confluence two arms to R Rea Water Body	Moderate (2019)	Moderate (2019)	Moderate (2019)

Key Habitats [2]			
Broad Habitat Type	Woodland	**Priority Habitat**	Lowland mixed deciduous woodland
There are two areas of woodland designated as Ancient Semi-natural Woodland in the south-west of the ecological sub-area (Chambers Wood and Bluebell Wood). There are further small areas of mature Oak woodland scattered through the south-west which may be ancient or old plantations.			
Broad Habitat Type	Woodland	**Priority Habitat**	
Younger woodland is frequent throughout Sandwell Valley, either as plantations or spontaneous woodland on abandoned sites. Planted areas include around Forge Mill Lake, along fairways in the area's many golf courses, around the sewage works and along some of the motorway embankments. Older ornamental plantations are found around the parkland of the former Sandwell Hall. Young woodland now occupies the site of the former Sandwell Park Colliery, though it is not known if this is planted or spontaneous.			
Broad Habitat Type	Grassland	**Priority Habitat**	Lowland meadows
There are small areas of remnant meadow in Priory Woods Local Nature Reserve, though the extent or condition of this habitat is not known. The irregular fields of the Peak House Farm field system have in recent years been cut for hay, however, these are not floristically diverse and are likely to have been managed as pasture prior to this.			
Broad Habitat Type	Grassland	**Priority Habitat**	
Grassland of various sward types dominates much of Sandwell Valley. Permeant pasture exists in the southern part of the ecological sub-area, with the surviving ridge and furrow at the Wigmore Farm being a notable surviving remnant of the former open field system of the area. Throughout the publicly accessible parts of Sandwell Valley there are areas of irregularly managed grassland that is relatively species-poor and rank. There are also significant areas of regularly mown grassland in the formal parks and on the golf course fairways.			
Broad Habitat Type	Boundary	**Priority Habitat**	Hedgerows
Numerous field boundary hedgerows exist throughout the ecological sub-area, either demarcating the boundaries of existing fields or as remnants within areas now used for alternative purposes. It is thought that most of Sandwell Valley was enclosed from mediaeval open fields (see Wigmore Farm), however, the fields at Peak House Farm are considered to be an uncommon example of earlier enclosure. Here the field-pattern is notably more irregular and the hedgerows have been allowed to grow to a substantial size.			
Broad Habitat Type	Freshwater	**Priority Habitat**	Rivers

A stretch of the River Tame runs through Sandwell Valley, entering the ecological sub-area in the north-west adjacent to the M6 and meandering south and then eastwards around Forge Mill Lake and exiting into Birmingham. The channel is heavily modified, being of uniform width and with raised flood banks, with few natural erosion and depositional features, and very little aquatic vegetation. The catchment is classified Moderate status by the Environment Agency and suffers from urban diffuse pollution.

There are numerous minor channels which flow into the River Tame from across the ecological sub-area. These range from unmodified watercourses to artificial drainage channels.

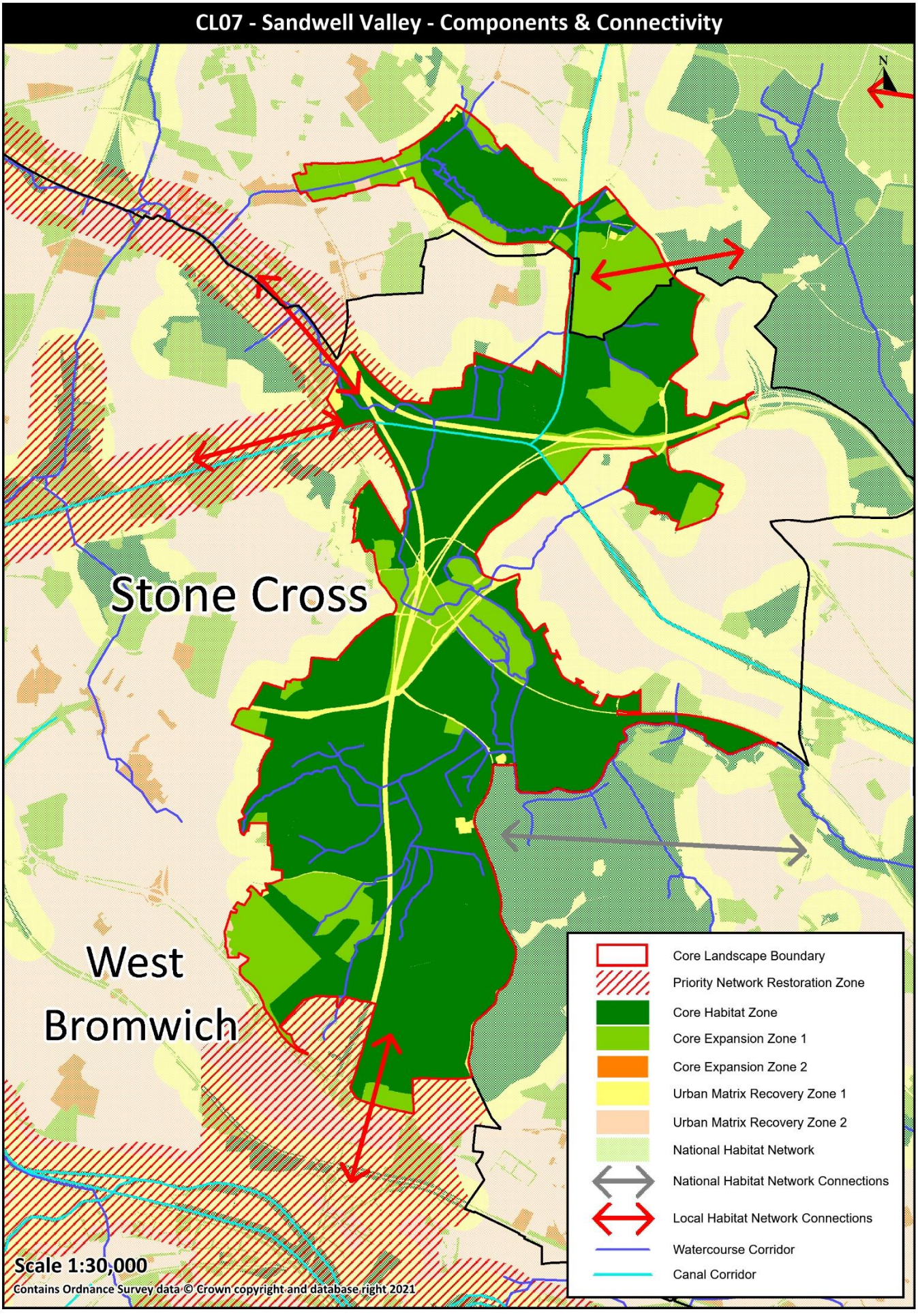
Broad Habitat Type	Freshwater	**Priority Habitat**	Eutrophic standing waters

There are a number of artificial standing waters throughout Sandwell Valley. These include an ornamental pool and boating lake in Dartmouth Park, the large floodwater storage lake Forge Mill Lake, and those associated with the former grounds of Sandwell Hall (Pleasure Pool and Swan Pool). These vary significantly in ecological value, with significant works having been undertaken for the benefit of wetland birds at RSPB Sandwell Valley (parts of Forge Mill Lake), and wetland and adjacent terrestrial vegetation having developed at the Pleasure Pool. Conversely the boating lake has artificial banks, and very few naturalised features and associated species.

Key Species [3]	
Bird indicators	
Farmland	Common Reed Bunting, Eurasian Skylark, Goldfinch, Greenfinch, Jackdaw, Kestrel, Lapwing, Rook, Starling, Stock Dove, Western Yellow Wagtail, Whitethroat, Woodpigeon, Yellowhammer.
Woodland	Blackbird, Chiffchaff, Coal Tit, Common Chaffinch, Dunnock, Eurasian Blackcap, Eurasian Blue Tit, Eurasian Bullfinch, Eurasian Nuthatch, Eurasian Wren, European Green Woodpecker, Garden Warbler, Goldcrest, Great Spotted Woodpecker, Great Tit, Jay, Lesser Redpoll, Lesser Whitethroat, Long-tailed Tit, Marsh Tit, Redstart, Robin, Siskin, Song Thrush, Sparrowhawk, Spotted Flycatcher, Tawny Owl, Treecreeper, Willow Tit, Willow Warbler.
Water & Wetland	Cetti's Warbler, Common Merganser, Common Reed Bunting, Common Sandpiper, Eurasian Coot, Great Crested Grebe, Grey Heron, Grey Wagtail, Kingfisher, Lapwing, Little Egret, Little Grebe, Mallard, Moorhen, Mute Swan, Oystercatcher, Redshank, Reed Warbler, Sand Martin, Sedge Warbler, Snipe, Teal, Tufted Duck, Western Yellow Wagtail.
Other	Black-headed Gull, Buzzard, Carrion Crow, Collared Dove, Common House Martin, Eurasian Magpie, Gadwall, Golden Plover, House Sparrow, Meadow Pipit, Mistle Thrush, Northern Raven, Peregrine, Pied Wagtail, Pochard, Red Kite, Shelduck, Shoveler, Stonechat, Swallow, Swift, Whinchat.
Amphibians & Reptiles	
Amphibians	Common Frog, Common Toad, Great Crested Newt, Smooth Newt.
Reptiles	none
Mammals	
Bats	Brown Long-eared Bat, Common Pipistrelle, Daubenton's Bat, Lesser Noctule, Nathusius's Pipistrelle, Noctule Bat, Soprano Pipistrelle.
Other	Eurasian Badger, Eurasian Common Shrew, European Water Vole, Harvest Mouse, West European Hedgehog.
Fish	
Bony Fish	none
Jawless Fish	none
Invertebrates	
Assemblage type	
Flora (axiophytes)	
Woodland	*Ajuga reptans, Allium ursinum, Anemone nemorosa, Angelica sylvestris, Athyrium filix-femina, Blechnum spicant, Brachypodium sylvaticum, Bromopsis ramosa, Caltha palustris, Carex paniculata, Carex remota, Carex sylvatica,*

	Chrysosplenium oppositifolium, Deschampsia flexuosa, Dioscorea communis, Dryopteris affinis, Epipactis helleborine, Equisetum telmateia, Festuca gigantea, Filipendula ulmaria, Fragaria vesca, Frangula alnus, Galium odoratum, Lysimachia vulgaris, Malus sylvestris, Melica uniflora, Mercurialis perennis, Milium effusum, Molinia caerulea, Oxalis acetosella, Persicaria hydropiper, Quercus petraea, Sorbus torminalis, Stellaria holostea, Teucrium scorodonia, Tilia cordata, Torilis japonica, Valeriana officinalis, Veronica montana.
Grassland	*Achillea ptarmica, Agrimonia eupatoria, Agrostis canina, Aira caryophyllea, Ajuga reptans, Blackstonia perfoliata, Blechnum spicant, Brachypodium sylvaticum, Caltha palustris, Carex disticha, Centaurium erythraea, Cirsium palustre, Dactylorhiza fuchsii, Dactylorhiza fuchsii x praetermissa = D. x grandis, Dactylorhiza praetermissa, Daucus carota subsp. carota, Deschampsia flexuosa, Euphrasia officinalis agg., Festuca filiformis, Filipendula ulmaria, Fragaria vesca, Galium mollugo subsp. erectum, Galium saxatile, Lathyrus nissolia, Leontodon hispidus, Linum catharticum, Lotus pedunculatus, Nardus stricta, Odontites vernus, Ornithopus perpusillus, Persicaria bistorta, Phleum bertolonii, Potentilla anglica, Potentilla erecta, Potentilla sterilis, Rhinanthus minor, Sanguisorba officinalis, Silene flos-cuculi, Stachys officinalis, Stellaria holostea, Succisa pratensis, Trifolium medium.*
Heathland	*Agrostis canina, Aira praecox, Blechnum spicant, Calluna vulgaris, Carex nigra, Deschampsia flexuosa, Festuca filiformis, Galium saxatile, Juncus squarrosus, Molinia caerulea, Nardus stricta, Ornithopus perpusillus, Potentilla erecta, Salix aurita, Teucrium scorodonia, Ulex gallii.*
Mires	*Achillea ptarmica, Agrostis canina, Angelica sylvestris, Athyrium filix-femina, Caltha palustris, Carex acutiformis, Carex nigra, Carex paniculata, Carex riparia, Carex viridula subsp. oedocarpa, Cirsium palustre, Dactylorhiza fuchsii, Dactylorhiza fuchsii x praetermissa = D. x grandis, Dactylorhiza praetermissa, Dryopteris carthusiana, Eleocharis palustris, Epilobium palustre, Equisetum fluviatile, Equisetum palustre, Filipendula ulmaria, Galium palustre, Glyceria declinata, Glyceria notata, Hydrocotyle vulgaris, Hypericum tetrapterum, Jacobaea aquatica, Juncus acutiflorus, Juncus squarrosus, Lotus pedunculatus, Lysimachia vulgaris, Menyanthes trifoliata, Molinia caerulea, Persicaria hydropiper, Potentilla palustris, Pulicaria dysenterica, Ranunculus aquatilis, Ranunculus aquatilis, Ranunculus flammula, Ranunculus hederaceus, Silene flos-cuculi, Sparganium emersum, Stachys palustris, Stellaria alsine, Succisa pratensis, Thalictrum flavum, Valeriana officinalis, Veronica beccabunga.*
Open Water	*Bidens tripartita, Butomus umbellatus, Carex acutiformis, Carex paniculata, Carex riparia, Eleocharis palustris, Equisetum fluviatile, Galium palustre, Glyceria notata, Luronium natans, Menyanthes trifoliata, Potamogeton perfoliatus, Ranunculus aquatilis, Ranunculus aquatilis, Sagittaria sagittifolia, Schoenoplectus lacustris.*
Post-industrial (water-stressed)	*Agrimonia eupatoria, Aira caryophyllea, Aira praecox, Anthyllis vulneraria, Asplenium adiantum-nigrum, Blackstonia perfoliata, Blechnum spicant, Centaurea scabiosa, Centaurium erythraea, Daucus carota subsp. carota, Deschampsia flexuosa, Erigeron acris, Filago vulgaris, Fragaria vesca, Jacobaea erucifolia, Linum catharticum, Ophrys apifera, Ornithopus perpusillus, Orobanche minor, Reseda lutea, Senecio viscosus, Silene vulgaris, Trifolium arvense, Trifolium medium, Trifolium micranthum, Trifolium striatum, Vicia tetrasperma.*
Cultivation	*Chenopodium polyspermum, Orobanche minor, Stachys arvensis, Thlaspi arvense, Vicia tetrasperma.*

Ecological Connectivity
Local Habitat Network
Sandwell Valley links directly with Core Landscape 06 Park Lime Pits, Cuckoo's Dingle & Great Barr Hall which is located to the north. There are additional links to the Priority Network Restoration Zones M6 Motorway Corridor and Tame Valley Canal to the north-west, and Birmingham Canal to the south.
National Habitat Network
Sandwell Valley links to the national habitat network in Birmingham to the north-east.


CL07 - Sandwell Valley - Components & Connectivity
N
Stone Cross
West Bromwich
Core Landscape Boundary
Priority Network Restoration Zone
Core Habitat Zone
Core Expansion Zone 1
Core Expansion Zone 2
Urban Matrix Recovery Zone 1
Urban Matrix Recovery Zone 2
National Habitat Network
National Habitat Network Connections
Local Habitat Network Connections
Watercourse Corridor
Canal Corridor
Scale 1:30,000
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Ecological Sub-area Opportunities

Focus Habitats		
Habitat	**Action**	**Measure**
Hedgerows	Improve management of existing	Habitat in good condition
	Reinstate historic/grubbed-out	New habitat
	Restore through gapping up	Habitat in good condition
	Establish hedgerow trees	Habitat structure improved
Ponds	Create new	New habitat at existing and new sites
Rivers	Restore hydromorphology (naturalise modified channels)	Improved ecological status
	Reduce artificial inputs	Improved chemical status
Eutrophic Standing Waters	Enhance marginal and emergent vegetation	Increased floral diversity and habitat structure improved
Lowland meadows	Enhance existing neutral grasslands	Increased floral diversity
	Create new species-rich neutral grasslands	Increased floral diversity and habitat structure improved
Lowland mixed deciduous woodland	Coppice	Habitat structure improved
	Create woodland edge	Habitat structure improved
	Diversify woody component	Habitat structure improved
	Diversify field-layer component of plantations	Increased floral diversity

Target Species	
Species/Species Group	**Measure**
Barn Owl	Confirmed recent records
Bats	Increased abundance of confirmed species
Breeding farmland birds (specialists)	Increased species and abundance
Breeding water & wetland birds (specialists)	Increased species and abundance
Breeding woodland birds (specialists)	Increased species and abundance
Brown Hare	Confirmed recent records
Brown Long-eared Bat	Confirmed recent records
Brown/Sea Trout	Confirmed recent records
European Otter	Increased signs, confirmed breeding population
European Water Vole	Confirmed recent records
Great Crested Newt	Increased abundance and number of breeding ponds
Hedgehog	Confirmed recent records
Woodland axiophytes	Recent records and increased abundance
Grassland axiophytes	Recent records and increased abundance
Heathland axiophytes	Recent records and increased abundance
Mires axiophytes	Recent records and increased abundance
Open Water axiophytes	Recent records and increased abundance

Geodiversity		
Site	**Action**	**Measure**
Sandwell Valley Country Park	Unknown	n/a

Connectivity Opportunities	
Local Habitat Network	
Connection	**Action**
Within Core Landscape CL07	Restoration of modified channel of the River Tame and tributaries.
	Species-rich neutral grassland enhancement and creation at sites including areas of public open space, golf courses, school grounds and sports fields.
	Plantation woodland enhancement.
	Creation of new ponds.
	Field boundary hedgerow recreation, restoration and creation.
	Planting of standard trees in parks, green spaces and school grounds.
Priority Network Restoration Zones (Tame Valley Canal and Birmingham Canal)	Increased marginal vegetation through the installation of coir roles along hard banks.
	Species-rich neutral grassland enhancement and creation on undeveloped land including parks, green spaces, school grounds and substantial road verges.
	Woodland enhancement and small-scale planting.
	Planting of standard trees (including fruit trees) along canal corridor.
Priority Network Restoration Zone (M6 Motorway Corridor)	Species-rich neutral grassland enhancement and creation on undeveloped land including parks, green spaces, school grounds and substantial road verges.
	Woodland enhancement and small-scale planting in adjacent areas of open space.
National Habitat Network	
Connection	**Action**
Birmingham section of Sandwell Valley (to south-east)	Restoration of modified channel of the River Tame and tributaries.
	Species-rich neutral grassland enhancement and creation at sites including areas of public open space, golf courses, school grounds and sports fields.
	Plantation woodland enhancement.
	Creation of new ponds.
	Field boundary hedgerow recreation, restoration and creation.
	Planting of standard trees in parks, green spaces and school grounds.

Information and Data Sources		
	Source	**Date**
Landuse	Ecological Evaluation of Birmingham and Black Country GIS data set, EcoRecord.	2021
Topography	OS Terrain 50 GIS data set, Ordnance Survey.	2017
Geology	British Geological Society 1:625,000 bedrock & superficial GIS web map services from BGS website: http://mapapps.bgs.ac.uk/geologyofbritain/home.html	2021
	Black Country UNESCO Global Geopark sites names and location information https://blackcountrygeopark.dudley.gov.uk/bcg/	2021
Soils	Soilscapes, Cranfield Soil & Agricultural Institute website: http://www.landis.org.uk/soilscapes/	2021
Species and Habitats	EcoRecord species and habitat databases.	2021
Ecological Connectivity	EcoRecord, The Wildlife Trust for Birmingham and the Black Country (2021) *Draft Black Country Local Nature Recovery Opportunity Map*	2021
	EcoRecord et al. (2021) *Midlands Heathland Heartland Lowland Heathland Nature Recovery Opportunity Mapping*.	2021
Historic Landscape Character Areas	Wolverhampton City Council (2010) *Black Country Historic Landscape Characterisation* [data-set]. York: Archaeology Data Service [distributor] https://doi.org/10.5284/1000030	2010
Historic Environment Area Designations	Black Country Historic Landscape Characterisation Study, Oxford Archaeology.	2019

[1] HISTORIC ENVIRONMENT AREA DESIGNATIONS

The Black Country Historic Landscape Characterisation Study has divided the Historic Environment Area Designations into four categories:

Archaeological Priority Areas (APA): sites with a high potential for archaeological remains of regional or national significance that have not been considered for designation as scheduled monuments, or where there is insufficient data available about the state or preservation of any remains to justify a designation. APAs are likely to have high archaeological and historic interest.

Areas of High Historic Townscape Value (AHHTV): areas where built heritage makes a significant contribution to local character and distinctiveness. The significance of AHHTVs is likely to be derived primarily from their architectural and historic interests. However, these areas may also have artistic and archaeological interests. Areas of High Historic Townscape Value are not limited to towns or cities, they also include villages, hamlets and areas of industry where the built heritage is considered to make a positive contribution to the historic environment of an area.

Designed Landscapes of High Historic Value (DLHHV): landscape areas that make an important contribution to local historic character but do not meet the criteria for inclusion on the national Register for Parks and Gardens. The significance of these areas is likely to arise from their historic, artistic and architectural interests, although such areas may also contain remains of archaeological interest.

Areas of High Historic Landscape Value (AHHLV): these recognise the quality of the wider landscape and their relative values. The significance of these areas arises from the natural and historic features contained within them (e.g. woodland, watercourses, hedgerows, and archaeological features). The significance of these areas is likely to be derived from their archaeological and historic interests.

[2] KEY HABITATS follows the UK Biodiversity Action Plan (BAP) Broad & Priority Habitat definitions

This is a UK-habitat classification prepared by the UK Biodiversity Group that classifies all terrestrial and freshwater habitats in the UK into 37 broad habitat types. UK BAP Priority Habitats are a range of semi-natural habitat types that were identified as being the most threatened and requiring conservation action. The original Priority Habitat list was created between 1995 and 1999 and revised in 2007. The list of Priority Habitats has been used to help draw up statutory lists of habitats of principal importance for the conservation of biodiversity in England, Scotland, Wales and Northern Ireland. The suite of habitats of principal importance for the conservation of biodiversity (formerly Priority Habitats) nest into the defined Broad Habitat Types.

[3] KEY SPECIES

Bird Indicators: Species listed under UK Biodiversity Indicator C5, Birds of the wider countryside and at sea (JNCC). The indicator shows changes in the breeding population sizes of common native birds of farmland and woodland and of freshwater and marine habitats in the UK.

Amphibians & Reptiles: All amphibian and reptile species native to the UK are included.

Mammals: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Fish: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Invertebrates: Pantheon Assemblage Types Analysis.

Flora (axiophytes): Those included on the Birmingham & the Black Country list of axiophytes (administered by EcoRecord) by four locally defined habitat types.

Ecological Sub-area Statement of Biodiversity Priorities – Technical Appendix			
Sub-area name	Illey, Lapal and Hasbury	**Sub-area ref.**	CL13
Natural Character Area	Arden	**NCA ref.**	97
Local Authority Area	Dudley	**Area km^2**	4.04

Ecological Sub-area Description

Overview

Illey, Lapal and Hasbury comprises an area of countryside in the south of the borough of Dudley and encompasses parts of the former parishes and townships of Lutley, Hasbury, Hunnington, Illey, Lapal and Northfield. The ecological sub-area forms part of a large rural landscape which predominantly lies in Worcestershire, with the western and southern boundaries (between Dudley and rural Bromsgrove) following the historic parish/township boundaries. To the north lie the modern suburbs of Halesowen, whilst to the east is the M5 motorway.

The landscape is comprised of an historic pattern of small irregular fields and woodlands with numerous unmodified headwaters of the River Stour, and contains extensive prehistoric, Roman and medieval remains. There are a large number of sites designated for their nature conservation value, including two ancient meadows designated as Illey Pastures Site of Special Scientific Interest.

Land Use

The land use is almost entirely agricultural, with numerous small pastures and permanent grasslands, and with some larger fields (frequently where historic field divisions have been removed) arable. Small dingle woodlands occupy a number of the shallow valleys of the numerous small watercourses. Settlements include approximately 15 farms (or former farms), the small village of Illey and the hamlet of historic Lapal.

There is a small athletics stadium, velodrome and tennis club in the north of the ecological sub-area off Manor Way.

Topography

Illey, Lapal and Hasbury has an undulating landscape, generally sloping from the highest elevations at the eastern, western and southern boundaries (at the highest an elevation of 180 metres) towards the centre and north of the ecological sub-area where both the River Stour and Illey Brook flow northwards into Core Landscape 11, Stour Valley, at an elevation of 120 metres.

Geology

Sedimentary bedrock of the Halesowen Formation - mudstone, siltstone and sandstone, formed approximately 308 to 310 million years ago. This is partially overlain with superficial deposits of head - clay, silt, sand and gravel formed up to 3 million years ago in the Quaternary Period; alluvium - clay, silt, sand and gravel formed up to 2 million years ago in the Quaternary Period; and diamicton till formed up to 2 million years ago in the Quaternary Period.

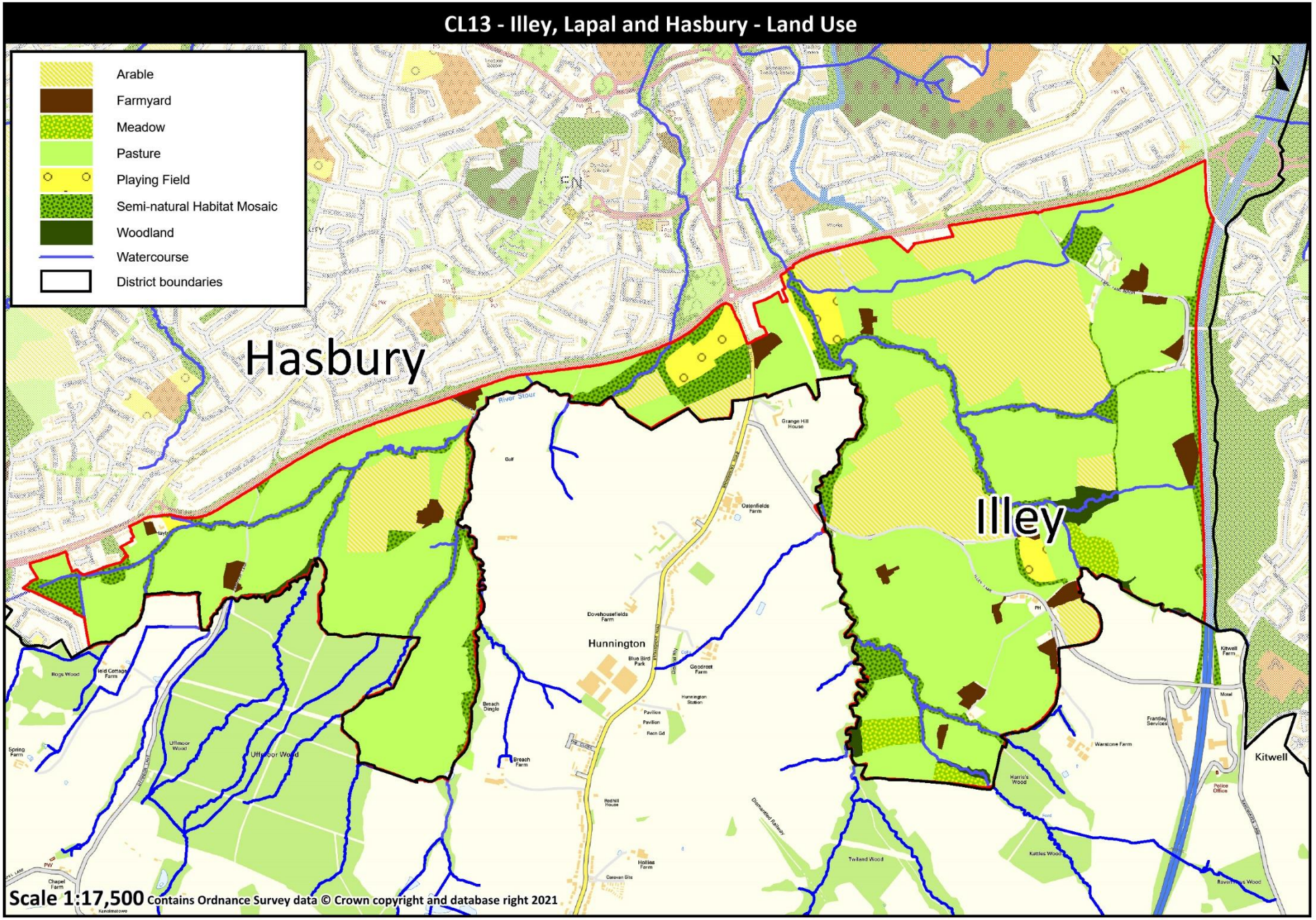
Geopark Sites

n/a

Soils

Predominantly slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, with an approximately 1 km^2 area with freely draining slightly acid loamy soils in the eastern part of the ecological sub-area.

CL13 - Illey, Lapal and Hasbury - Land Use



Historic Landscape Character Areas			
Reference	DY03	**Name**	Haley Fields & Illey

The ecological sub-area is almost coterminous with HLC area DY03 Hayley Fields & Illey. The Character Area is dominated by scattered settlement and fields (90%) and is situated on an underlying geology of sandstone, mudstone and conglomerate. Settlement comprises small farmsteads and hamlets which predate the early 19th century. Historically the Character Area was dominated by agriculture associated with St Marys Abbey, which dates from the 13th century. The creation of granges within the area was part of the Abbey's efforts to develop its supply of agricultural goods. Many of the fields in the area contains traces of ridge and furrow associated with this early land use. While the area did not have an industrial phase it is crossed by the [disused] Dudley Number 2 Canal and a now disused railway line.

A small part of the ecological sub-area (c. 0.1 km^2), including the athletics ground, lies within the large HLC area DY02 Halesowen.

Historic Environment Area Designations [1]			
Reference	AHHLV 31	**Name**	Uffmoor ridge and furrow

AHHLV 31 Uffmoor ridge and furrow is coterminous with the entire western section of the Illey, Lapal and Hasbury from Hayley Park Road to Grange Hill.

The AHHLV falls within the historic townships of Hasbury and Lutley and contains the head waters of the River Stour and is predominantly agricultural. The fields in this area contain large areas of surviving ridge and furrow earthworks enclosed by substantial hawthorn hedges. The landscape was enclosed by the late 19th century, and the field pattern has been subject to some modern alteration. An ancient parish boundary forms the eastern boundary of the area. The AHHLV contains possible medieval ridge and furrow, which provides a tangible link to the former land use in the area and can provide information about the medieval open field system in the area.

Heat crazed stones (potboilers) have been recorded in the area, possibly remnants of prehistoric burnt mounds, highlighting the archaeological potential of this area.

Visually the AHHLV is part of the rolling North Worcestershire landscape and it is set against the continued open landscape whose views are closed to the south and west by the North Worcestershire Hills. The southern boundary of the heritage area retains the ancient parish boundary line which is consistent with the Illey/Lapal heritage area southern boundary to the east. The AHHLV is traversed by public footpaths which follow an enclosed stream bed and wooded copse aligned in a north-south direction.

Reference	AHHLV 32	**Name**	Illey and Lapal

AHHLV 32 Illey and Lapal is coterminous with almost the entire eastern section of the Illey, Lapal and Hasbury from Grange Hill to the M5 motorway.

The AHHLV is one of the largest in the borough and is inseparably part of the North Worcestershire Countryside and forms a foreground to the North Worcestershire hills which terminate views to the south and west. It is of considerable scenic value and contains a complex mix of landscape elements.

The AHHLV falls within the historic townships of Illey and Frankley and can be divided into three areas with the topography to the east and west of Lapal Lane South and north of Illey, falling to the west to Illey brook and then rising to the south to Illey Lane. The bowl between the A456 and Illey Lane is dominated by the monastic ruins and infirmary of the ruined 13th century St Mary's Abbey. The abbey system of fishponds and dams, although dry, are clearly visible to the east and south of the abbey precinct and provides evidence of medieval watercourse management. The abbey and surrounding land form a scheduled monument (NHLE 1009770) while the abbey ruins are a Grade I listed building. Halesowen Abbey is in the guardianship of the Secretary of State and English Heritage and a detailed Conservation Management Plan has been published for the site by Historic England. The area to the west of Lapal Lane, and north of Illey Lane is within the curtilage of Manor Farm. The scheduled abbey has a high level of archaeological interest, and could be directly impacted by unsympathetic development e.g. ground works. Outside of the scheduled area large blocks of masonry were recorded during the construction of Manor Way, these remains may be associated with the abbey and could suggest that the abbey landscape extends outside the scheduled area. Development within the surrounds of the scheduled monument could impact upon its setting.

Historic Environment Area Designations [1]

Ridge and furrow earthworks have also been recorded in the area to the east of Lapal Lane South associated with Green Lane which is a possible holloway. The ridge and furrow earthworks providing visible evidence of previous land management and agricultural practice. The field boundaries within the AHHLV preserve the route of old parish boundaries providing evidence of early administrative boundaries. There may be earthwork banks and ditches associated with the parish boundary preserved in these areas.

The AHHLV also derives archaeological interest from the site of the former Manor Colliery and the course of the former Lapal Canal and Lapal Tunnel. These remains could provide evidence about the industrial development within this area during the 19th century.

The AHHLV is inseparably part of the North Worcestershire Countryside and forms a foreground to the North Worcestershire hills which terminate views to the south and west. It is of considerable scenic value and contains a complex mix of landscape elements.

The AHHLV contains nationally rare archaeological remains associated with St Mary's Abbey. It also contains extensive prehistoric, Roman and medieval remains. Such remains are rare within the Black Country, as much of the area has been affected by ground disturbance associated with the high level of urbanisation and development that has occurred.

This AHHLV is particularly rare as it represents one of the few areas within the Black Country that has been less affected by the industrial and residential development of the area.

Reference	APA 42	**Name**	Lutley Lane Roman Villa

The APA contains the suggested site of Lutley Lane Roman Villa. The site has been identified as a cropmark visible upon aerial photographs. While the presence of archaeological remains in this area has yet to be ground truthed by excavation, the morphology of the APA suggest that the archaeological remains of a Roman villa site are present.

There is limited evidence of Roman activity within Dudley, probably due to later industrial activity and residential development. The APA is thus considered to contain a regionally rare example of archaeological remains associated with a Roman rural settlement. These remains could inform understanding of Roman rural settlements and land use in the area.

Unsympathetic development i.e. groundworks would detrimentally affect archaeological remains within the APA.

Reference	APA 176	**Name**	Illey Township

The APA contains the site of the historic settlement of Illey in the parish of Halesowen. The place-name is derived from two elements Hilla and leah. These elements are Anglo-Saxon and refer to a woodland estate belonging to a man called Hilla. The earliest reference to Illey is in the Manor Court Book in 1270 (Hemmingway 2005). There were two open fields in the high land in the centre of the township, Hilley Field to the north of main road between Halesowen and Fingal Field and Fingall Field so the south of the road. The open fields were surrounded by a large number of meadows aligned on the brooks (ibid). The settlement dates back to at least the early post-medieval period, and is first shown on the 1845 Tithe map of the area. The buildings within the APA date to the 19th and 20th century, however the APA is considered to have the potential to contain below ground archaeological remains associated with the earlier settlement. The site of a medieval tithe barn (HER 4325) is recorded in the southern part of the APA, the APA has the potential to contain archaeological remains associated with the barn, further contributing to the archaeological interest of the APA.

Reference	APA 203	**Name**	Dudley No. 2 Canal

The APA contains the line of the Dudley No. 2 Canal, which ran from Bumble Hole to the Lapal Tunnel. The Canal was built in 1798. The APA contains the Lapal Tunnel which is first shown on a to the map of Lapal dated to 1841. The APA has been included as the area contains below ground archaeological remains associated with the 18th century canal.

Waterbody Catchments			
River Basin District	Severn	**Management Catchment**	Severn Middle Worcestershire
Waterbody Catchment	**Overall Classification**	**Ecological**	**Chemical**
Stour (Worcs) source to confluence with Smestow Brook	Poor (2019)	Poor (2019)	Fail (2019)

Key Habitats [2]			
Broad Habitat Type	Arable and horticulture	**Priority Habitat**	
A number of the larger fields are arable, with some field boundaries within these having been removed since the Ordnance Survey County Series mapping of the 1880s. No Priority Habitat field margins have been recorded.			
Broad Habitat Type	Boundary & Linear Features	**Priority Habitat**	Hedgerows
There are numerous field boundary hedgerows throughout the ecological sub-area associated with the mostly small irregularly-shaped fields and along trackways. These frequently sit atop bank and ditch systems and contain mature Pedunculate Oak standards. The hedgerows are predominantly Hawthorn-dominated and support a diverse range of tree and shrub species, as well as a diverse field-layer of woodland-associated species. Only a small proportion of the hedgerows have been assessed against the Local Wildlife Sites selection criteria and of these a number have been selected as SLINCs.			
Broad Habitat Type	Rivers and Streams	**Priority Habitat**	Rivers
Numerous small headwaters rise within or just outside the ecological sub-area in Worcestershire. These flow northwards to form the River Stour and Illey Brook (itself a tributary of the Stour). The watercourses are predominantly unmodified and support a diversity of features associated with the processes of erosion and deposition. Most of the channels are lined by trees and some dingle woodlands where the watercourse has incised the soft sedimentary bedrock. This part of the waterbody catchment is ecologically isolated from the wider downstream catchment by urban features including man-made in-channel structures and high pollution levels.			
Broad Habitat Type	Standing Open Water and Canals	**Priority Habitat**	Ponds
There are a small number of garden and field ponds in the ecological sub-area, including one in Illey Pastures SSSI described in the citation as a small basin mire dominated by Bog Mosses with Bog Pondweed and marginal species such as Water-plantain, Branched Bur-reed and Water Forget-me-not. In the west of the sub-area are Tack Farm Ponds SLINC described as two farm ponds with relatively diverse flora and forb rich adjacent neutral grassland.			
Broad Habitat Type	Neutral Grassland	**Priority Habitat**	Lowland Meadows
In the south of the ecological sub-area Illey Pastures SSSI consists of two fields of species-rich unimproved neutral grassland. The grassland has developed on ridge and furrow of loamy soils with subsoils where the drainage is partially impeded. The sward contains an abundance of forbs such as Field Scabious, Betony, Dyer's Greenweed and Common Spotted-orchid. There are also other less diverse Lowland Meadows in the sub-area.			
Broad Habitat Type	Neutral Grassland	**Priority Habitat**	
Many of the smaller fields within the ecological sub-area are pastures that are variously cattle, sheep and horse grazed. Some of these have developed on ridge and furrow and are of some age, whereas others have been cultivated in recent decades. There are no pastures that are designated for their nature conservation value.			

Broad Habitat Type	Broadleaved, Mixed and Yew Woodland	Priority Habitat	Lowland mixed deciduous woodland

There are a number of small dingle woodlands occupying the valleys of the watercourses which are of some age and likely to be ancient (woodland since at least AD 1600). These are variously designated as SINC or SLINC and include Cooper's Wood, Paddock Wood, Manor Abbey Woodland and Kitswell Dingle. The woodlands support a diverse woody and field-layer flora associated with ancient woodlands.

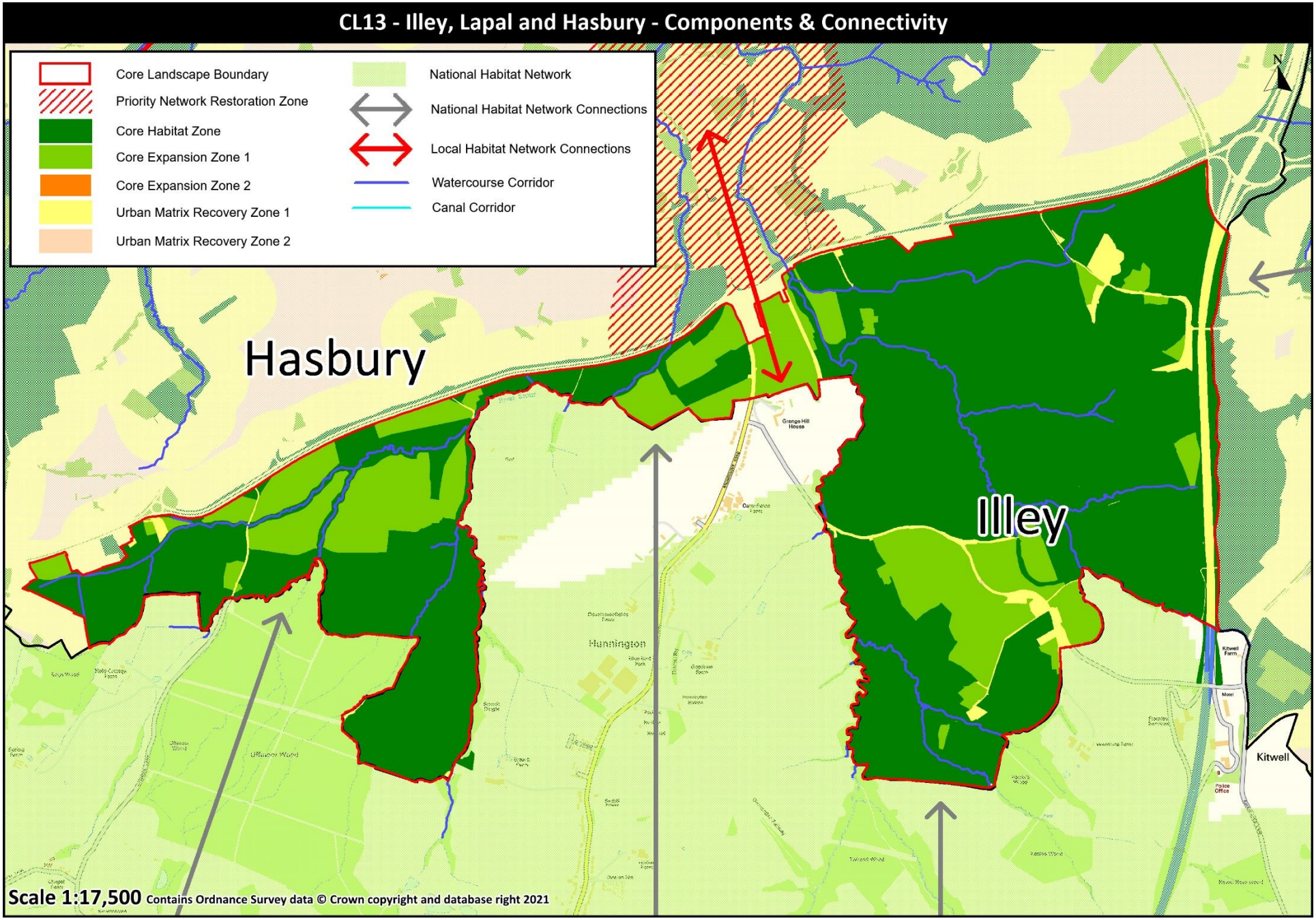
Narrow strips of woodland/trees have colonised the banks of most of the ecological sub-area's watercourses and these areas frequently support a similarly diverse woodland flora.

Key Species [3]	
Bird indicators	
Farmland	Eurasian Skylark, Goldfinch, Greenfinch, Jackdaw, Kestrel, Linnet, Stock Dove, Woodpigeon, Yellowhammer.
Woodland	Blackbird, Chiffchaff, Coal Tit, Dunnock, Eurasian Blackcap, Eurasian Blue Tit, Eurasian Nuthatch, Eurasian Wren, Great Spotted Woodpecker, Great Tit, Jay, Long-tailed Tit, Robin, Song Thrush, Tawny Owl, Treecreeper.
Water & Wetland	Mallard
Other	Buzzard, Carrion Crow, Common House Martin, Eurasian Magpie, House Sparrow, Mistle Thrush, Northern Raven, Swallow, Whinchat.
Amphibians & Reptiles	
Amphibians	Common Frog.
Reptiles	none
Mammals	
Bats	Brown Long-eared Bat, Common Pipistrelle, Nathusius's Pipistrelle, Natterer's Bat, Noctule Bat, Soprano Pipistrelle.
Other	Eurasian Badger, European Otter, European Water Vole, West European Hedgehog.
Fish	
Bony Fish	Brown Trout
Jawless Fish	none
Invertebrates	
Assemblage type	
Flora (axiophytes)	
Woodland	*Adoxa moschatellina, Ajuga reptans, Allium ursinum, Anemone nemorosa, Angelica sylvestris, Athyrium filix-femina, Brachypodium sylvaticum, Bromopsis ramosa, Cardamine amara, Carex remota, Carex sylvatica, Chrysosplenium oppositifolium, Deschampsia flexuosa, Dioscorea communis, Dryopteris affinis, Epipactis helleborine, Equisetum telmateia, Festuca gigantea, Filipendula ulmaria, Fragaria vesca, Galium odoratum, Hordelymus europaeus, Hypericum pulchrum, Lamiastrum galeobdolon subsp. montanum, Lathraea squamaria, Lysimachia nemorum, Lysimachia vulgaris, Malus sylvestris, Melica uniflora, Mercurialis perennis, Milium effusum, Oxalis acetosella, Poa nemoralis, Polystichum aculeatum, Polystichum setiferum, Sanicula europaea, Stellaria holostea, Taraxacum nordstedtii, Valeriana officinalis, Veronica montana, Viola reichenbachiana.*
Grassland	*Achillea ptarmica, Agrimonia eupatoria, Ajuga reptans, Alchemilla filicaulis subsp. vestita, Brachypodium sylvaticum, Briza media, Campanula rotundifolia, Carex caryophyllea, Centaurium erythraea, Cirsium palustre, Dactylorhiza fuchsii, Danthonia decumbens, Deschampsia flexuosa, Filipendula ulmaria, Fragaria vesca, Galium mollugo subsp. erectum, Genista tinctoria, Hypericum pulchrum, Lathyrus linifolius, Leontodon hispidus, Linum catharticum, Lotus pedunculatus, Persicaria bistorta, Phleum bertolonii, Pimpinella saxifraga, Potentilla anglica, Potentilla erecta, Potentilla sterilis, Rhinanthus minor, Sanguisorba officinalis, Serratula tinctoria, Silaum silaus, Stachys officinalis, Stellaria holostea, Succisa pratensis, Trifolium medium, Veronica officinalis.*

Heathland	*Campanula rotundifolia, Carex nigra, Danthonia decumbens, Deschampsia flexuosa, Potentilla erecta, Veronica officinalis.*
Mires	*Achillea ptarmica, Alchemilla filicaulis subsp. vestita, Angelica sylvestris, Athyrium filix-femina, Briza media, Cardamine amara, Carex nigra, Carex panicea, Cirsium palustre, Dactylorhiza fuchsii, Dryopteris carthusiana, Eleocharis palustris, Epilobium palustre, Equisetum fluviatile, Filipendula ulmaria, Galium palustre, Glyceria declinata, Glyceria notata, Hypericum tetrapterum, Jacobaea aquatica, Juncus acutiflorus, Lotus pedunculatus, Lysimachia vulgaris, Potamogeton polygonifolius, Ranunculus flammula, Stachys palustris, Stellaria alsine, Succisa pratensis, Valeriana officinalis, Veronica beccabunga, Veronica scutellata.*
Open Water	*Eleocharis palustris, Equisetum fluviatile, Galium palustre, Glyceria notata, Potamogeton polygonifolius, Schoenoplectus lacustris, Veronica scutellata.*
Post-industrial (water-stressed)	*Agrimonia eupatoria, Centaurium erythraea, Deschampsia flexuosa, Fragaria vesca, Jacobaea erucifolia, Linum catharticum, Trifolium medium, Vicia tetrasperma.*
Cultivation	*Vicia tetrasperma.*

Ecological Connectivity
Local Habitat Network
There is a direct link from the ecological sub-area to Core Landscape 11 Stour Valley via the corridors of the River Stour and Illey Brook.
National Habitat Network
Illey, Lapal and Hasbury forms part of a wider rural landscape that is predominantly in Worcestershire and therefore links directly with the National Habitat Network. This landscape includes a similar pattern of small irregular-shaped grassland fields with lesser amounts of arable, and numerous small watercourses and ancient woodlands including Uffmoor Wood and Twiland Wood.

CL13 - Illey, Lapal and Hasbury - Components & Connectivity



Ecological Sub-area Opportunities

Focus Habitats		
Habitat	**Action**	**Measure**
Hedgerows	Improve management of existing	Habitat in good condition
	Restore through gapping up	Habitat in good condition
	Reinstate lost field-boundary hedgerows	New habitat
	Establish hedgerow trees	Habitat structure improved
Ponds	Restore existing	Habitat in good condition
	Create new	New habitat at existing and new sites
Rivers	Restore hydromorphology (naturalise modified channels) downstream (CL11)	Improved ecological status
	Reduce artificial inputs	Improved chemical status
	Improve soil management	Reduced silt inputs to watercourses
Lowland meadows	Enhance existing neutral grasslands	Increased floral diversity
	Create new species-rich neutral grasslands	Increased floral diversity and habitat structure improved
Lowland mixed deciduous woodland	Coppice	Habitat structure improved
	Create new	New habitat at existing and new sites

Target Species	
Species/Species Group	**Measure**
Breeding farmland birds (specialists)	Increased species and abundance
Breeding woodland birds (specialists)	Increased species and abundance
Breeding water & wetland birds (specialists)	Increased species and abundance
Dipper	Confirmed recent records
Barn Owl	Confirmed recent records
Brown Hare	Confirmed recent records
Hedgehog	Confirmed recent records
Bats	Increased abundance of confirmed species
European Otter	Increased signs
European Water Vole	Confirmed recent records
Grassland axiophytes	Increased abundance
Woodland axiophytes	Recent records and increased abundance

Geodiversity		
Site	**Action**	**Measure**
n/a		

Connectivity Opportunities	
Local Habitat Network	
Connection	**Action**
Within Core Landscape CL13	Species-rich neutral grassland enhancement and creation.
	Creation of new ponds.
	Field boundary hedgerow restoration and creation.
Core Landscape CL11 Stour Valley	Restoration of modified channel and removal/mitigation of artificial in-channel barriers.
National Habitat Network	
Connection	**Action**
With wider rural landscape (Worcestershire)	Species-rich neutral grassland enhancement and creation.
	Creation of new ponds.
	Field boundary hedgerow restoration and creation.

Information and Data Sources		
	Source	**Date**
Landuse	Ecological Evaluation of Birmingham and Black Country GIS data set, EcoRecord.	2021
Topography	OS Terrain 50 GIS data set, Ordnance Survey.	2017
Geology	British Geological Society 1:625,000 bedrock & superficial GIS web map services from BGS website: http://mapapps.bgs.ac.uk/geologyofbritain/home.html	2021
	Black Country UNESCO Global Geopark sites names and location information https://blackcountrygeopark.dudley.gov.uk/bcg/	2021
Soils	Soilscapes, Cranfield Soil & Agricultural Institute website: http://www.landis.org.uk/soilscapes/	2021
Species and Habitats	EcoRecord species and habitat databases.	2021
Ecological Connectivity	EcoRecord, The Wildlife Trust for Birmingham and the Black Country (2021) *Draft Black Country Local Nature Recovery Opportunity Map*	2021
	EcoRecord et al. (2021) *Midlands Heathland Heartland Lowland Heathland Nature Recovery Opportunity Mapping*.	2021
Historic Landscape Character Areas	Wolverhampton City Council (2010) *Black Country Historic Landscape Characterisation* [data-set]. York: Archaeology Data Service [distributor] https://doi.org/10.5284/1000030	2010
Historic Environment Area Designations	Black Country Historic Landscape Characterisation Study, Oxford Archaeology.	2019

[1] HISTORIC ENVIRONMENT AREA DESIGNATIONS

The Black Country Historic Landscape Characterisation Study has divided the Historic Environment Area Designations into four categories:

Archaeological Priority Areas (APA): sites with a high potential for archaeological remains of regional or national significance that have not been considered for designation as scheduled monuments, or where there is insufficient data available about the state or preservation of any remains to justify a designation. APAs are likely to have high archaeological and historic interest.

Areas of High Historic Townscape Value (AHHTV): areas where built heritage makes a significant contribution to local character and distinctiveness. The significance of AHHTVs is likely to be derived primarily from their architectural and historic interests. However, these areas may also have artistic and archaeological interests. Areas of High Historic Townscape Value are not limited to towns or cities, they also include villages, hamlets and areas of industry where the built heritage is considered to make a positive contribution to the historic environment of an area.

Designed Landscapes of High Historic Value (DLHHV): landscape areas that make an important contribution to local historic character but do not meet the criteria for inclusion on the national Register for Parks and Gardens. The significance of these areas is likely to arise from their historic, artistic and architectural interests, although such areas may also contain remains of archaeological interest.

Areas of High Historic Landscape Value (AHHLV): these recognise the quality of the wider landscape and their relative values. The significance of these areas arises from the natural and historic features contained within them (e.g. woodland, watercourses, hedgerows, and archaeological features). The significance of these areas is likely to be derived from their archaeological and historic interests.

[2] KEY HABITATS follows the UK Biodiversity Action Plan (BAP) Broad & Priority Habitat definitions

This is a UK-habitat classification prepared by the UK Biodiversity Group that classifies all terrestrial and freshwater habitats in the UK into 37 broad habitat types. UK BAP Priority Habitats are a range of semi-natural habitat types that were identified as being the most threatened and requiring conservation action. The original Priority Habitat list was created between 1995 and 1999 and revised in 2007. The list of Priority Habitats has been used to help draw up statutory lists of habitats of principal importance for the conservation of biodiversity in England, Scotland, Wales and Northern Ireland. The suite of habitats of principal importance for the conservation of biodiversity (formerly Priority Habitats) nest into the defined Broad Habitat Types.

[3] KEY SPECIES

Bird Indicators: Species listed under UK Biodiversity Indicator C5, Birds of the wider countryside and at sea (JNCC). The indicator shows changes in the breeding population sizes of common native birds of farmland and woodland and of freshwater and marine habitats in the UK.

Amphibians & Reptiles: All amphibian and reptile species native to the UK are included.

Mammals: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Fish: Those protected by UK or EU law, included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended), and those included on the latest B&BC LBAP list of Priority Habitats/Species.

Invertebrates: Pantheon Assemblage Types Analysis.

Flora (axiophytes): Those included on the Birmingham & the Black Country list of axiophytes (administered by EcoRecord) by four locally defined habitat types.