Staffordshire Ecological Record

Staffordshire Wildlife Trust

Audley Rural Civil Parish Natural Capital Assessment

REPORT

Staffordshire Wildlife Trust
June 2024

Contents

1. Executive Summary

Staffordshire Wildlife Trust was commissioned by Audley Rural Parish Council to carry out a Natural Capital Assessment for their parish. This document presents the current ecological network of the parish and suggests recommendations for the protection and development of the network for future generations, within the bounds of national environmental and planning policy legislation.

The landscape character of the parish is discussed. Existing data at the local level, including wildlife conservation sites, habitat, and species data is presented, alongside derived data from the Nature Recovery Network and local habitat connectivity modelling. The demand and provision of ecosystem services are also presented.

Together, this data creates the current ecological network for the parish, including:

- High habitat distinctiveness areas with statutory and non-statutory designations. These form the core areas of the ecological network;
- High habitat distinctiveness areas between these sites which act as corridors and stepping stones for dispersing species.

The document also highlights potential areas which, through positive conservation management, could be included within the ecological network in the future, as well as suggesting ways to improve connectivity by creating habitat.

2. Introduction

Natural capital assessments offer a community the opportunity to shape their local environment for future generations. By identifying and assessing local environmental opportunities and constraints at the local level, communities can make informed decisions and effectively safeguard their valuable natural assets.

2.a. National Planning Policy Framework (NPPF)

Natural capital assessments aim to deliver an evidence base for protecting and enhancing a parish's natural environment through the spatial identification of core areas of valuable habitat and the networks between them. This enables connectivity, interpretation, and integration of the parish's natural resources to deliver overall net gain for biodiversity. Identifying these spatial priorities will assist the parish in fulfilling the requirements articulated within para 180 - 188 of the National Planning Policy Framework (December 2023 publication).

The key stimulus in updating spatial environmental objectives was because of documents such as the Making Space for Nature: A Review of England's Wildlife Sites and ecological networks report by Lawton, et al. (2010), the government's 25-Year Environment Plan (2018) and most recently The Environment Act (2021).

The fundamental principles behind the Making Space for Nature report are for England's ecological network to be 'more, bigger, better and joined' to ensure the survival of species in the face of multiple pressures at a range of scales (see **section 2.b.**). The government's 25-year Environment Plan puts more impetus on the statutory need to consider the conservation of biodiversity and ensure that it is effectively accounted for through the spatial planning system and the recently published Defra Environment Act.

The Environment Act sets out environmental principles directed toward the restoration and enhancement of nature and plots a course for how these should be achieved through mapping natural capital assets at a 'local' level (Local Nature Recovery Strategies (LNRS)) and will be a key document in driving the way that these networks are developed and delivered. Staffordshire County Council is the responsible authority for Staffordshire's Local Nature Recovery Strategy development and delivery. The natural capital assessment for Audley Rural Parish Council will form an important spatial element of the LNRS and help guide policy and decision-making around environmental targets and delivery of other core areas such as biodiversity net gain.

Additionally, updated guidance through the National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023, 2019) and Planning Practice Guidance (PPG) (Ministry of Housing, Communities and Local Government, 2019) have all served to put more emphasis on the protection and conservation of nature and our natural resources through spatial planning. This provides further justification for the need to map natural capital assets, as it will create a roadmap of where these enhancements could and should go at the parish scale. This is coupled with the emergence of mandatory biodiversity net gain provision. The Biodiversity Metric 4.0 provides a means of assessing changes in biodiversity value (losses or gains) brought about by development and changes in land use management. The metric is habitat-based and considers improved ecological connectivity. The mapping outputs presented in this report are designed to inform Biodiversity Metric 4.0

site assessments, particularly concerning the strategic connectivity elements of the Nature Recovery Network mapping (see **Section 5.e.**) and targeting the connectivity impact and subsequent specific habitat selection with on and off-site habitat mitigation schemes.

2.b. Ecological Networks

Ecosystems affect our daily lives, contributing to our health, security, social relations, freedom, choice and prosperity. Their positive impact on society can be categorised in terms of the benefits, or "ecosystem services", they provide. Development (construction of grey infrastructure, e.g., roads, and buildings) reduces and fragments natural habitats and can decrease the number or quality of the services these habitats provide. Such changes may reduce opportunities to relax, learn from, and enjoy nature. Careful planning, with the consideration of how development and land use change may affect the provision of ecosystem services, can help minimise impacts on human wellbeing. The development of integrated and standardised "ecosystem services aware" planning strategies and policies is increasingly important.

Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network was submitted to Defra in 2010. It covered the current state of England's protected areas, concluding that:

- Many of England's wildlife sites were too small;
- Losses of certain habitats have been so great that the area remaining is no longer enough to halt additional biodiversity losses without concerted efforts;
- With the exception of Natura2000 sites and SSSIs, most of England's semi-natural habitats important for wildlife were generally insufficiently protected and under-managed;
- Many of the natural connections in our countryside have been degraded or lost, leading to isolation of sites;
- Too few people have easy access to wildlife.

The impact of these has led to significant declines in the provision of certain ecosystem services and biodiversity. Ecological networks and the Nature Recovery Network have both been recognised as effective ways to conserve wildlife in environments that have been fragmented by human activities and bring nature back into recovery.

Ecological networks generally have five components (***Figure 1***) which reflect both the existing and potential future ecological importance and function:

- Core areas – These are areas of high nature conservation value that form the heart of an ecological network. They contain habitats that are rare or important because of the wildlife they support or the ecosystem services they provide. They generally have the highest concentrations of species or support rare species assemblages. They include protected wildlife sites and other semi-natural areas of high ecological quality.
- Corridors and stepping stones – These are spaces that improve the functional connectivity between core areas, enabling species to move between them to feed, disperse, migrate or reproduce. Connectivity need not just come from linear, continuous habitats; several

small sites may act as ‘stepping stones’ across which certain mobile species can move between core areas.

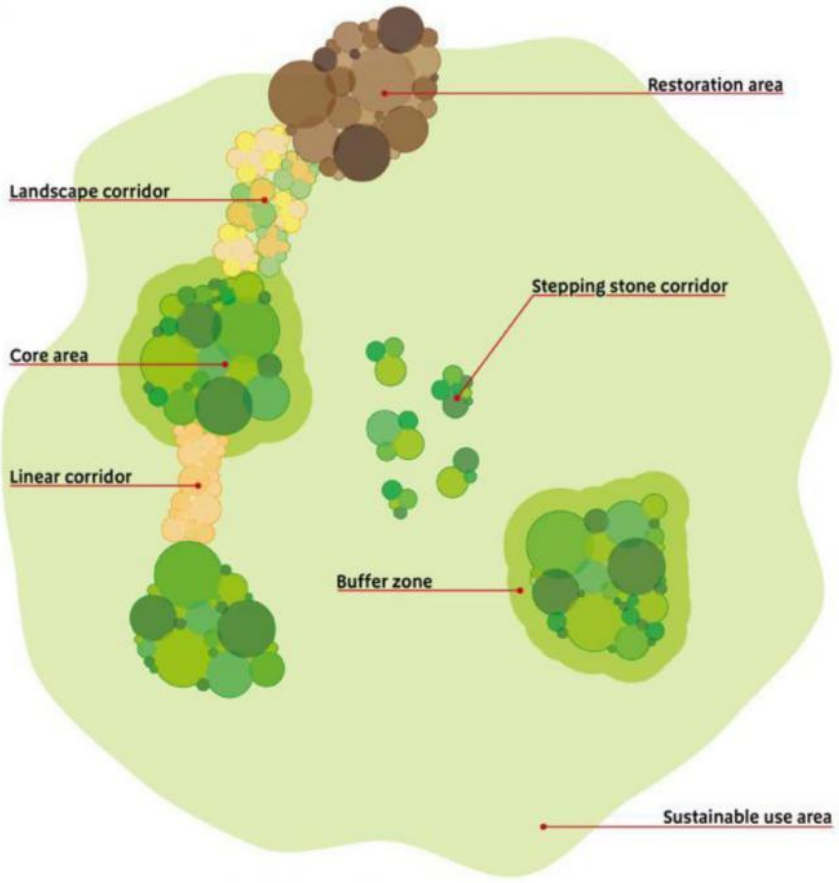


***Figure 1**. The components of ecological networks (Making Space for Nature report)*

- Restoration areas – These are areas where measures are planned to restore or create new high-value areas (with the ultimate goal of becoming ‘core areas’) so that ecological function is restored and the associated species populations can return. They are often situated to complement, connect or enhance existing core areas.
- Buffer zones – These are areas closely surrounding core areas, restoration areas, and ecological corridors and stepping stones that protect them from adverse impacts from the wider environment.
- Sustainable use areas – These are areas within the wider landscape focussed on the sustainable use of natural resources and appropriate economic activities alongside the maintenance of ecosystem services. Set up appropriately, they help to ‘soften the matrix’ outside the network and make it more permeable and less hostile to wildlife, supporting self-sustaining populations of species that are dependent upon, or at least tolerant of, certain forms of agriculture. The functions of buffer zones and sustainable use areas overlap, but the latter are less clearly demarcated than buffers and have a greater variety of land uses.

The principles of establishing coherent ecological networks are now embedded within many planning and policy documents. The NPPF (2021), includes specific guidance on conserving, restoring and enhancing ecological networks including:

- Paragraph 180 - Planning policies and decisions should contribute to and enhance the natural and local environment by:

  a) Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

  b) Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

  c) Maintaining the character of the undeveloped coast, while improving public access to it where appropriate;

  d) Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

  e) Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

  f) Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

- Paragraph 181 - Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

- Paragraph 185 - To protect and enhance biodiversity and geodiversity, plans should:

  a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and

  b) Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

3. Study Objective

In order to protect its natural environment, it is important to first identify the natural assets that exist within a parish. Within Audley Rural Civil Parish (hereafter Audley), this report aims to:

- Identify sites which are of high ecological value and currently have some form of protection, which should act as the core areas of the ecological network;
- Identify sites which connect core areas of the ecological network, acting as wildlife corridors for dispersing species;
- Identify sites which may be of reduced ecological value due to their size; however, in combination with others, form stepping stones for a dispersing species;
- Identify sites which are of potentially high ecological value, but do not currently have any form of protection. These sites could be the focus of restoration work, in order to improve the connectivity of the current ecological network;
- Identify buffer areas for the high ecological areas, which should be protected in order to mitigate the effects of development on the core areas of the ecological network.

4. Landscape Character Assessment

4.a. National Character Areas (NCA)

There are 159 National Character Areas (NCA) in England, each of which is distinctive with a unique 'sense of place'. These broad divisions of landscape form the basic units of cohesive countryside character, on which strategies for both ecological and landscape assessments can be based. The Character Area framework is used to describe and shape objectives for the countryside, its planning and management. These NCA areas are very broad and can encompass many different objectives and opportunities depending on the designated landscape and its respective character, biodiversity and challenges.

Audley is situated at the border between two National Character Areas (**Map 1**). The first, NCA 61 (Shropshire, Cheshire and Staffordshire Plain) is characterised as an expanse of flat or gently undulating, pastoral farmland which is important for food production (especially dairy farming). Its key statements of environmental opportunity are as follows:

- Restore, manage and protect from diffuse pollution the rivers, streams, lakes, ponds and wetland habitats (including floodplain grazing marsh and wet woodland) and support partnerships to maintain the integrity and unique conditions for the preservation of the internationally important meres and mosses and River Dee, to benefit water availability, water quality, landscape character, biodiversity and climate regulation.
- Protect the landscape of the plain, recognising its importance to food production and incorporating well-maintained hedgerows, ponds and lowland grassland margins within agricultural systems, to secure resource protection and maintain productivity, while reducing fragmentation of semi-natural habitats to benefit a wide range of services, such as landscape character, sense of place, water quality and biodiversity.
- Manage and restore lowland heathland and ancient and plantation woodland, support partnerships to plan appropriately scaled new woodland cover, particularly where this will link and extend existing woodlands, restore and reinstate traditional orchards and increase biomass provision to mitigate the impact of climate change, where this will benefit biodiversity, landscape character and enhance the experiential qualities of the area.

- Protect and manage the nationally important geological sites and heritage features demonstrating how the interaction of natural and historical factors influenced the distinctive character of its landscape and settlement patterns, and helping to promote a greater understanding of the link between wildlife, heritage and geodiversity, particularly the importance of former extraction sites for both geodiversity and biodiversity.

NCA 64 (Potteries and Churnet Valley) is characterised by its strong contrast between the industrial landscape of the Potteries and the pastoral, strongly dissected hills and small plateaux that flank the Churnet and Dove Valleys. The rich industrial heritage associated with the production of pottery contributed strongly to its sense of space. Its key statements of environmental opportunity are as follows:

- Manage, expand, link and buffer the characteristic semi-natural woodland and protect the ancient woodland, for example in the Churnet Valley, reducing habitat fragmentation to benefit landscape character, biodiversity, resource protection and regulation; and enhancing the recreational and experiential qualities of the NCA.
- Protect and manage the rivers, streams and springs to enhance the riverine character of the many valleys and cloughs to protect the quality of water from diffuse pollution to benefit biodiversity; and expand riparian habitats to mitigate flood events and to improve the experiential qualities of the NCA.
- Manage and expand areas of characteristic unimproved grassland pastures in the Churnet Valley and heathland and moorland of the Staffordshire Moorlands, reducing habitat fragmentation and restoring traditional boundary features to benefit landscape character, sense of place, biodiversity and resource protection while enhancing the recreational and experiential qualities of the NCA.
- Protect and manage historic landscape character and associated heritage assets that include the historic transport network and industrial heritage and improve the understanding of its intrinsic links with geodiversity, and find sustainable solutions to manage visitor pressure at popular attractions, for example, Alton Towers and Trentham Gardens, thus supporting the tourist economy and maintaining a high level of public access to enjoy the wealth of recreational experience that the NCA offers.

4.b. Staffordshire Biodiversity Action Plan (SBAP) Ecosystem Action Plan Areas (EAP)

The Staffordshire Biodiversity Action Plan (SBAP) focuses conservation efforts on the areas within the county that will result in the greatest benefit for ecological networks, habitats and species. By integrating biodiversity objectives with other environmental, social and economic needs, the SBAP aims to provide a sustainable living and working environment that benefits both people and nature. The county is split into 14 Ecosystem Action Plans (EAPs) and one Rivers Action Plan, which aims to prioritise conservation management at a landscape level and contribute to local, regional and national conservation targets.

Audley is covered by three EAPs (**Map 2**), the Wooded Quarter, Urban and Meres and Mosses. Due to its geology, the Wooded Quarter EAP covers a highly diverse area of land that ranges from marshy clay farmland and vales, wet heath moor and boglands, stream valleys and washlands, free-draining upland estates and large areas of dry heathland and

woodland. The north of this area is characterised by mixed arable and pastoral farmland across a rolling landform with numerous broadleaved and coniferous woodlands. Especially important in this landscape are the many marl pits, five meres and mosses sites (covered in the Meres & Mosses EAP) and a series of small brooks and canals. In the centre and south, land use varies from intensive arable and pastoral farming, where hedgerows are in decline, to pastoral uses of small-scale field patterns resulting in intimate areas in which large grown-up intact hedges and numerous hedgerow oaks. Ponds are frequent and woodland cover can consist of broadleaved or conifer plantations with linear woodland along stream corridors and ridge tops. The clay area west of Newcastle is a key area for great crested newts.

Priority habitats within this area are native woodlands, wood pasture and parkland. The following points provide guidance for landscape management and built development within this EAP:

- Promote the use of the English Woodland Grant Scheme to create areas of native woodland and carry out sustainable woodland management;
- Thinning of conifer plantations on Planted Ancient Woodland (PAW) sites to facilitate a reversion back to broadleaved woodland;
- Landscape-scale removal of conifer plantations on heathland inventory sites and expansion of the heathland resource on a scale that ensures it is robust enough to withstand eradication through climate change (minimum 30ha blocks with links to other sites);
- Actively engage and promote agri-environment schemes to landowners (e.g. higher-level stewardship schemes) as a source of funding for promoting good practices for maintaining biodiversity;
- Ensure that sustainable practices are adopted to enhance the biodiversity of the area while still maintaining it as a living and working environment;
- There are several large commercial woodlands in this area giving rise to the potential of partnership projects to promote the aims of the EAP. Of the woodlands found on the Hanchurch Hills, Burnt Wood and Bishops Wood are ancient woodland sites and Swynnerton Old Park was a former heathland;
- Several restored sites such as Silverdale and Apedale, and active clay pits give potential for the creation of BAP habitats in restoration;
- Where no other solution is viable, and development has a negative impact on semi-natural habitats, mitigation can make a real and positive contribution to the creation of new sites and networks;
- Biodiversity, connectivity and climate change adaptation measures could be secured through green infrastructure implementation and development mitigation;
- Future urban development can present opportunities to create new accessible natural open spaces or areas within existing sites which are of sufficient quality and appropriate type to draw people away from current sensitive sites;

- Utilise opportunity mapping work to expand priority BAP habitats, develop an ecological network, assist with climate change adaptation and in turn meet West Midlands and local targets.

Urban centres are often considered to be less important for biodiversity than rural environments. However, urban environments provide a diverse, and often highly specialised, range of animals and plants in several important habitats such as green spaces, brownfield sites and private gardens. A continually expanding human population has meant that the sustainable development of urban centres is crucial in maintaining, and improving, the level of biodiversity in each urban area. Not only will this be important for biodiversity itself, but it also provides a direct link for the public to enjoy nature and improve the overall quality of life. Urban areas of high biodiversity will benefit from environmental and economic benefits such as cleaner air and more recreational activities.

The priority habitats within these landscapes are lowland meadows, native woodland and open mosaics on previously developed land. The following points provide guidance for landscape management and built development within this EAP:

- Actively engage and promote agri-environment schemes to landowners (e.g. higher-level stewardship schemes) as a source of funding for promoting good practices for maintaining biodiversity;
- Ensure that sustainable practices are adopted to enhance the biodiversity of the area while still maintaining it as a living and working environment;
- Incorporate and promote positive biodiversity use of allotments and gardens;
- The conservation value of open mosaic habitats is often overlooked and mismanagement by conservationists or local authorities in turning it into more 'attractive green spaces' is a particular problem. These habitats support many species and some habitat types that are a priority for nature conservation and need to be managed accordingly;
- Mitigation must ensure that new sites draw people away from current sensitive sites and make a positive contribution to the area. Where no other solution is viable and development has a negative impact on semi-natural habitats mitigation can make a real and positive contribution to the creation of new sites and networks;
- Encourage the use of sustainable development technologies to benefit biodiversity such as Sustainable Urban Drainage Schemes and Green Roofs;
- Biodiversity, connectivity and climate change adaptation measures could be secured through green infrastructure implementation and development mitigation;
- Utilise opportunity mapping work to expand priority BAP habitats, develop an ecological network, assist with climate change adaptation and in turn meet West Midlands and local targets.

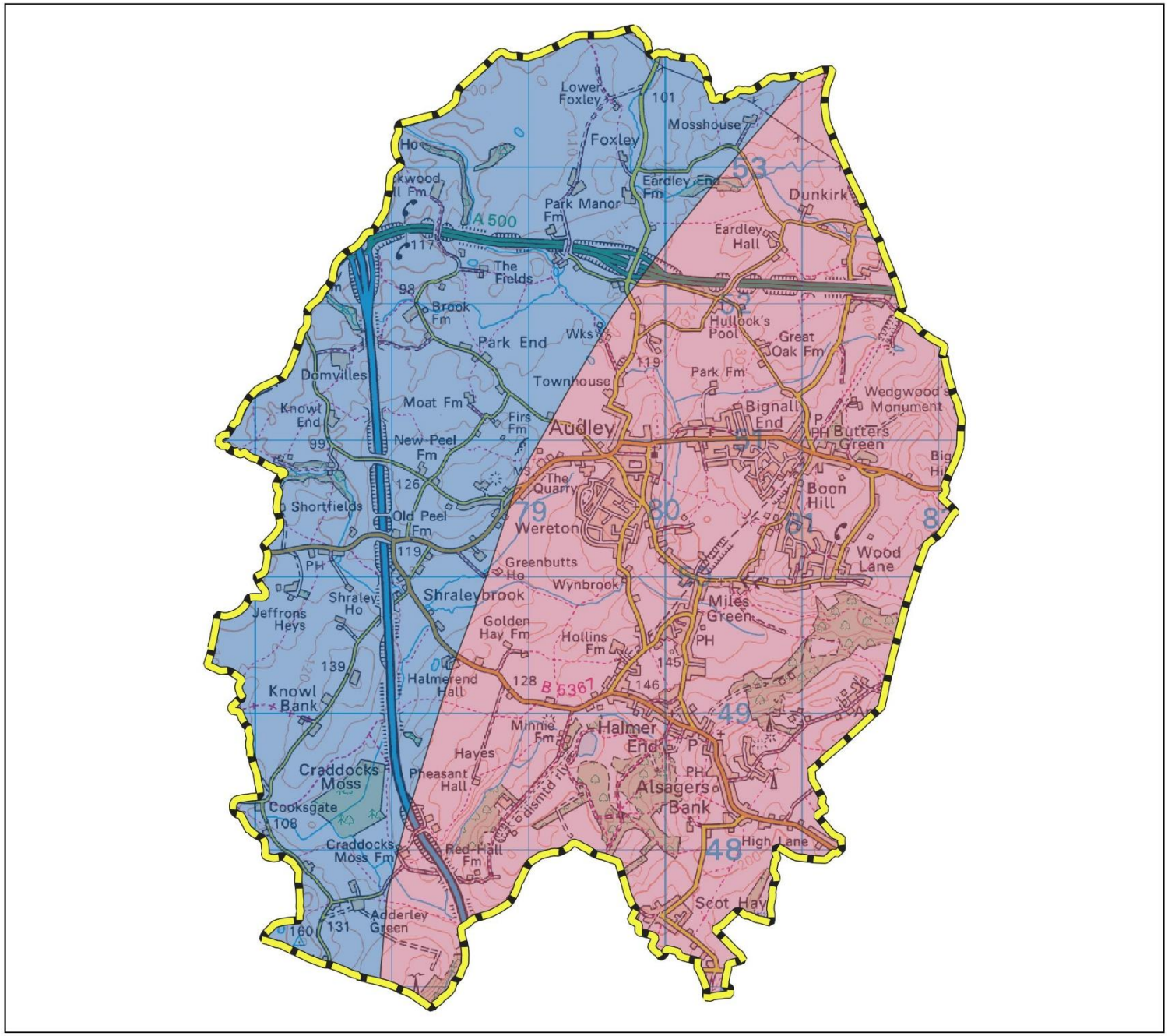
The Meres and Mosses EAP forms part of a wider network that spans across Shropshire and Cheshire. Meres are water bodies in hollows that have been formed during the retreat of the last glaciers. They are often associated with a variety of wetland habitats that illustrate the natural progression of open water habitats through to swamp and fen and then wet willow or alder woodlands. Mosses are bog communities that have developed in very acidic conditions

in glacial hollows due to a build-up of peat. Both meres and mosses provide habitats for an extensive range of rare and highly specialised plant and animal communities.

Priority habitats within this EAP are Lowland Raised Bog, Fen and Eutrophic Standing Water. The following points provide guidance for landscape management and built development within this EAP:

- Actively engage and promote agri-environment schemes to landowners (e.g. Higher level stewardship schemes) as a source of funding for increasing, connecting and managing new and existing habitats and to reduce diffuse pollution impacts on mere and moss habitat;
- Work needs to be carried out at a sub-catchment scale with surrounding landowners to tackle water quantity and quality issues;
- Creation or expansion of buffer zones around all sites should also be encouraged to minimise the direct impact of pollution, enrichment and encroachment from site edges;
- Ensure that sustainable practices are adopted to enhance the biodiversity of the area while still maintaining it as a living and working environment;
- Utilise opportunity mapping work to expand priority BAP habitats, develop an ecological network, assist with climate change adaptation and in turn meet West Midlands and local targets.

Map 1 – National Character Areas (NCA) Map



Staffordshire Ecological Record

Audley Rural CP

National Character Areas

Key

Audley Rural Parish

National Character Areas

NCA 61 - Shropshire, Cheshire and Staffordshire Plain

NCA 64 - Potteries and Churnet Valley

Date Produced: 21/05/2024

0 0.75 1.5 km

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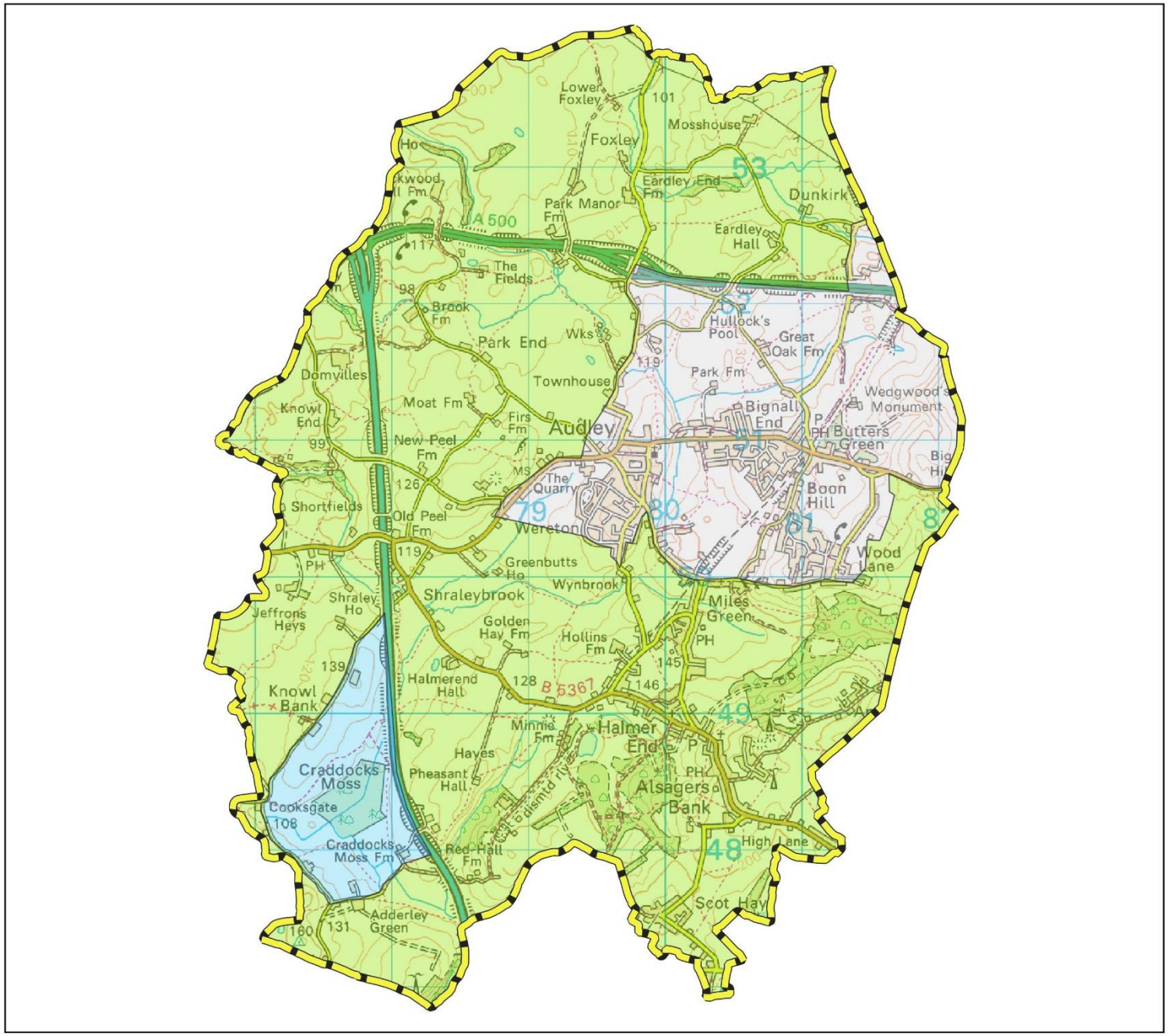
SER/24/209

Map 2 – SBAP Ecosystem Action Plan (EAP) Areas



Audley Rural CP

SBAP Ecosystem Action Plan (EAP) Areas

Key

Audley Rural Parish

EAP Areas

- Meres & Mosses
- Urban
- Wooded Quarter

Date Produced: 21/05/2024

0 0.75 1.5 km

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5. Local Area Assessment

5.a. Habitat

Habitat data is mostly classified based on the Phase 1 Habitat System. However, there may also be National Vegetation Classification (NVC) or other habitat survey system data as well. Cover within the parish is 99%.

5.b. Protected/Notable/BAP Species

Species data was retrieved from the Staffordshire Ecological Record (SER) database. The resulting list contains records of European and UK protected species, Species of Principal Importance, species occurring on the UK Biodiversity Action Plan (BAP) (shortlist), Staffordshire BAP and species listed on the Red Data Lists.

5.c. Nature Conservation Sites

Site data was retrieved from the Staffordshire Ecological Record (SER) database. The resulting list contains sites within the survey area with a statutory designation:

- Site of Special Scientific Interest (SSSI) – an area designated to protect the UK's best examples of natural habitats, wildlife species, and geological or physiographical features.
- NNR (National Nature Reserves) – an area which is among the best examples of a particular habitat in the country;
- LNR (Local Natures Reserves) – a protected area of land designated by a local authority because of its local special natural interest and, where possible, educational and community value;

A non-statutory designation:

- SBI (Sites of Biological Importance) – equivalent to County Wildlife Sites (*i.e*. of County Importance) and are included in the Local Plans of Staffordshire's Local Authorities with a presumption against development;
- BAS (Biodiversity Alert Sites) – of Local Importance for Nature Conservation or other areas of interest for wildlife where there may be potential to improve the habitat to SBI standard with appropriate management. These sites are not normally included in the Local Plans;
- SWT and RSPB Nature Reserves;
- RIGS Sites – Regionally Important Geological/geomorphological Sites, also known as Local Geodiversity Sites;

Together with a list of woodlands listed on Natural England's Ancient Woodlands Inventory (AWI). These are woodlands that there is sufficient evidence to suggest that they are over 400 years old.

5.d. Historic Nature Conservation Sites

Historic Nature Conservation Site boundaries show sites which were surveyed during the 1980's. These may still possess high biodiversity; however, they currently do not meet the modern criteria for a non-statutory designation (SBI and BAS).

5.e. Waterway Condition

The Environment Agency (EA) assesses the current health of the water environment in terms of its status. Surface waters are assessed for ecological status or potential and chemical status. A range of quality elements are assessed in each water body. Every element assessed must be at good status or better for a water body to achieve good status. If one element is below its threshold for good status, then the water body's status is classed as less than good.

Surface water chemical status can be classed as good or fail. Ecological status can be classed as:

- **High**, which represents waterways with near natural conditions. There are no restrictions on the beneficial uses of the water body and no impacts on amenity, wildlife, or fisheries.
- **Good**, which represents waterways with a slight change from natural conditions because of human activity. There are no restrictions on the beneficial uses of the water body, there is no impact on amenity or fisheries and all but the most sensitive wildlife is protected.
- **Moderate,** which represents waterways with a moderate change from natural conditions because of human activity. There are some restrictions on the beneficial uses of the water body, with no impact on amenity, however, there is some impact on wildlife and fisheries.
- **Poor**, which represents waterways where there is a major change in natural conditions because of human activity. There are some restrictions on the beneficial uses of the water body, some impact on amenity and a moderate impact on wildlife and fisheries.
- **Bad**, which represents waterways with a severe change from natural conditions because of human activity. There is a significant restriction on the beneficial uses of the water body and major impacts on amenity, wildlife and fisheries. Many species are not present.

Where an element is classified as being at less than good status, an assessment is needed of the measures that could be taken to improve the status to good. In order to identify appropriate measures, it is first necessary to understand the cause of the failure. Likewise, where the status has been thought to have gotten worse, reasons for deterioration may have been assigned. The activities (e.g. sewage discharge, poor management) thought to be contributing to these are stated.

Not every stretch of a waterway is assessed. Where notable stretches of waterway are present, however, have not been assessed directly, a blue line, from the OS Open Rivers dataset, is used to show this river.

Appendix II contains a table which contains a summary of the latest report (2019) for cycle 2. It also contains links to the full open-source report for each catchment if further information, including other years and cycles, is required.

5.e. Nature Recovery Network – Strategic Significance

The Strategic habitat area methodology we have applied was developed and is currently being implemented by Warwickshire County Council (WCC) and was developed in partnership with Warwickshire Habitat Biodiversity Audit (WHBA), The University of York and Warwickshire Wildlife Trust. The methodology forms part of WCC's Sub Regional Green Infrastructure Strategy and is used in targeting areas for habitat enhancement through biodiversity offsetting compensation.

This model was chosen for this assessment because it can be relatively easily applied with the habitat data available; it is robust having been peer-reviewed during development, it is already in use by an adjacent local authority and it is based on the fundamental principles of habitat connectivity identified in Making Space for Nature.

The model assesses the proportion of broad habitats e.g. woodland, grassland, heathland etc. within an area to determine whether these are 'strategic', 'semi-strategic' or 'non-strategic' for the creation or restoration of further habitat based on the proportion of habitat already present in the area.

The strategic habitat areas were produced using the composite habitat dataset identified in the evidence-based review. Firstly, specific higher-quality habitats were selected and isolated from the composite habitat map (e.g. heathlands or species-rich grassland etc). The proportion of the selected habitats that overlap individual Ordnance Survey 100m grid squares was then calculated in a GIS package and each square was subsequently classified into one of the area bands below, based on the proportion of habitat overlapping the 100m square.

The strategic habitat areas can be viewed as a hierarchy when it comes to the creation of a particular type of habitat:

- **Strategic areas.** These areas already have over 30% area of high-quality semi-natural habitat within the 100x100m square but more would still be of benefit.
- **Semi-strategic areas.** There is between 5-30% of high-quality semi-natural habitat in a 100x100m square, additional high-quality semi-natural habitat would improve the function of the network greatest in these areas.
- **Non-strategic areas** are where there is very little or no high-quality semi-natural habitat, where it would be difficult to create enough high-quality semi-natural habitat for it to be functional. (This is not to say that semi-natural habitats should not be created in this area but that it is lower in the overall hierarchy).

The strategic area mapping described will be crucial in delivering the fundamental principles in the making space for nature report and in delivering against 30by30 priorities.

Using this methodology, it is possible to create a coarse overall 'connectivity map' by highlighting the areas with the highest combined overall habitat availability and connectivity as opposed to those areas where it is best to create habitats.

The strategic areas are not static and are merely a snapshot in time, changes are an inevitable part of the mapping as available habitat data changes. To an extent the strategic areas mapping is self-fulfilling, as opportunities to enhance habitats described by the map are

practically implemented on the ground, mapped through subsequent monitoring and the new habitat data being incorporated into future maps will influence future mapping iterations.

5.f. Nature Recovery Network – Habitat Distinctiveness

Habitat distinctiveness mapping is one of several elements included within the Statutory Biodiversity Net Gain Metric, using habitat as a proxy for wider biodiversity value by associating and scoring different habitat types according to their relative biodiversity value. An example of this would be Wetland Fens categorised as very highly distinctiveness (higher biodiversity value) whereas intensively managed amenity grassland or highly improved agricultural arable land would be categorised as low distinctiveness (lower relative biodiversity value).

The criteria used for the creation of the habitat distinctiveness map was based on the Statutory Biodiversity Net Gain Metric which loosely defines what habitats are included within each distinctiveness band. These metrics are currently emerging and form the basis of the Environment Act but represent the most comprehensive set of standards on which to base the distinctiveness mapping on.

The distinctiveness map was produced using Phase 1 habitat data by associating a distinctiveness value to each specific habitat type (e.g. arable land) in a GIS package based on translation guidance provided in the Statutory Biodiversity Metric, selecting, and isolating the habitats spatially into the 5 respective distinctiveness bands. Further ratification to the irreplaceable habitats in the very high distinctiveness band was completed by use of priority habitat inventory (Ancient Woodland Inventory & Long Established Woodland) boundaries. A spatial GIS file was produced for each distinctiveness band.

Habitat distinctiveness mapping provides multiple uses outside of the biodiversity metric 2.0, including:

- Identifying areas of high biodiversity value that are a priority for protection and expansion within a local plan whilst working in line with biodiversity mitigation hierarchy (avoid, minimise, remediate, compensate).
- Flagging areas that may contain medium-value (semi-natural) habitat. These could be highlighted in policy as requiring a comprehensive biodiversity evaluation if they are put forward for planning purposes (based on mitigation hierarchy). Biodiversity offsetting/compensation may be required in these areas if they are developed.
- Identifying possible wildlife corridors which can be highlighted and designated as part of a local plan/Green Infrastructure Strategy. These areas could be the target of restoration projects/funding/aspirational opportunity areas funded through development compensation (obviously the allocation of funds is based on broad-scale spatial analysis as opposed to the methods of calculating the offsetting requirement of a specific site).

to the way that habitat creation and enhancement risks are accounted for. The mitigation hierarchy is in the desirability order as follows:

- **Avoid** – Where possible habitat damage should be avoided
- **Minimise** – Where possible habitat damage and loss should be minimised

- **Remediate** – Where possible any damaged or lost habitat should be restored
- **Compensate** – As a last resort, damaged or lost habitat should be compensated for

The mitigation hierarchy corresponds with the habitat distinctiveness mapping, e.g. very high distinctiveness habitats such as irreplaceable ancient woodlands should be avoided from development and 'low' value habitats should be compensated.

The habitat distinctiveness mapping is based on available habitat data and the designated nature conservation site boundaries for the District, including the UK Biodiversity Action Plan (UKBAP) and priority habitat areas.

Habitat distinctiveness mapping does not include species explicitly. Instead, it uses broad habitat categories as a proxy for the biodiversity 'value' of the species communities that make up different habitats. The metric does not change existing levels of species protection and the processes linked to protection regimes are outside the scope of the metric.

Habitats are assigned to distinctiveness bands based on an assessment of their distinguishing features including for example rarity (at local, regional, national and international scales), and the degree to which a habitat supports species rarely found in other habitats. It must also be noted that this mapping is at a broad district-wide scale for identifying risks where there may potentially be losses to important habitats. Full ecological surveys and Preliminary Ecological Appraisals (PEA) or Environmental Impact Assessment (EIA) should be carried out at a site-specific level to determine the ecological value and amount of 'biodiversity units' at a site level.

Habitat distinctiveness mapping limitations

The distinctiveness mapping has been carried out using a desk-based methodology utilising available habitat datasets at a landscape scale with a view of being able to quickly determine on a wider scale the likely impacts of a development. As such the landscape level distinctiveness map in some cases may not provide an accurate account of a site's full habitat distinctiveness at a finer scale (for example at the site level). Due to this, developments requiring distinctiveness mapping as part of biodiversity net gain analysis should be subject to a thorough Preliminary Ecological Assessment (PEA) to determine the full extent of in situ habitats and the expected biodiversity impact of any potential habitat loss or damage.

5.g. Nature Recovery Network – Habitat Connectivity Opportunity

The strategic areas mapping described previously still leaves gaps between areas deemed to be strategic or semi-strategic for a particular habitat type, therefore the creation of habitats solely within these areas may still end up leaving isolated habitat patches which potentially do not link to one another within a landscape. In the interests of driving habitat creation in the direction of connecting these isolated spaces, it is important to map an aspirational 'ideal' connected habitat network to work toward a Nature Recovery Network.

Using local knowledge coupled with additional datasets including soils, nature conservation site boundaries, Staffordshire Biodiversity Action Plan (SBAP) Ecosystem Action Plan Areas (EAPs and priority habitat inventories along with a piece of ecological modelling software called Condatis (full explanation discussed in Local Habitat Connectivity), it was possible to further scrutinise and refine the strategic areas map to define comprehensive Habitat Connectivity Opportunity (HCO) areas map for the District based on individual habitats.

The HCO areas add an additional dimension to the strategic areas modelling detailed previously to define where habitats are both already well connected and crucially broadly identify where to direct the delivery of habitat creation or restoration to create a connected habitat network.

Habitat Connectivity Opportunity Areas Rationale

The decision to use Condatis to build upon the strategic mapping was in part due to the fact the software has previously been used to identify habitat connectivity in other areas of the county (Churnet Valley Landscape Ecology Pilot Partnership in 2014), where it worked well at identifying rough habitat corridors. Condatis also works on a per habitat basis it is therefore possible to analyse habitat connectivity on an individual habitat basis. Condatis has some limitations in that it only takes into account a single habitat at a time and does not account for other potential connectivity barriers, for example, urban areas. It is therefore crucial that these outputs were vetted against other relevant datasets such as soil data; ensuring that identified connectivity opportunities fall in line with the SBAP EAP areas and that crucially the connectivity opportunity areas correspond with how local expert knowledge would expect the habitat connectivity areas to look in the District, to sense check what is produced by the models.

5.h. Habitat Wildlife Corridor Network

Using the habitat map from **section 5.a.**, a map highlighting the networks of key habitats, split into four broad habitat types (woodland, grassland, wetland and heathland), was created. Specific habitat types (mostly Phase 1 habitat types) included in each broad habitat are listed in **Appendix I.** The quality of the habitat is not included in this map.

This map was also used in the base maps within **section 5.j**.

5.i. High Distinctiveness Network

Using the Habitat Distinctiveness map created in **section 5.f.,** this map shows just the habitats listed as of high distinctiveness, very high distinctiveness and potentially locally irreplaceable. A 15 m buffer was also added to the network to ensure that corridors are substantial enough to protect the valuable habitats identified.

5.j. Local Habitat Connectivity

Condatis works by modelling a landscape of habitats as if it were an electrical circuit (***Figure 2***). A circuit board consists of several wires joining up resistors in combinations. When a voltage is applied to the board at one end, the current will pass through the board to the other end but the amount of current passing through each wire will vary according to the resistances it meets through each pathway. Condatis considers a landscape as analogous to a circuit board, with a source population of species being considered the voltage, the links between habitat useable by these species being the resistors, and the flow of species colonising the available habitat across those links being considered the current. Condatis can measure the flow of a hypothetical species across a landscape based on the availability of a distinct habitat category e.g. woodland or grassland.

Habitat source and target locations are specified: the source either represents a nominal population of species or an actual population (in this case a nominal population was used), and the target represents an area for eventual colonisation. The direction of travel is defined by the placement of the source and target and will depend on the purpose of the study. A south-north orientation was chosen for the source and target to reflect the likely species movement change in response to climate change. Condatis looks at how the habitat in between the source and target could contribute to the species' progress over multiple generations, so it is not designed to look in detail at individual patch-to-patch movements.

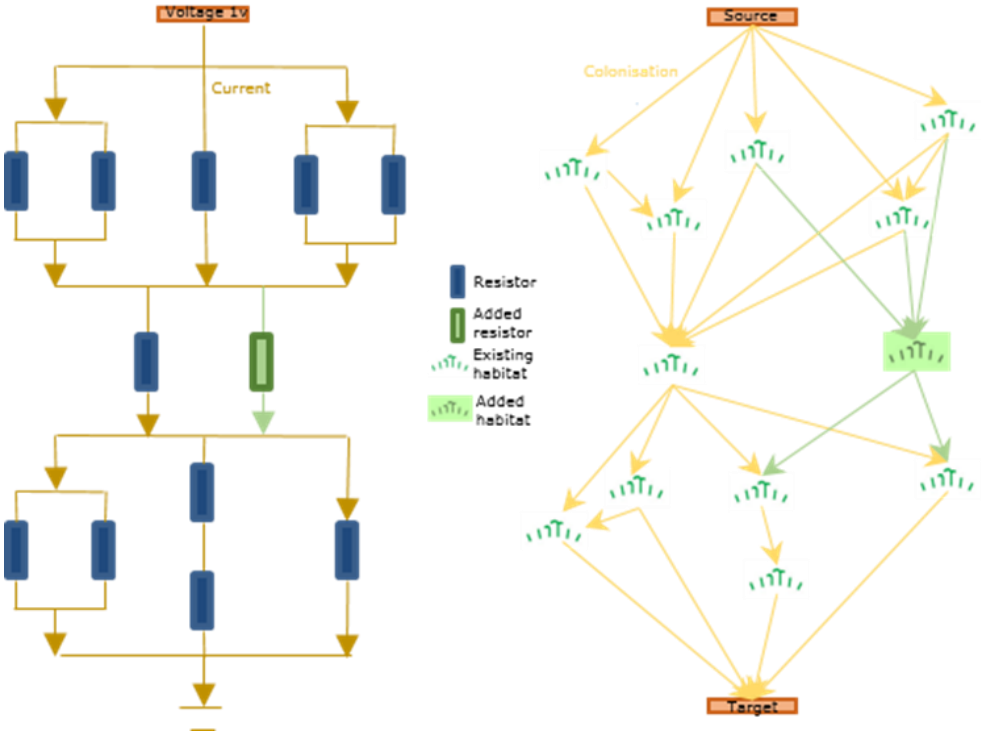


***Figure 2**. Electrical circuit on the left and comparable stylised habitat map on the right. Green represents adding a resistor or additional habitat to each to increase the number of pathways available and therefore improve the flow.*

Condatis requires inputs derived from ground data/expert knowledge to run. This included the reproductive rate, which is effectively the number of emigrants leaving each 1km^2 of suitable habitat each generation, and dispersal distance, which is the distance from where the parent is born to where the offspring is born. As there was no focal species, three colonisation speeds were used to represent species with:

- Slow colonisation – a low reproduction rate and low dispersal distance;
- Medium colonisation – a medium reproduction rate and medium dispersal distance;
- Fast colonisation – a fast reproduction rate and fast dispersal distance.

For each broad habitat (grassland, heathland, wetland and woodland, see **section 5.h.**), as well as all habitats, three maps are given at each colonisation speed:

- Flow. This highlights where the focal species is most likely to colonise between the source (the south of the parish) and the target (the north of the parish). Cells with high flow are priorities for conservation because, if they were lost, the overall speed is likely to suffer.

The flow is sometimes very "concentrated" in one major route through the landscape, and sometimes more diffused.

- Progress. Habitat patches near to the source will have progress values close to 0 (start) and patches near to the target will have progress values close to 100 (end). This indicates the order in which cells are likely to be colonised through time. For example, out of the overall time taken to reach the target, half will be taken getting to wherever the progress shows 50, and the other half of the time will be taken crossing the rest of the landscape. If the landscape is very blocky (big blocks of habitat with big gaps), the cells within one block will be close together in progress (because the species will spread through there very quickly), and between blocks, there will appear to be gaps in progress (because there will tend to be a long wait before the next block gets colonised).
- Bottleneck. This helps to identify the places where new habitats would be most beneficial to colonisation speed. In the Condatis model, every cell has a link (however weak) to every other cell. By looking at the properties of these links we can find those that straddle bottlenecks. A place is a bottleneck if it has high resistance and yet forms part of one of the best available routes through the landscape. If habitat were added on or around the lines representing these bottleneck links, then the whole route would have significantly higher flow. Therefore, the map of the top bottleneck links gives suggestions of where you would ideally add habitat if you could only make one change to the network. Since every cell in the landscape is connected to every other cell in the landscape there are a large number of links. It would be meaningless if all the links were plotted. Instead, the software plots only the links that have the greatest power relative to the cumulative power. The number of links plotted is controlled by the value set when creating the job.

The models are presented in **Map 15-19** for slow colonisation, as this presents the most likely scenario for a colonisation species. The models for fast and medium colonisation are presented in Appendix III. Additional Habitat Local Connectivity Maps.

5.k. Natural Capital & Ecosystem Services

EcoservR is a tool for mapping natural capital assets and ecosystem services. It is a rewrite of Ecoserv-GIS (Durham Wildlife Trust) and is currently being developed and tested at Liverpool John Moores University in collaboration with Natural Capital Solutions, Forest Research, and the Cheshire Wildlife Trust. The work is supported by Defra and the Natural Capital Working Group in the Liverpool City Region.

The toolkit generates an environmental baseline classifying over 200 habitat types based on a range of nationally available and mostly free datasets. It then uses spatial models to map their capacity to provide a range of ecosystem services. These areas of capacity are graded according to the predicted level or quality of the service they may be able to provide, using service-specific geospatial indicators. For certain services there may be features that restrict the capacity of an ecosystem to deliver a service, for example, if an area is publicly or easily accessible or not. In such cases, maps of both unrestricted capacity (e.g. only within accessible areas) and restricted capacity (all areas, even if not accessible) are produced.

The level of societal demand for a particular service is also modelled. This is estimated by measuring the relative number of potential beneficiaries, and the possible level of

improvements to health and well-being that a service could provide to them (e.g. the Index of Multiple Deprivation Health scores are used to estimate the demand for the health benefits of the accessible nature service). For those ecosystem services that relate to the regulation of hazards, the hazard areas are identified first and then only these areas are graded according to demand by combining the likelihood of the hazard occurring (regulatory need) and levels of societal demand.

Capacity and demand maps can then be analysed to identify opportunities and “pinch points”, to plan and deliver interventions where they are best suited and most needed. Ecosystem services modelled by EcoservR are described in **Table 1**. Currently, demand models are only available for air purification, climate regulation and noise regulation.

Table 1. *Capacity and demand models for ecosystem service modelled using EcoservR.*

Ecosystem Services	Description	Capacity/ Demand
Air Purification	Urban areas where people benefit from vegetation cover that helps to remove vehicle emissions from the air. The capacity of the natural environment to provide air purification is mapped by assigning air purification scores to broad habitat types based on their ability to trap pollutants and then identifying areas around the vegetation where air pollution may be reduced. Societal demand (need) for air purification is mapped by calculating population density in urban areas. The regulatory demand (need) for air purification is mapped by estimating traffic-based air pollution levels. These are calculated using reverse distance from roads, by road type, assuming higher traffic use on higher category roads.	Capacity/ Demand
Carbon Capacity	The storage of carbon in above and below-ground biomass. The capacity of the natural environment is mapped by assigning potential carbon storage values per mapped habitat type based on peer-reviewed literature. Values map typical habitat storage levels and levels within the upper 30 cm of soils.	Capacity
Climate Regulation	Areas where the natural environment may help to mitigate the urban heat island effect due to the cooling impact of the types and configurations of habitat that are present. The capacity of the natural environment is mapped based on the presence of water bodies and various types of green space within the local environment. The regulatory demand (need) for local climate regulation is mapped by calculating the proportion of urban land cover within the local environment. Societal demand (need) for local climate regulation is mapped based on population density, and population vulnerability to raised temperatures and heat waves, based on age.	Capacity/ Demand
Noise Regulation	Urban areas where people benefit from vegetation that helps to diffuse and absorb traffic noise. The capacity of the natural environment is mapped by assigning a noise regulation score to vegetation types based on height, density, permeability and year-round cover. The demand (need) for noise regulation is mapped by estimating noise volume levels and the potential societal impacts of noise. Potential noise volumes are calculated based on Euclidean distance from roads, railways and airports. Volume is estimated based on distance from the noise source, weighted according to source type. The societal need is mapped based on population density and health IMD scores.	Capacity/ Demand
Pollination	Allotments, orchards and areas of agricultural land where natural pollinators may contribute to crop yield and stability. The capacity of the natural environment to provide pollination is mapped based on the likelihood of pollinator visitation, calculated using likely travel distance from pollinator habitat.	Capacity

Flood Mitigation	At the time of writing, there is no literature provided by EcoservR to describe how the model for flood mitigation capacity was achieved.	Capacity

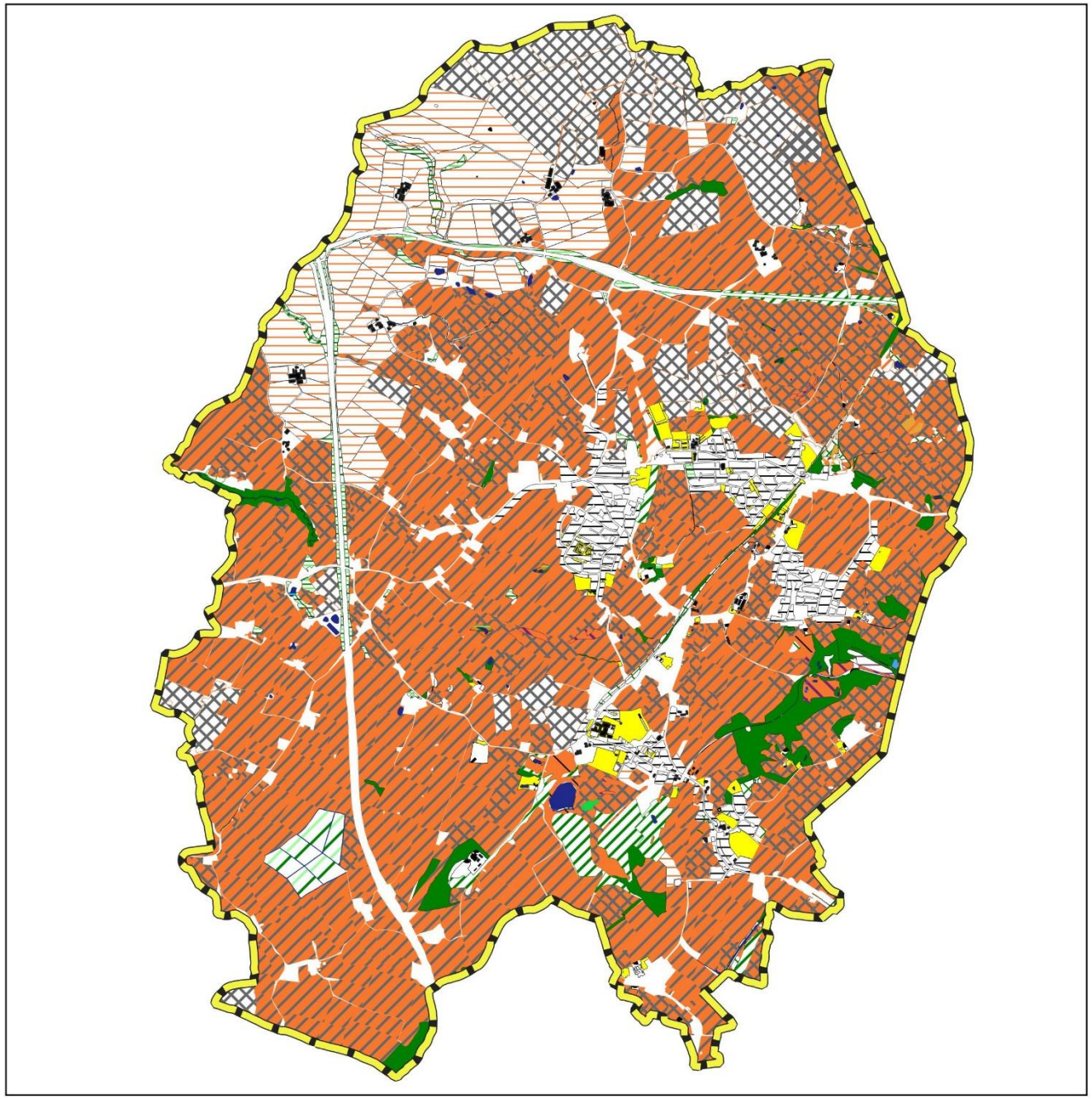
5.I. Land in Environmental Stewardship and Countryside Stewardship Schemes

Environmental Stewardship (ES) is a land management scheme. The Rural Payments Agency (RPA) manages existing agreements until they reach their agreed end date. There are 3 levels to the scheme:

- Entry Level Stewardship (ELS) – includes Uplands ELS: simple and effective land management agreements with priority options
- Organic Entry Level Stewardship (OELS) – includes Uplands OELS: organic and conventional mixed farming agreements
- Higher Level Stewardship (HLS) - more complex types of management and agreements tailored to local circumstances.

Similarly, Countryside Stewardship (CS) provides financial incentives for farmers, foresters and land managers to look after and improve the environment. CS protects and enhances the natural environment by increasing biodiversity, improving habitats, expanding woodland areas, improving water quality, improving air quality and improving natural flood management.

Map 3 – Habitats



Staffordshire Ecological Record

Audley Rural CP

Detailed Habitat Map

Note: Most names refer to habitats in the Phase 1 Habitat Survey. Names with astericks refer to habitats listed in the Integrated Habitat System.

Key

- Audley Rural CP Boundary
- Woodland
- Broad-leaved Woodland
- Semi-Natural Broad-leaved Woodland
- Plantation Broad-leaved Woodland
- Coniferous Plantation Woodland
- Mixed Plantation Woodland
- Dense Scrub
- Scattered Scrub
- Grassland (Possibly Unimproved)*
- Unimproved Acid Grassland
- Semi-proved Acid Grassland
- Unimproved Neural Grassland
- Semi-improved Neutral Grassland
- Improved Grassland
- Marshy Grassland
- Poor Semi-improved Grassland
- Bracken
- Continuous Bracken
- Tall Ruderal
- Dry Dwarf Shurb Heath
- Wet Dwarf Scrub Heath
- Lichen/Byrophyte Heath
- Dry Heath/Acid Grassland Mosaic
- Flush and Spring
- Swamp
- Marginal Vegetation
- Standing Water
- Running Water
- Arable
- Amenity Grassland
- Built-Up Areas and Gardens*
- Short Perennial
- Buildings
- Bare Ground
- Other Habitat

0 1 2 km

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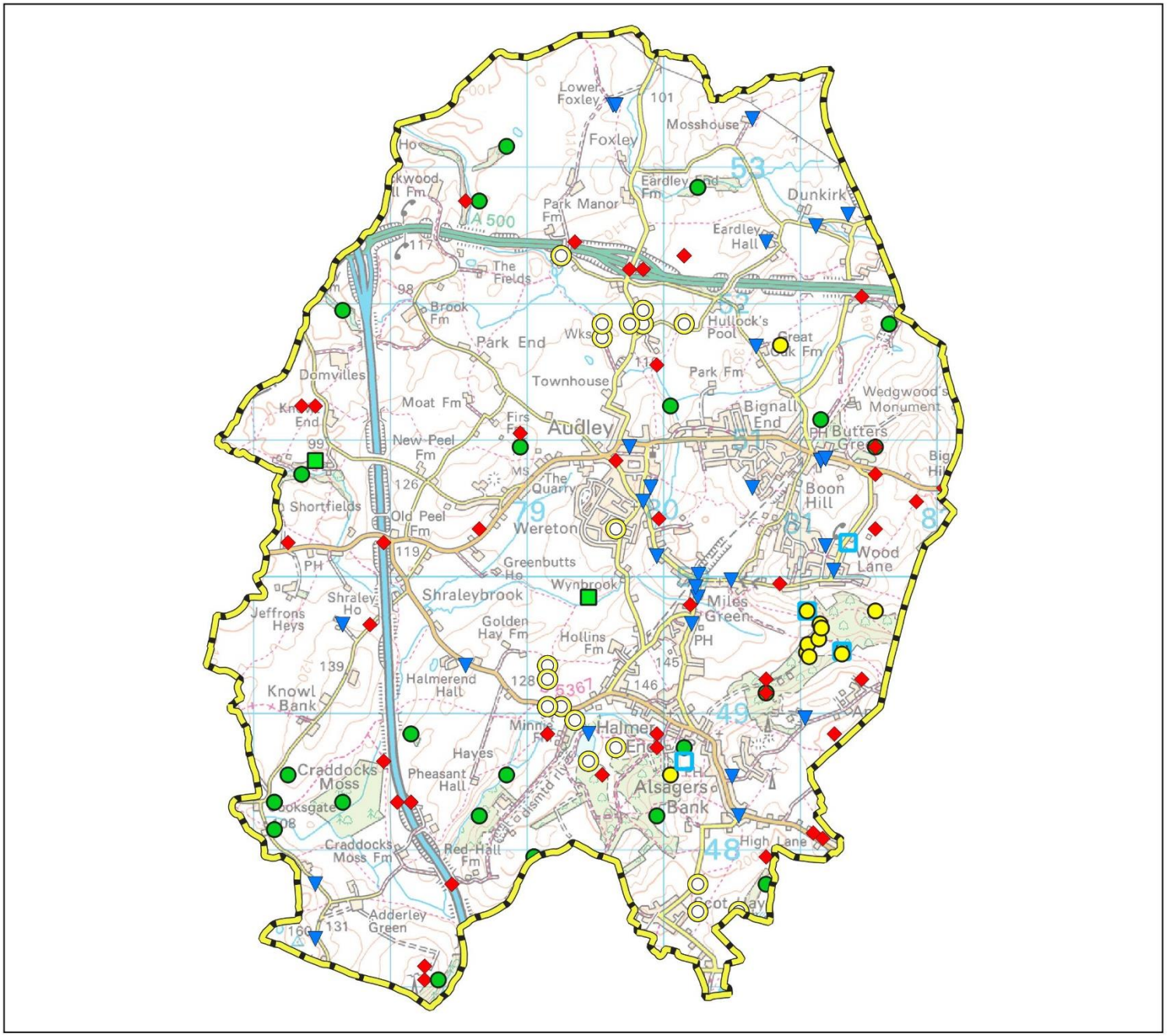
Map 4 – Protected Species



Staffordshire Ecological Record

Audley Rural CP

Protected Species

Note: Where there are multiple species records for the same grid reference, the dot for one species may obscure the dots. Badger records are excluded and only 100 m precision records are plotted.
* Excludes otherwise named species.

Key

- Audley Rural CP
- All Bird Species
- Bluebell (Hyacinthoides non-scripta)
- Mammals*
- All Bat Species
- Amphibians & Reptiles*
- Great Crested Newt (Triturus cristatus)
- Water Vole (Arvicola terrestis)

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0 0.75 1.5 km

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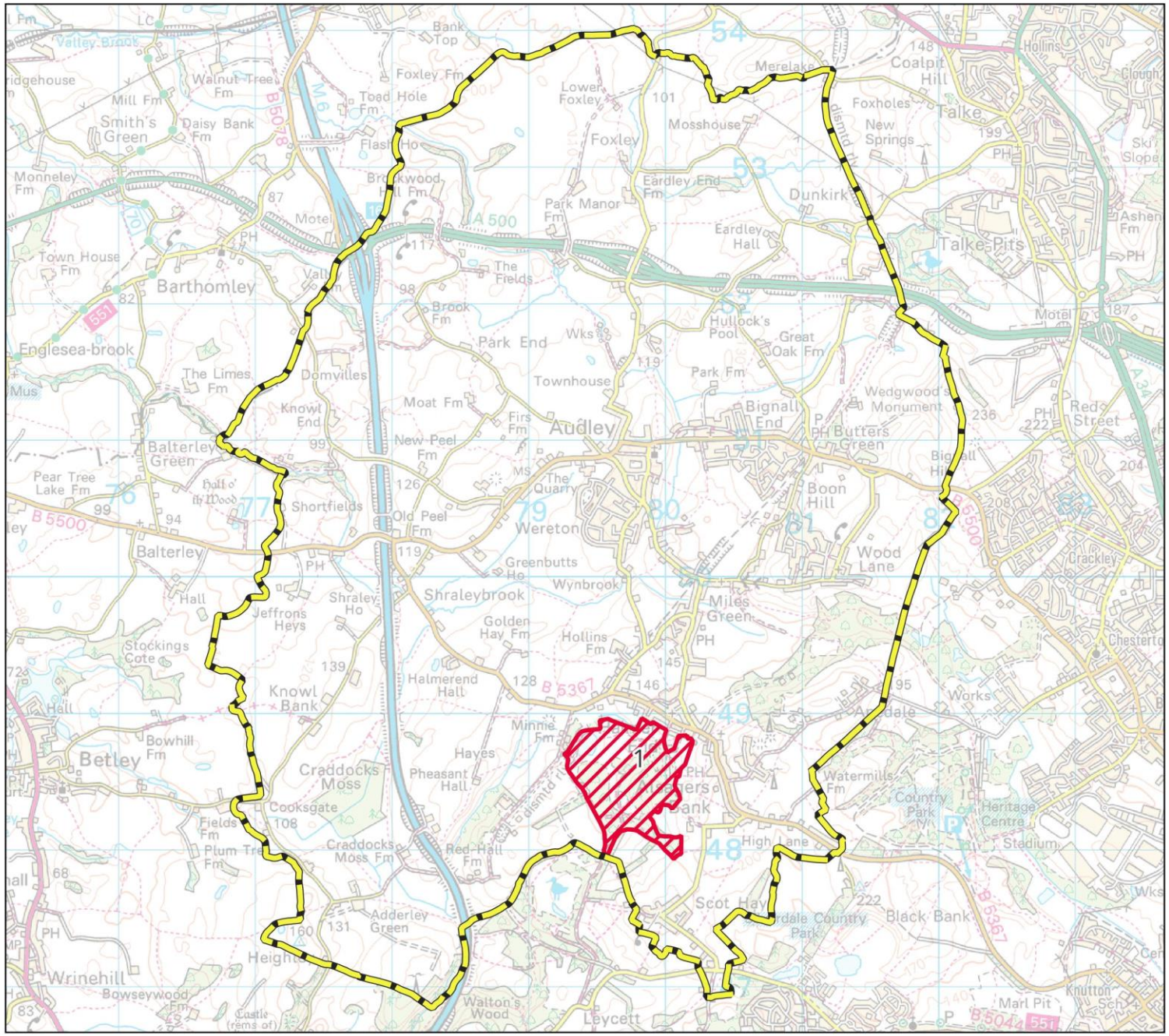
Map 5 – Statutory Sites



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Audley Rural CP

Statutory Sites

Key

Audley Rural CP

LNR 1 Bateswood North LNR

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0 0.75 1.5 km

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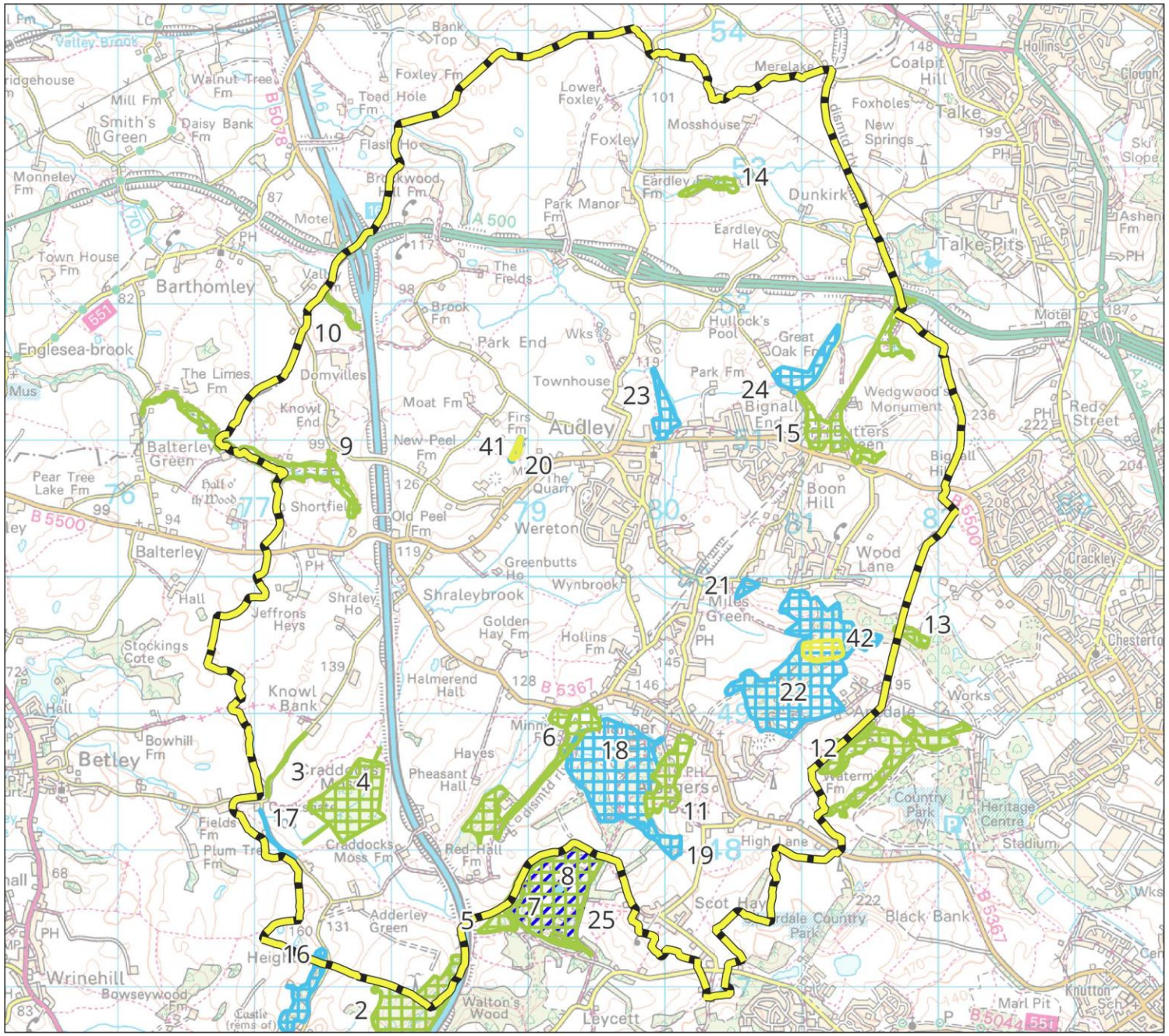
Map 6 – Non-Statutory Sites



Staffordshire Ecological Record

Audley Rural CP

Non-Statutory Sites

Key

Audley Rural CP

SBI
2 Walton's Wood West
3 Knowlebank Lane
4 Craddocks Moss Woodland
5 Bullthorns Wood
6 Hayes Wood & Dismantled Railway
7 Bullthorns Wood (Woodland North)
8 Bateswood Nature Reserve
9 Mill Dale
10 Domvilles Wood
11 Podmore Pool
12 Watermills Wood
13 Apedale Marsh
14 Wrench's Coppice
15 Bignall End Coal Yards

BAS
16 Heighley Castle and Wood
17 Heighley Lane
18 Bateswood Open Space
19 Bates Wood
20 Kent Hill Quarry
21 Miles Green Farm Fields
22 Burgess's Wood
23 Audley Castle Banks
24 Bignall End Road

SWT
25 Bateswood

RIGS
41 Kent Hill Quarry
42 Miry Quarry

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0 0.75 1.5 km

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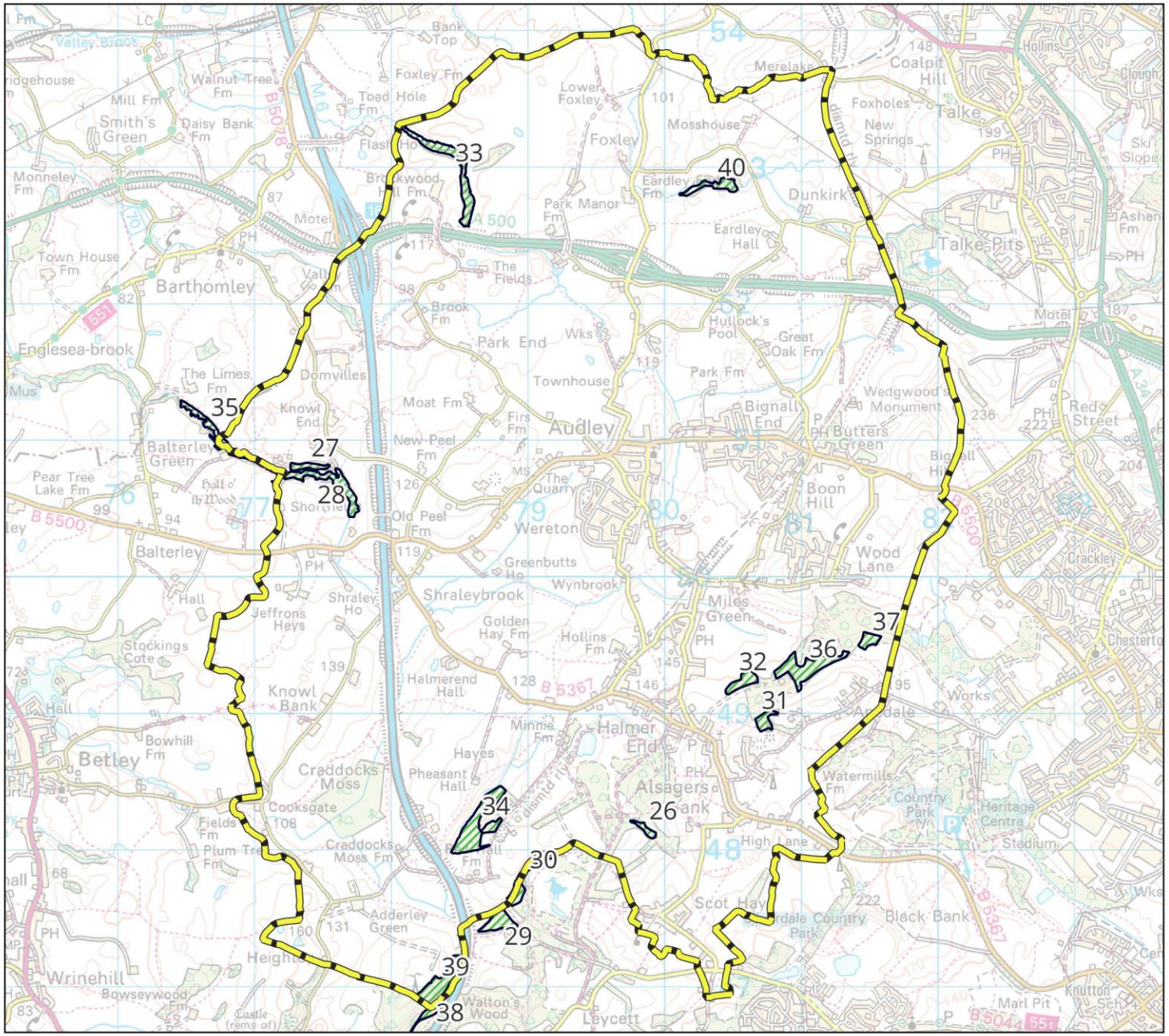
Map 7 – Ancient Woodland Inventory Sites



Staffordshire Ecological Record

Audley Rural CP

Ancient Woodland Inventory Sites

Key

Audley Rural CP

AWI	26	Bates Wood
	27	Birks Wood
	28	Birks Wood
	29	Bullhorns Wood 1
	30	Bullhorns Wood 2
	31	Burgess's Wood
	32	Burgess's Wood
	33	Foxley Drumble
	34	Hayes Wood
	35	Mill Dale Wood
	36	Miry Wood
	37	Miry Wood
	38	The Gladings
	39	The Gladings
	40	Wrench's Coppice

Date Produced: 31/05/2024

0 0.75 1.5 km

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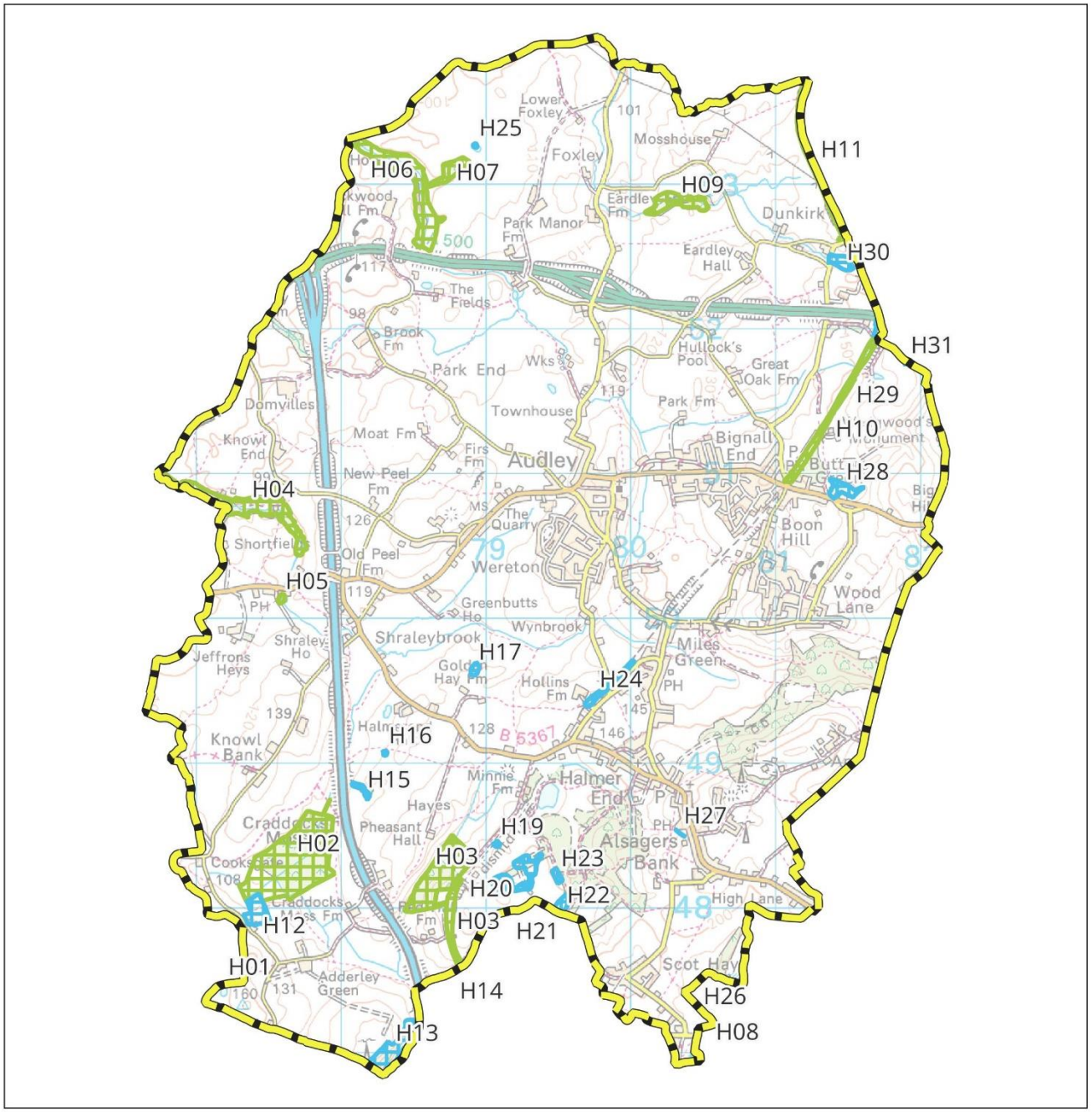
Map 8 – Historic Local Wildlife Sites



Staffordshire Ecological Record

Audley Rural CP

Historic LWS Boundaries

Key

Audley Rural CP

Grade 1 SBI

Grade 2 SBI

H01	Heighley	H12	Craddocks Moss (SW)
H02	Craddocks Moss	H13	The Gladings (NE)
H03	Hayes Wood (Dismantled Railway)	H14	Bullthorns Wood (S)
H03	Hayes Wood	H15	Pheasant Hall (NW)
H04	Mill Dale	H16	Halmerend Hall (S)
H05	Boughey's Mill	H17	Golden Hay Farm (N)
H06	Foxley Drumble	H18	Scot Hay (NW)
H07	Foxley Gorse	H19	Hayes Wood (NE)
H08	Grubbers Hill, Scot Hay	H20	Hayes Wood (E)
H09	Wrench's Coppice	H21	Hayesdelph Wood (W)
H10	Butters Green (NE)	H22	Hayesdelph Wood (SW)
H11	Merelake	H23	Hayesdelph Wood (W)
		H24	Hollins Farm (E)
		H25	Foxley Gorse (N)
		H26	Haying Wood (N)
		H27	Alsagers Bank
		H28	Bignall Hill
		H29	Bignall Hill Colliery (W)
		H30	Dunkirk (E)
		H31	Bignall Hill Colliery (E)

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0 0.75 1.5 km

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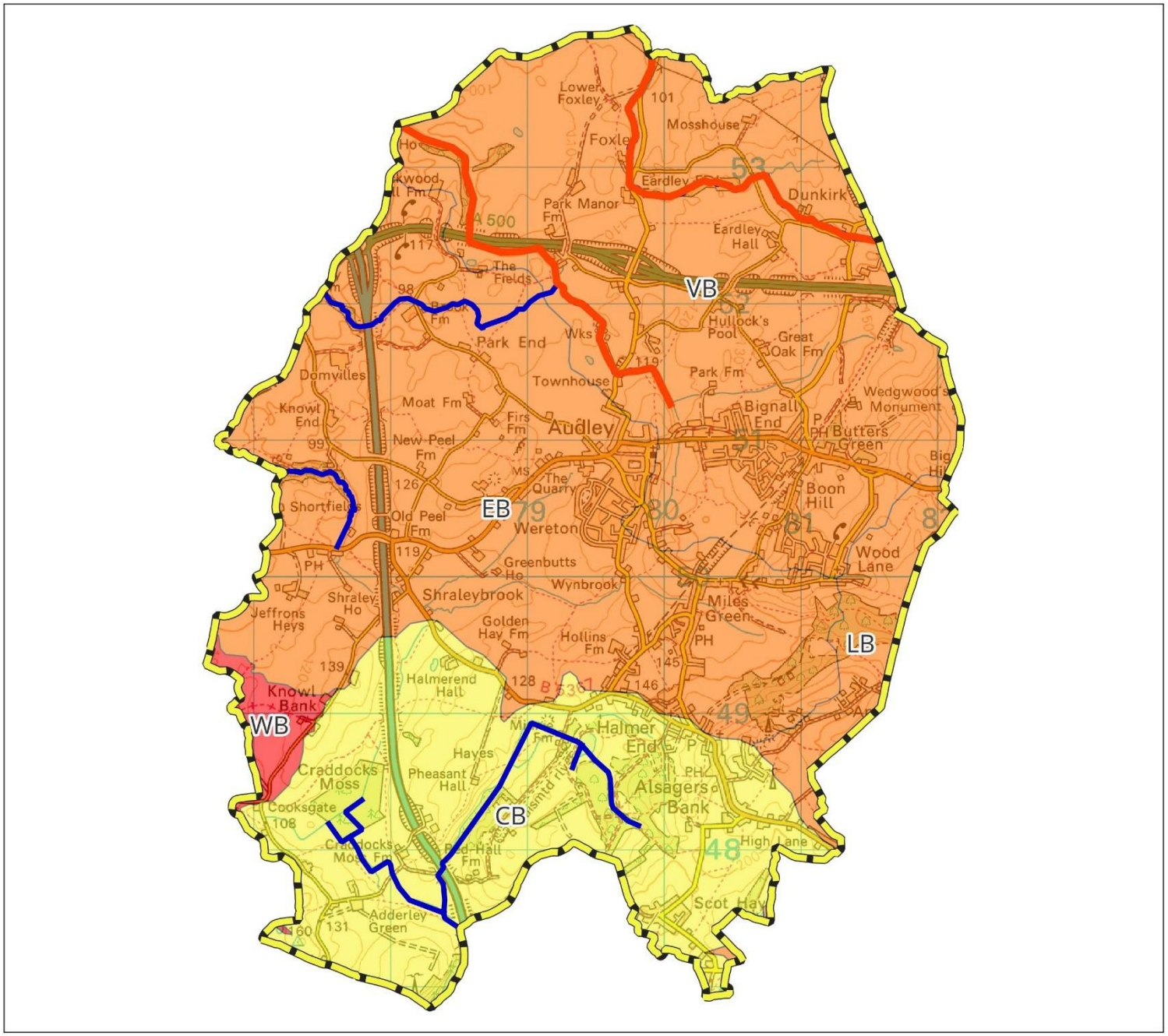
Map 9 – Waterway Condition



Staffordshire Ecological Record

Audley Rural CP

Waterway Condition

Note: waterway data was retrived from OS Open Rivers. Ecological class data was retrived from the Environment Agency River Water Body Catchments Cycle 2 Classifciation 2019.

Key

Audley Rural CP

River Ecological Class

- Moderate
- Poor
- Unassessed Notable Waterway

River Catchment Ecological Class

- Bad
- Poor
- Moderate

River Catchment Name

CB	Checkley Brook - Upper
EB	Englesea Brook
LB	Lyme Brook Catchment
VB	Valley Brook (Source to Englesea Brook)
WB	Wistaston Brook

0 0.75 1.5 km

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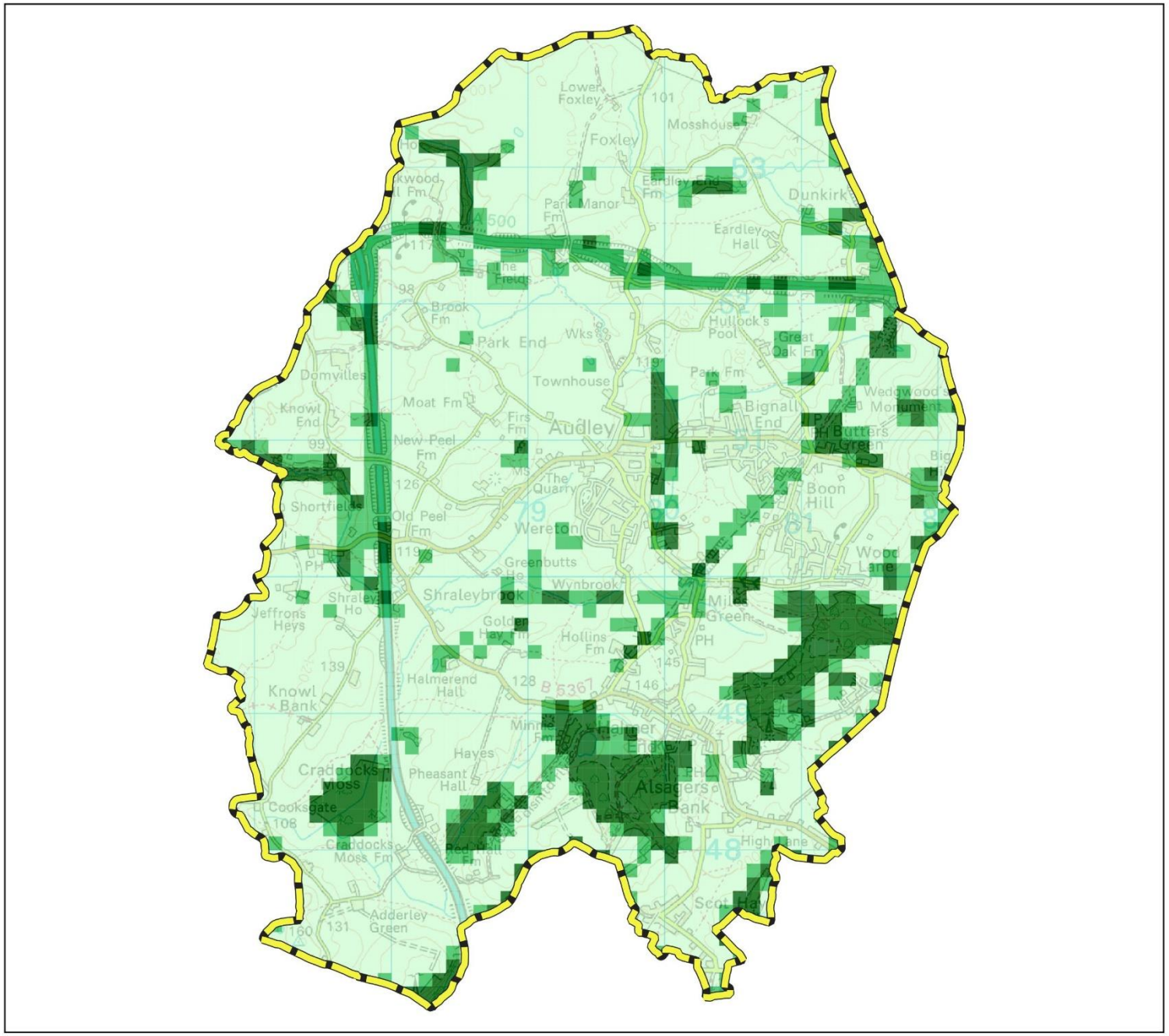
Map 10 – Nature Recovery Network (NRN) Strategic Significance Areas



Staffordshire Ecological Record

Audley Rural CP

NRN Strategic Significance

Key

Audley Rural CP Boundary

Strategic Areas

Strategic Area

Semi-Strategic Area

Non-Strategic Area

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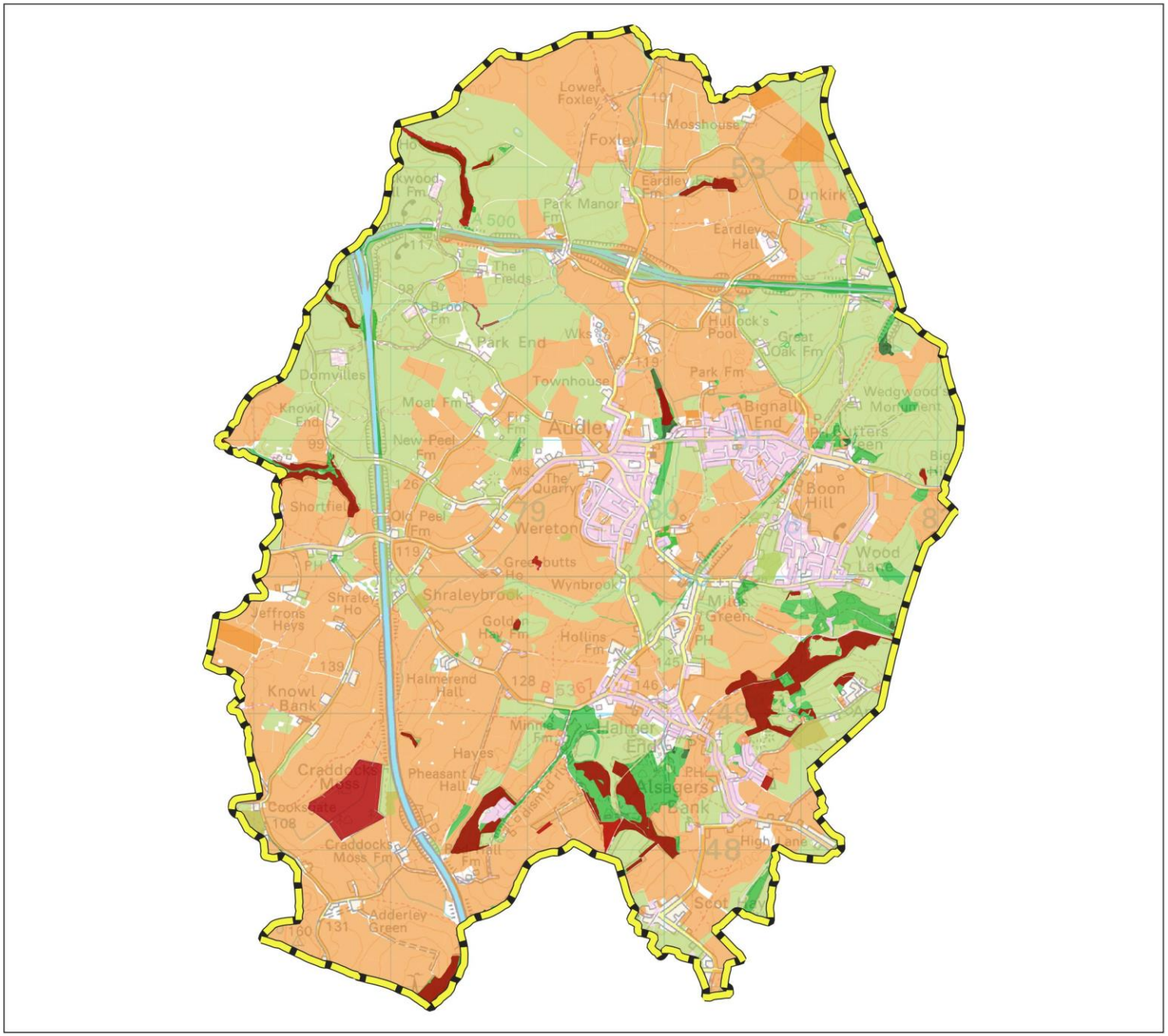
Map 11 – Nature Recovery Network (NRN) Habitat Distinctiveness Areas



Staffordshire Ecological Record

Audley Rural CP

NRN Habitat Distinctiveness

Note: Croddocks Moss is included as potentially locally irreplaceable, as through positive conservation management since the NRN mapping took place, it is likely the site is now of national importance.

Key

Audley Rural CP

Habitat Distinctiveness

- Potentially Locally Irreplaceable
- Very High Distinctiveness
- High Distinctiveness
- Medium Distinctiveness
- Low Distinctiveness
- Very Low Distinctiveness

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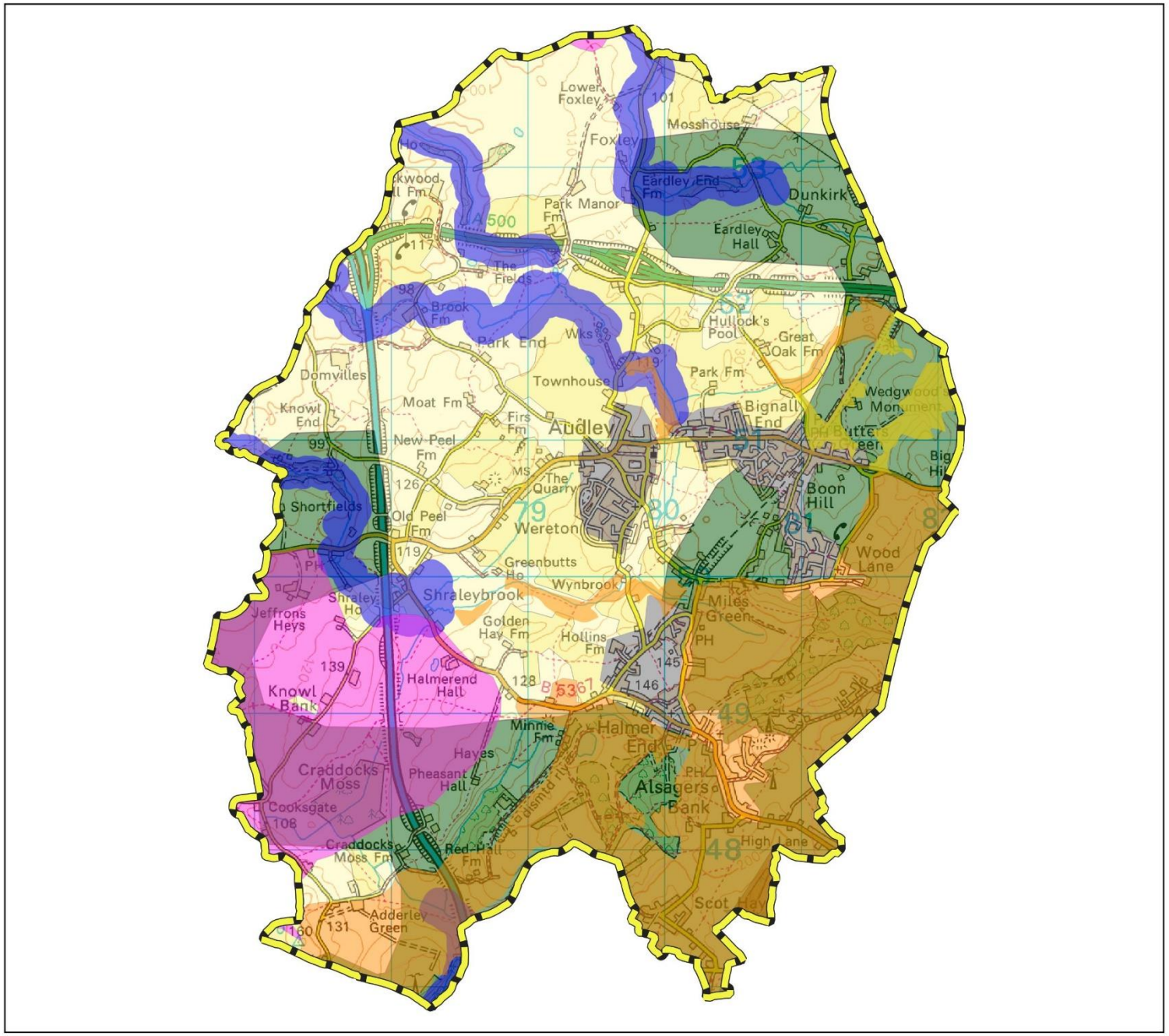
Map 12 – Nature Recovery Network (NRN) Habitat Connectivity Areas



Staffordshire Ecological Record

Audley Rural CP

NRN Habitat Connectivity Opportunity (HCO) Areas

Key

Audley Rural CP Boundary

Habitat Connectivity Opportunity (HCO) areas

- Meres & Mosses HCO
- Heathland HCO
- Grassland HCO
- Wetland HCO
- Woodland HCO
- OMHPDL HCO
- Pastures HCO
- Arable HCO
- Urban HCO

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0 0.75 1.5 km

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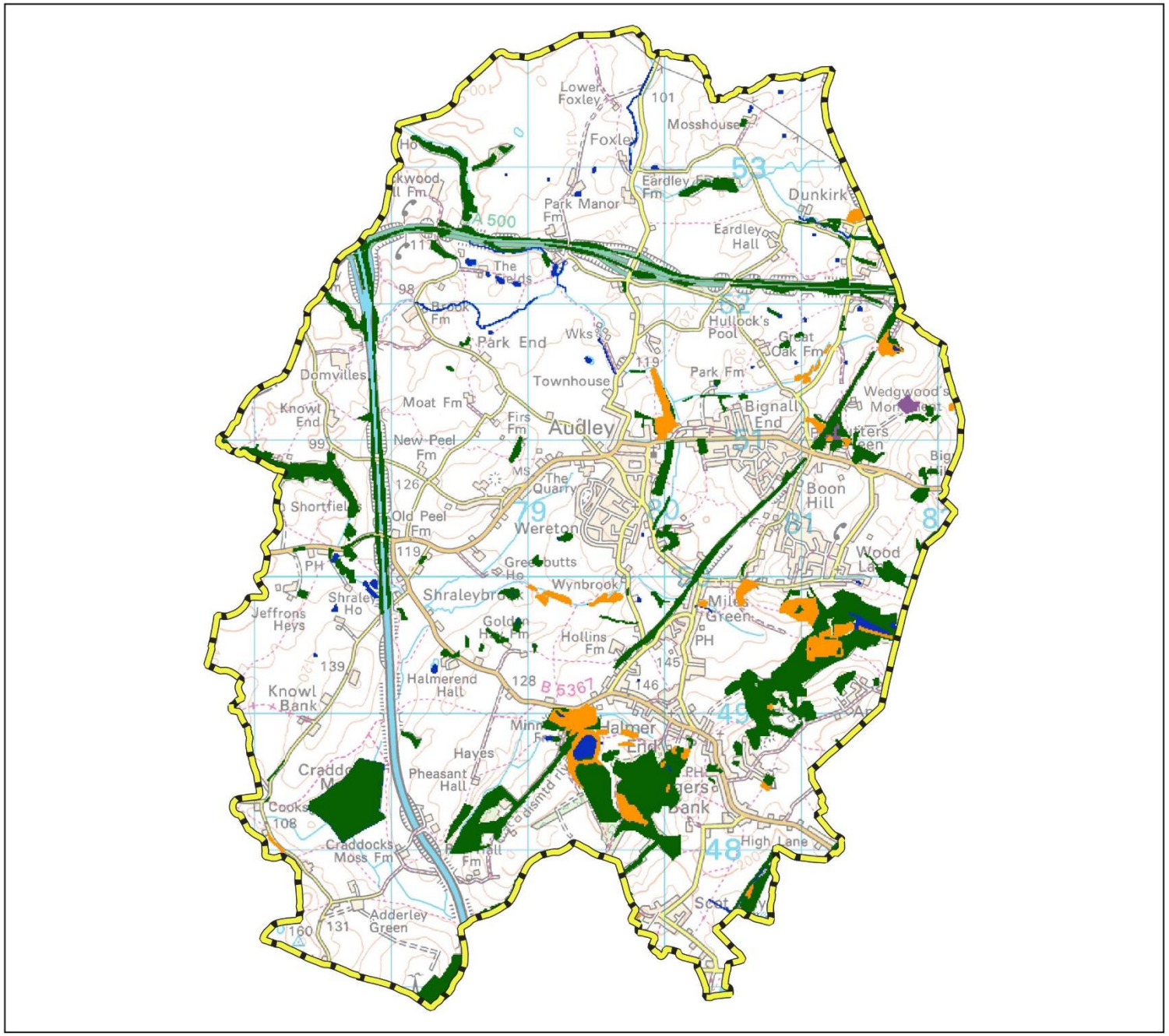
Map 13 – Habitat Wildlife Corridor Network



Staffordshire Ecological Record

Audley Rural CP

Habitat Wildlife Corridor Network

Key

- Audley Rural CP
- Grassland Habitat
- Woodland Habitat
- Heathland Habitat
- Wetland Habitat

Date Produced: 30/05/2024

0 0.75 1.5 km

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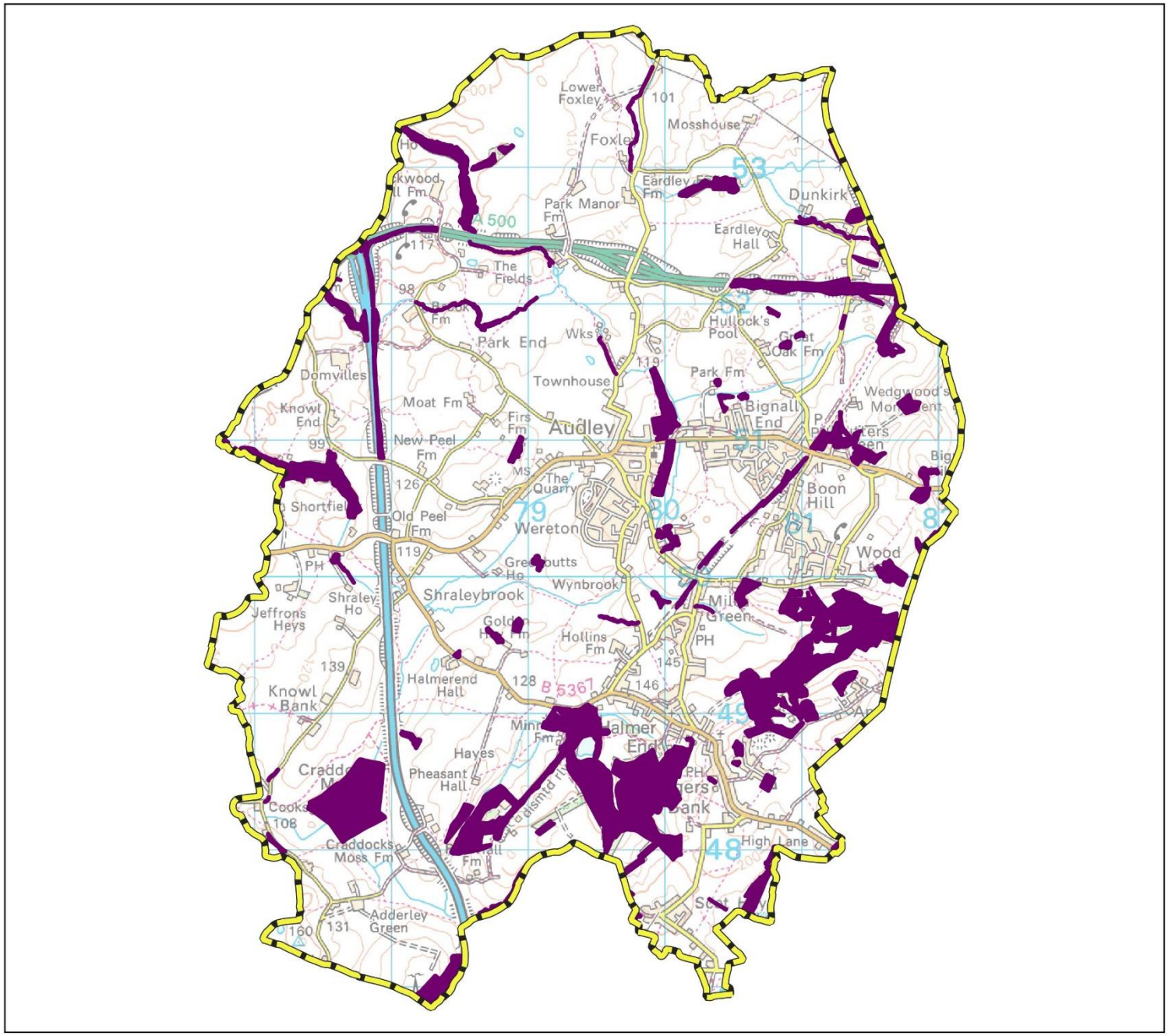
Map 14 – High Distinctiveness Wildlife Corridor Network



Staffordshire Ecological Record

Audley Rural CP

High Distinctiveness Wildlife Corridor

Note: Areas listed asbeing of high distinctiveness, very high distnctivenes or potentially locally irreplaceable on the NRN Habitat Distinctiveness mapping. Includes a 15 metre buffer.
Craddocks Moss is included on the mapping as an area of national importance currently under positive conservation action.

Key

- Audley Rural CP
- High Distinctiveness Wildlife Corridor

Date Produced: 06/06/2024

0 0.75 1.5 km

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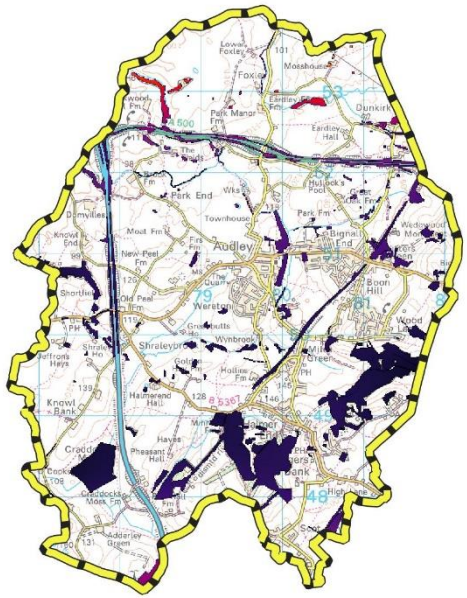
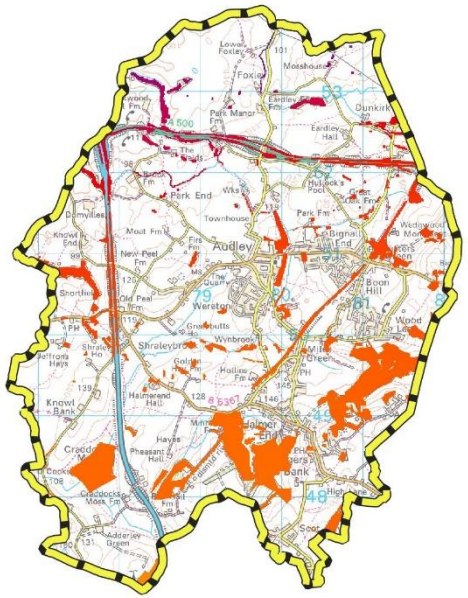
Map 15 – Local Habitat Connectivity (All Habitats)

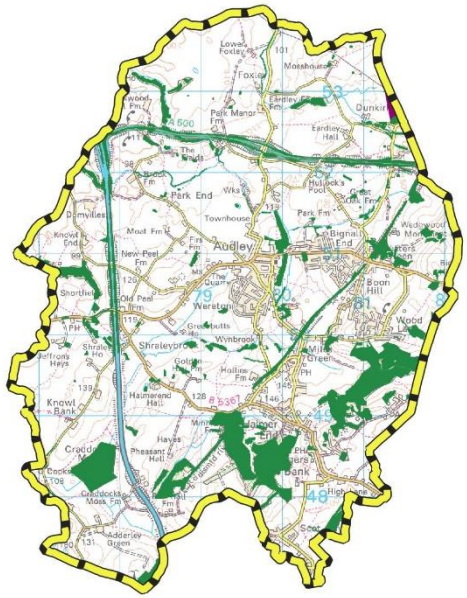
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Habitat Connectivity - Low Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 100 individuals per km2
Dispersal Distance: 1 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 03/06/2024

0 1.5 3 km

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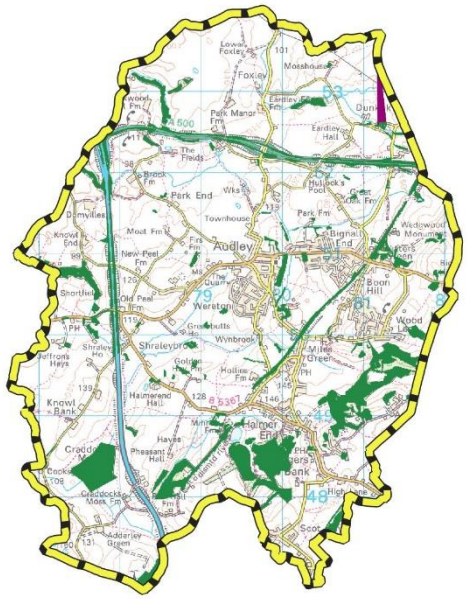
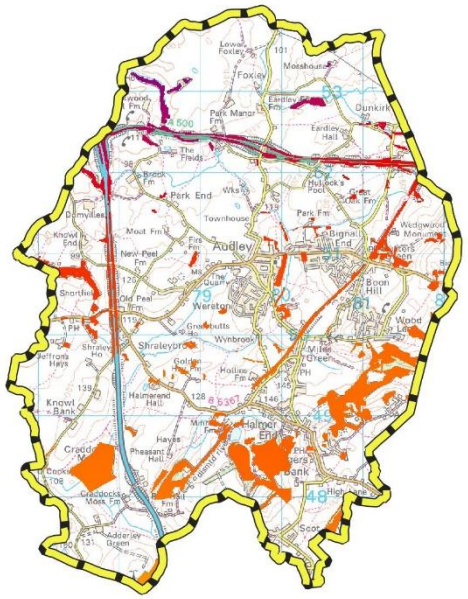
Map 16 – Local Habitat Connectivity (Woodland)

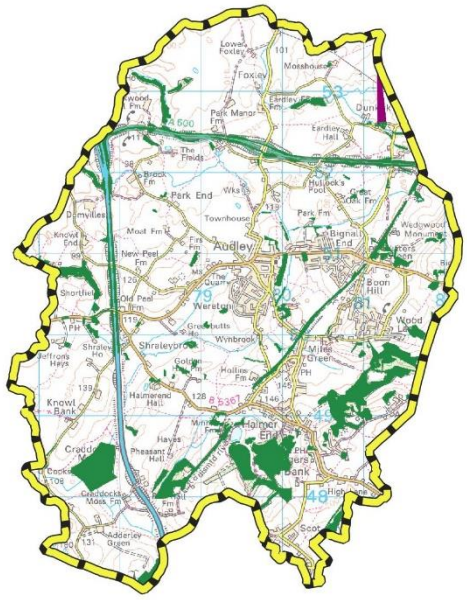
Flow



Progress



Bottlenecks



Key

- Audley Rural CP Boundary
- Flow
  - Max
  - Min
- Progress
  - Start
  - End
- Possible Bottlenecks
- Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Woodland Connectivity - Low Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 100 individuals per km2
Dispersal Distance: 1 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 03/06/2024

0 1.5 3 km

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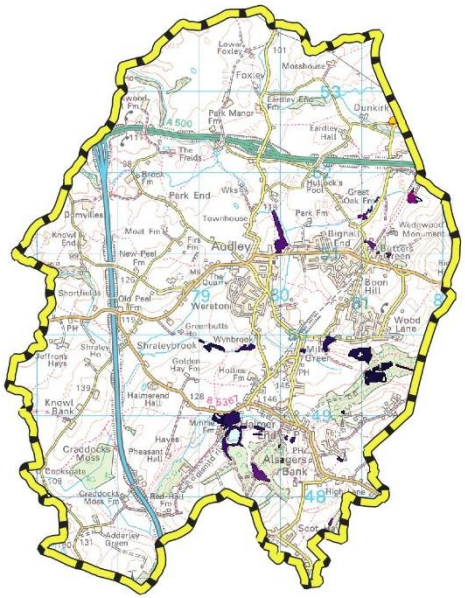
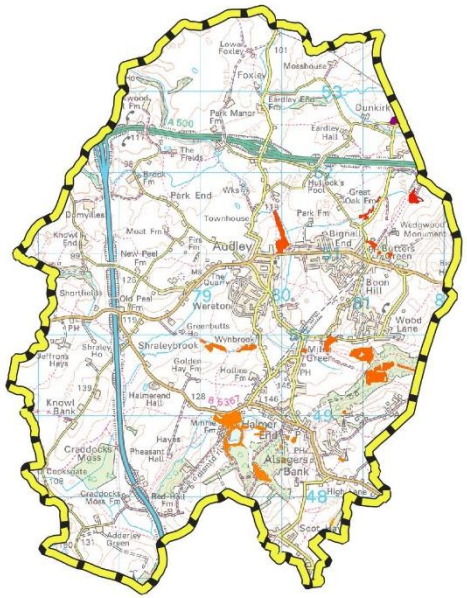
Map 17 – Local Habitat Connectivity (Grassland)

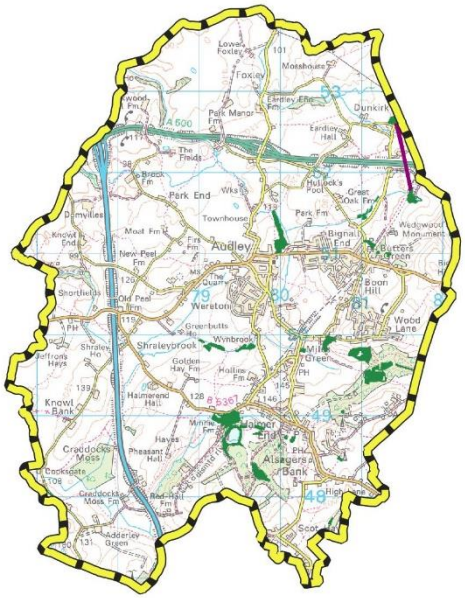
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Grassland Connectivity - Low Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 100 individuals per km2
Dispersal Distance: 1 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 03/06/2024

0 1.5 3 km

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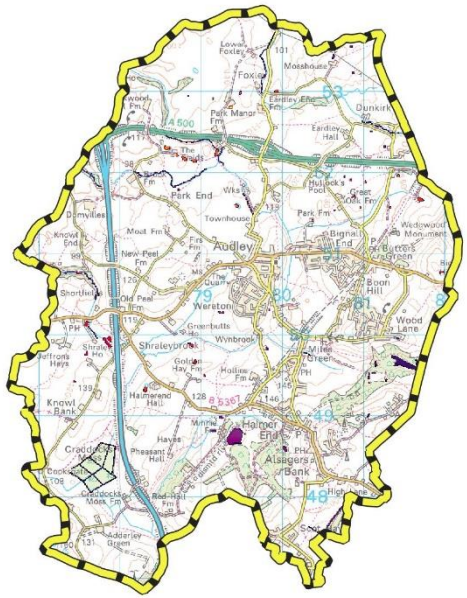
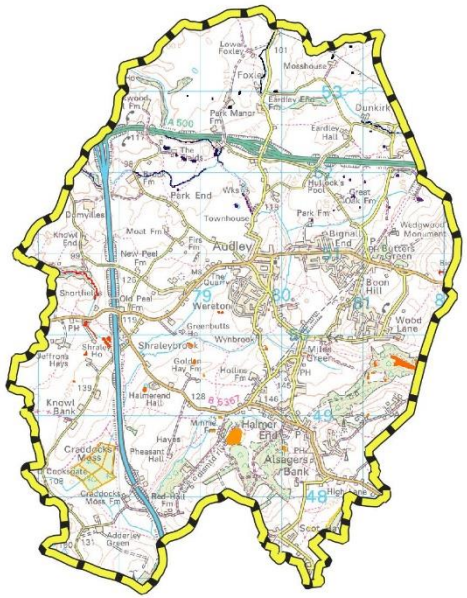
Map 18 – Local Habitat Connectivity (Wetland)

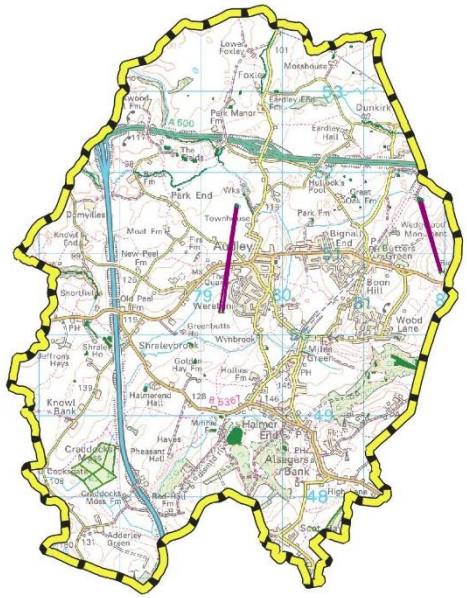
Flow



Progress



Bottlenecks



Key

- Audley Rural CP Boundary
- Flow
  - Max
  - Min
- Progress
  - Start
  - End
- Possible Bottlenecks
- Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Wetland Connectivity - Low Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 100 individuals per km2
Dispersal Distance: 1 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 03/06/2024

0 1.5 3 km

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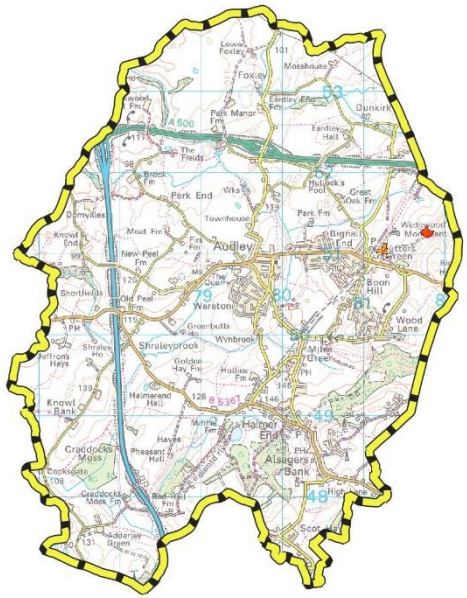
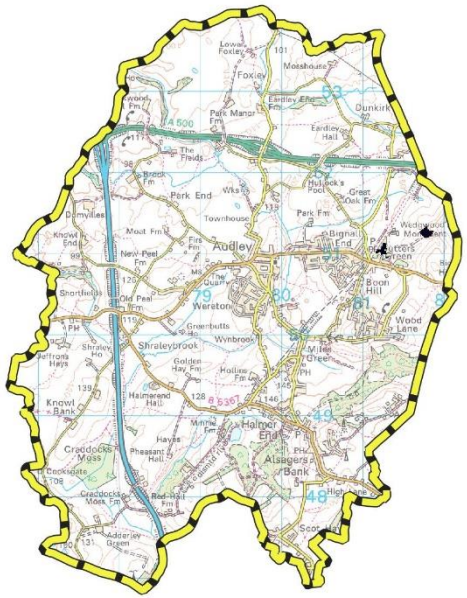
Map 19 – Local Habitat Connectivity (Heathland)

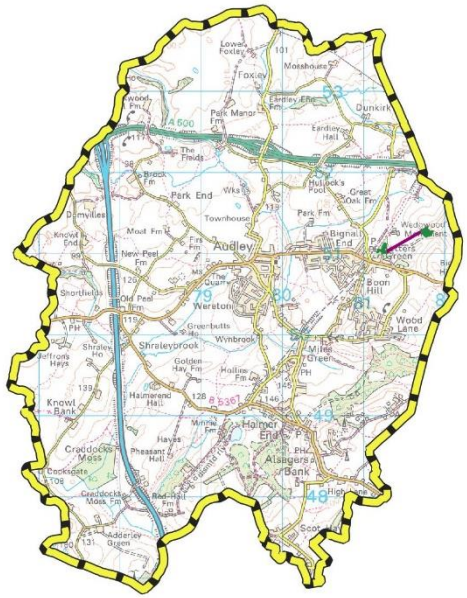
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Heathland Connectivity - Low Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 100 individuals per km2
Dispersal Distance: 1 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 03/06/2024

0 1.5 3 km

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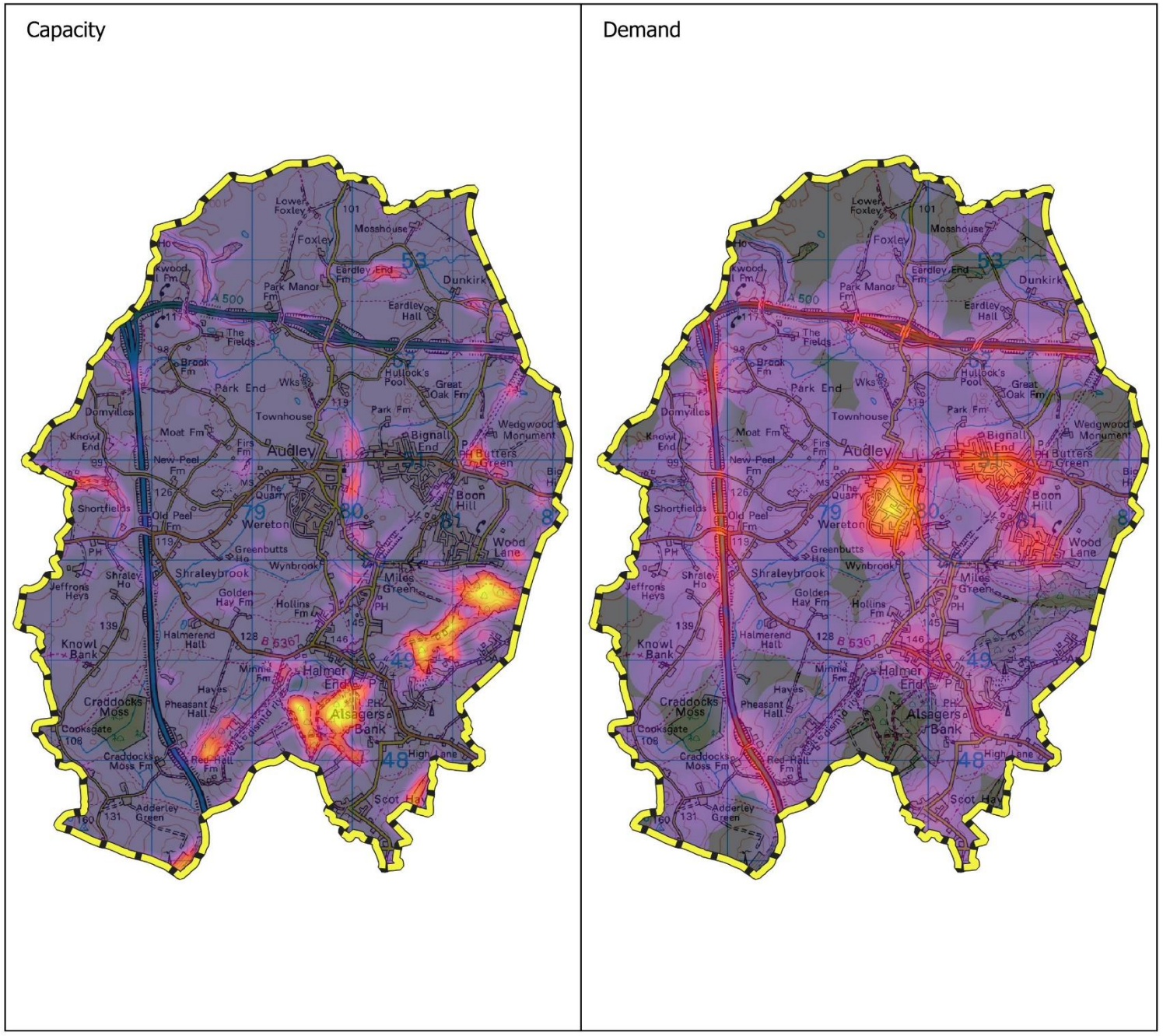
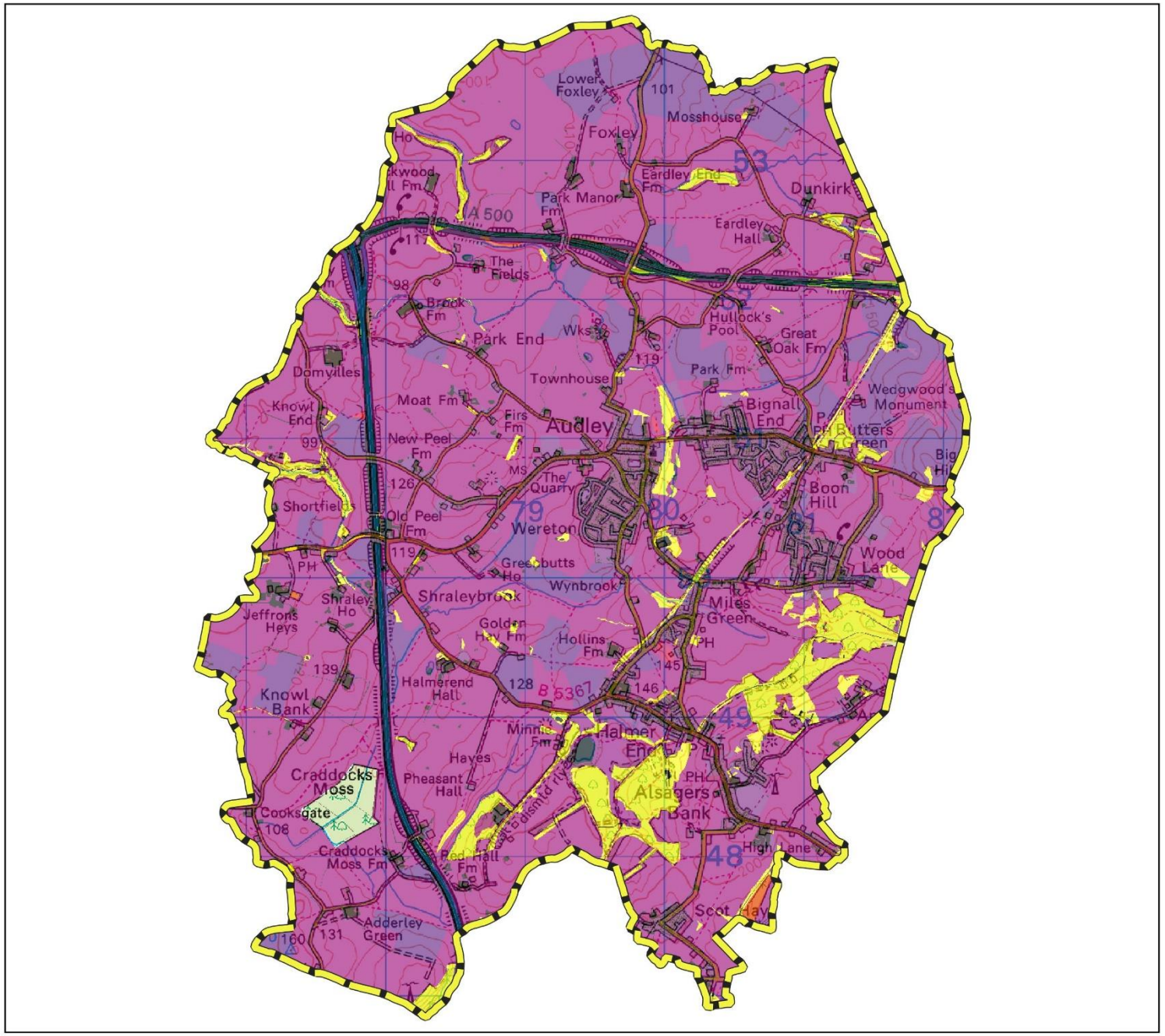
Map 20 – Ecosystem Service Provision – Air Purification



Map 21 – Ecosystem Service Provision – Carbon Capture



Staffordshire Ecological Record

Audley Rural CP

Ecosystem Services - Carbon Capture Capacity

Key

Audley Rural Parish

Capacity (Rescaled)

100

0

Date Produced: 22/05/2024

0 0.75 1.5 km

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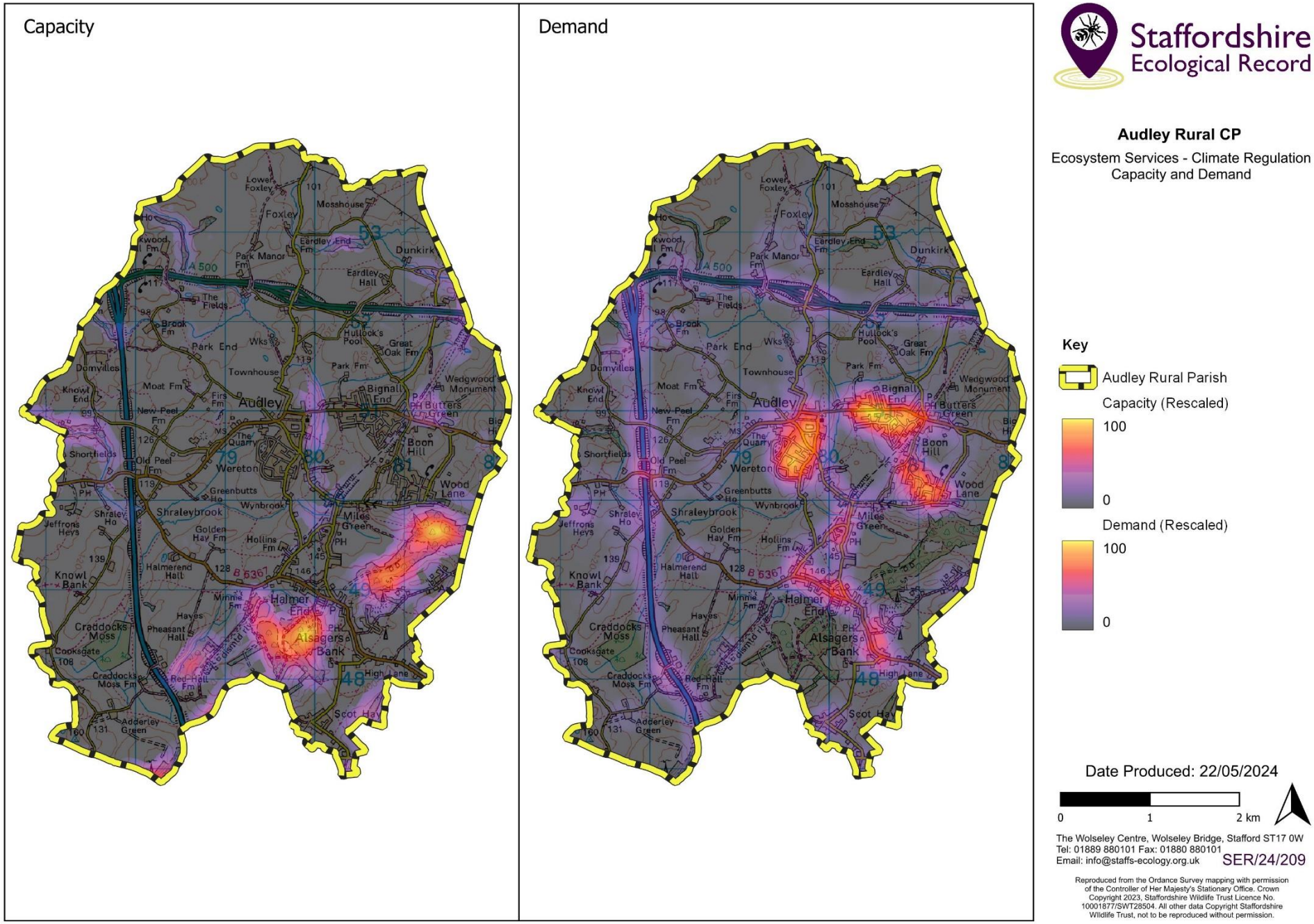
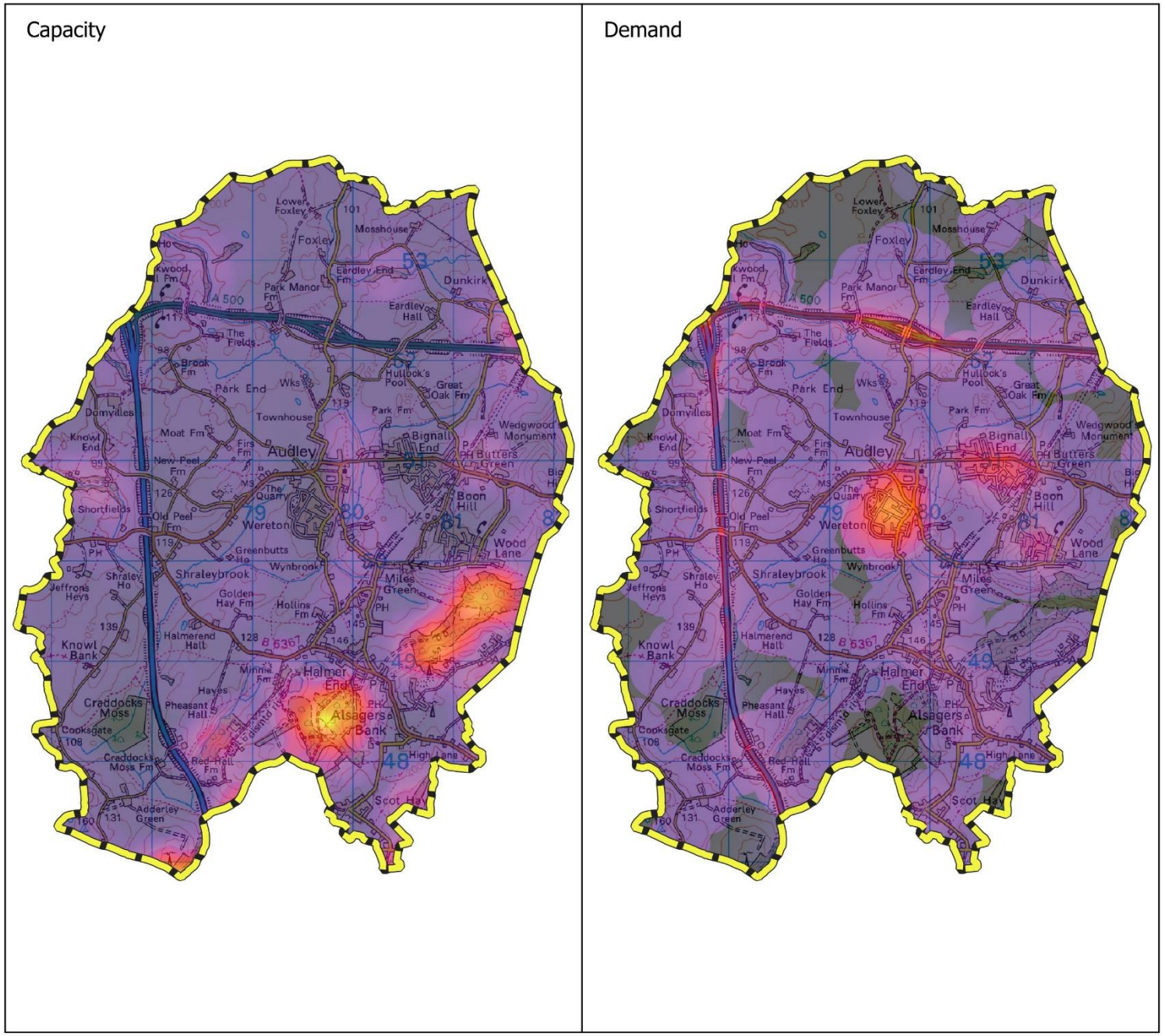
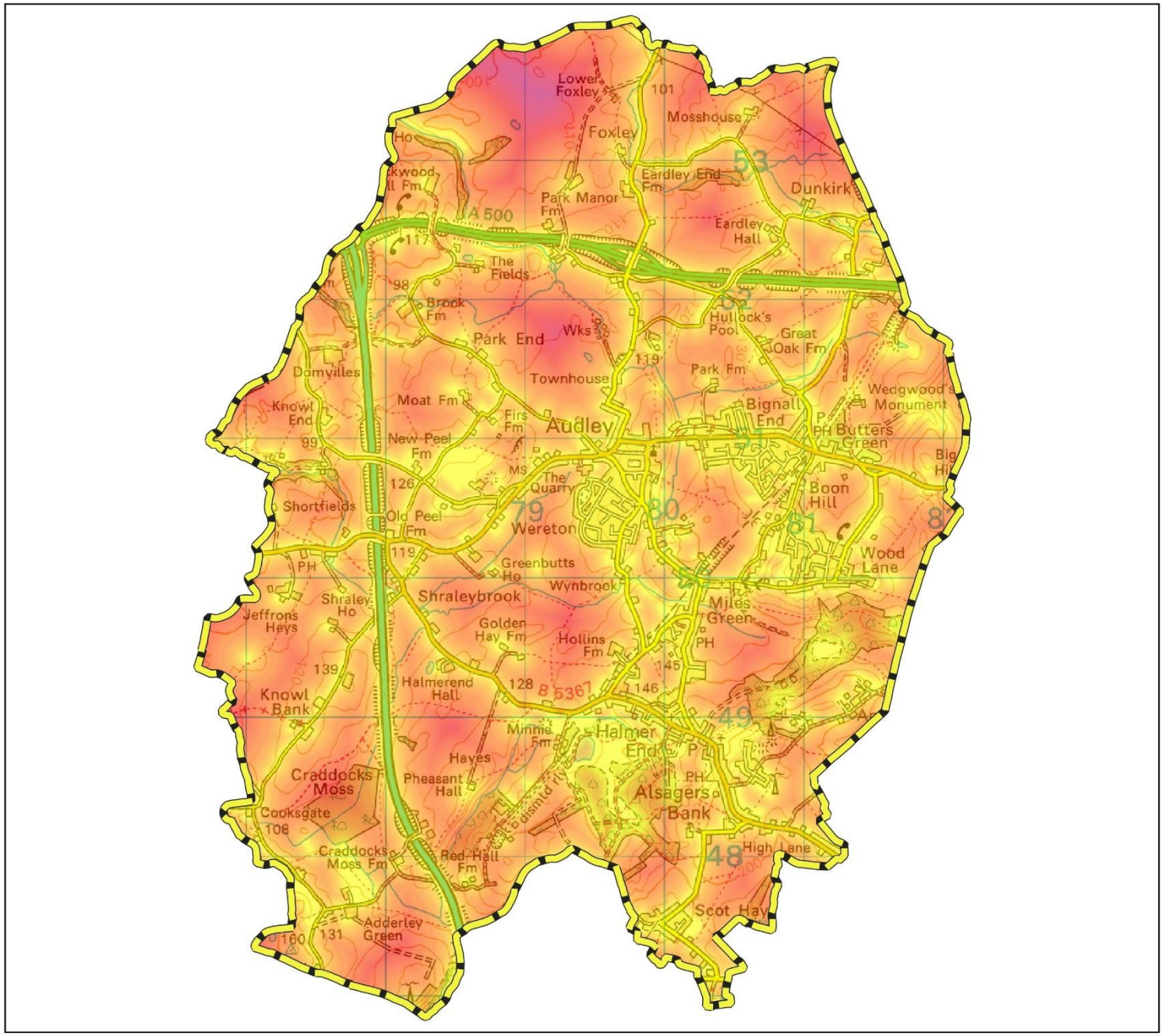
Map 22 – Ecosystem Service Provision – Climate Regulation



Map 23 – Ecosystem Service Provision – Noise Regulation



Map 24 – Ecosystem Service Provision – Pollination



Staffordshire Ecological Record

Audley Rural CP

Ecosystem Services - Pollination Capacity

Key

Audley Rural Parish

Capacity (Rescaled)

100

0

Date Produced: 22/05/2024

0 0.75 1.5 km

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Tel: 01889 880101 Fax: 01880 880101
Email: info@staffs-ecology.org.uk

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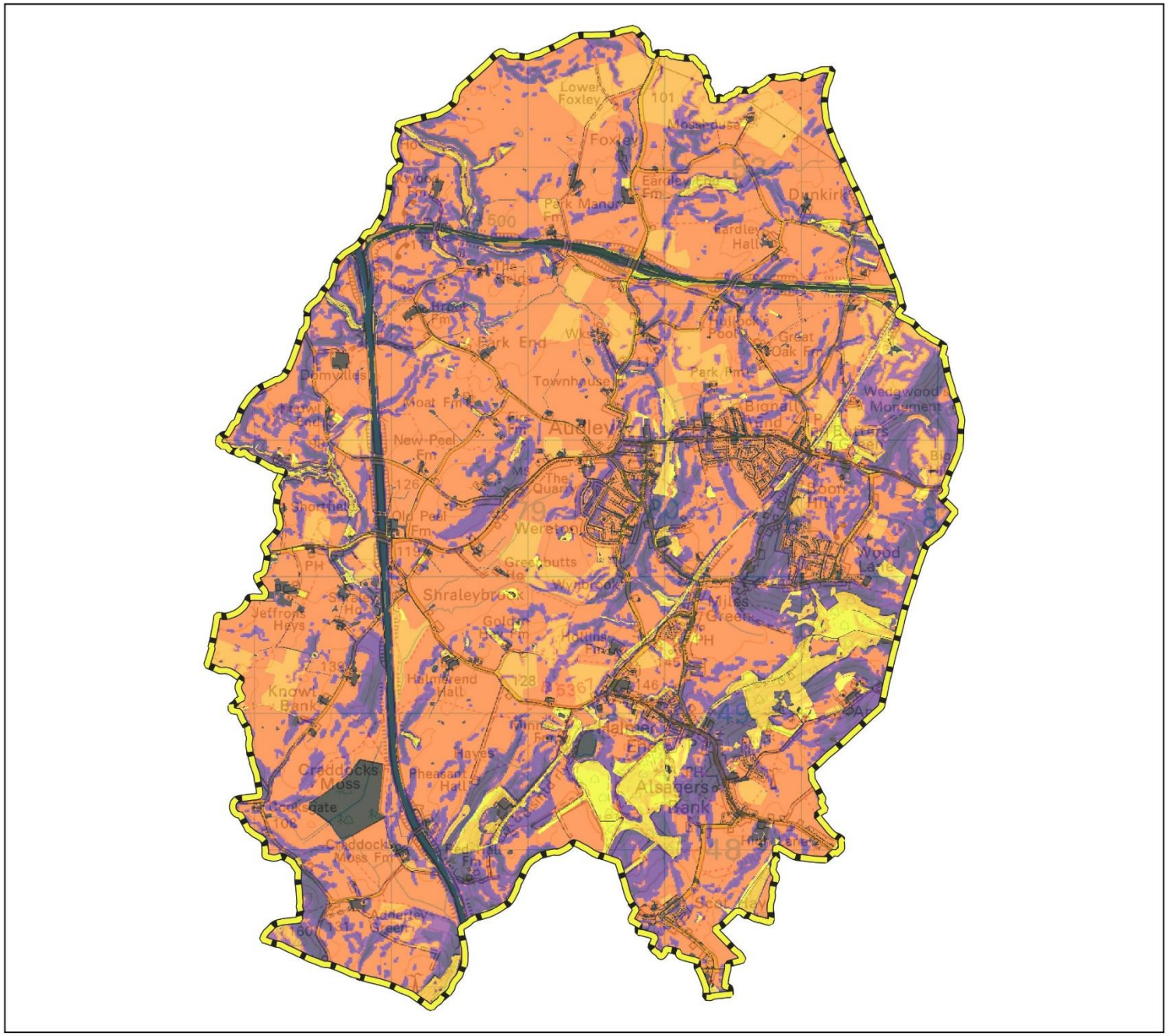
Map 25 – Ecosystem Service Provision – Flood Mitigation



Staffordshire Ecological Record

Audley Rural CP

Ecosystem Services - Flood Mitigation Capacity

Key

Audley Rural Parish

Capacity (Rescaled)

100

0

Date Produced: 06/06/2024

0 0.75 1.5 km

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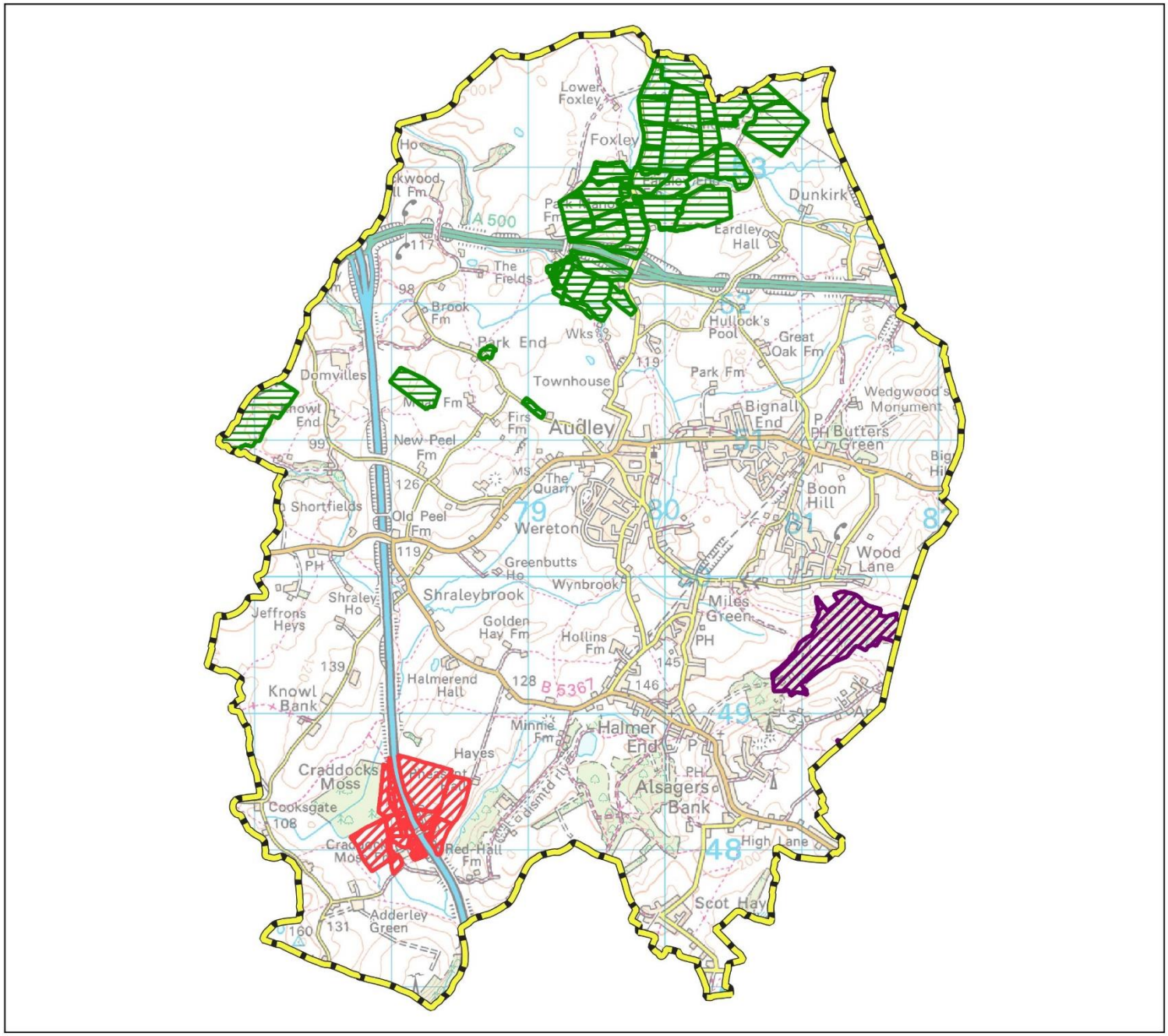
Map 26 – Land in Environmental Stewardship and Countryside Stewardship Schemes



Staffordshire Ecological Record

Audley Rural CP

Land in Environmental and Countryside Stewardship

Key

Audley Rural CP

Environmental Stewardship

Entry Level plus Higher Level Stewardship

Higher Level Stewardship

Countryside Stewardship

Countryside Stewardship

Date Produced: 06/06/2024

0 0.75 1.5 km

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6. Results and Discussion

The following four subsections present the results for four broad priority habitat types (woodland, grassland, wetland and heathland) in the context of the non-statutory wildlife conservation sites (**Map 6**) within the parish. The distinctiveness of the habitat (**Map 11**) and strategic importance (**Map 10**) within the Nature Recovery Network are also stated, alongside details of their ecological features and biodiversity. The map ID refers to the site boundaries on **Map 6**.

Section 6.e. discusses the wildlife corridors that are built for both these broad priority habitat types and the complete wildlife corridor network. **Section 6.f.** discusses the provision of ecosystem services within the parish. **Section 6.g.** discusses the protection the wildlife corridors.

6.a. Woodland

The UK remains one of the least-wooded countries in Europe and the tiny area of surviving ancient woodland is still under threat (Woodland Trust, 2021). In Staffordshire, they are an integral part of the landscape and are important for a huge range of wildlife including a range of Priority Species. However, while relatively widespread, they only represent approximately 9% of the county (Noake *et al*., 2016).

Within Audley, they represent much of the strategic and semi-strategic habitat, as well as potentially locally irreplaceable, very high and high distinctiveness habitat. Many of these are either fully or partly designated as SBIs, including:

- Walton's Wood West (**Map ID: 2**), a site containing a variety of habitats, with the eastern boundary bordering the M6. Within Audley, there is a section of semi-natural broadleaved woodland dominated by ash and silver birch. The herb layer includes red campion, soft rush and self-heal. The distinctiveness of the woodland is potentially locally irreplaceable. Part of this SBI, the Gladings (**Map 7** – **ID 38 & 39**), is listed on the Ancient Woodland Inventory.
- Craddocks Moss Woodland (**4**), a former glacially derived moss that has been damaged by drainage situated 2km north of Madeley[1]. The canopy of the woodland is dominated by downy birch, silver birch and scots pine with an occasional oak and rowan. Alder buckthorn is present in the understory, which is uncommon in Staffordshire. The species diversity of the ground flora is low, due to being out-competed by invasive bracken. Diversity improves in the several ditches of the area (discussed in 6.c. Wetland). The woodland of this site is of medium distinctiveness, while the wetland habitat is potentially locally irreplaceable.
- Hayes Wood and Dismantled Railway (**6**), a wet and dry broadleaved woodland, part of which colonises the banks of a dismantled railway. It is situated approximately 2 km north of Madeley. Silver birch and pedunculate oak are abundant in the canopy, while sessile oak is also recorded. The ground flora has several ancient woodland indicators, including pendulous sedge, remote sedge, bluebells, wood millet and red campion. The

[1] Since the latest assessment for Craddocks Moss was made, positive conservation measures have been made to the site, in an effort to restore it to its former botanical importance. Thus, this description does not accurately reflect the site in its current state.

distinctiveness of the woodland habitat is potentially locally irreplaceable and of high distinctiveness. The southern portion of the woodland is listed on the Ancient Woodland Inventory as Hayes Wood (**Map 7** – **ID 34**).

- Mill Dale (**9**), a wooded steep-sided stream valley, with the Dean Brook flowing westwards through the site. It lies on the Staffordshire/Cheshire border. The canopy is comprised mainly of oak showing signs of management, alder is frequent along the brook and crack willow is present in the wetter areas. The ground flora is co-dominated by bracken and bluebells. The distinctiveness of the woodland habitat is potentially locally irreplaceable and of high distinctiveness. The majority of this SBI is listed on the Ancient Woodland Inventory as Birks Wood (**Map 7** – **ID 27 and 28**) and Mill Dale Wood (**35**).
- Domvilles Wood (**10**), a sycamore/ash woodland set in a linear, steep-sided, stream valley showing a history of coppicing. It is situated in the north-west of the parish, on the border with Cheshire and Staffordshire. There is an abundance of alder in the damper region and oak and rowan are occasionally present. The ground flora is rich with ancient woodland indicators, with ransoms dominating throughout. Wood melic and wood millet, both uncommon for the county, and soft-shield fern, rare for the county, are also noted. The distinctiveness of the woodland is potentially locally irreplaceable.
- Podmore Pool (**11**), a mixture of habitats, mostly comprised of planted broad-leaved woodland, as well as a smaller compartment of semi-natural broad-leaved woodland, among others (discussed below). The planted section contains a great mixture of species and the scrub layer is well-developed and quite dense. The canopy of the semi-natural section is co-dominated by birch and sessile oak. Bramble is abundant within the ground flora, interspersed with ancient woodland indicator species, such as frequent bluebell, greater stitchwort and broad-buckler fern. This site forms part of the only statutory site within the parish, Bateswood (North) LNR (**Map 5 – ID 1**). The woodland habitat within the site is of high distinctiveness.
- Wrench's Coppice (**14**), an ancient, semi-natural, broadleaved woodland occurring in a small steep-sided valley. It is approximately 2 hectares in size and lies roughly 500 m north of the A500. A typical species assemblage occurs in the ground flora and the canopy, with alder the most frequent species in the lower valley. There is a small polluted steam running through the bottom. The distinctiveness of the woodland is potentially locally irreplaceable. Wrench's Coppice is listed on the ancient woodland inventory.
- Bignall End Coal Yards (**15**), a 1,000-metre section of disused railway line, off which lies a variety of habitats. The linear nature of the site makes it a valuable wildlife corridor through the predominantly agricultural landscape. There is a small parcel of woodland located along a stream cutting. The majority of the woodland is wet with goat and grey willow frequent in the canopy with hawthorn and elder occupying the understory. Up on the embankments on drier soils pedunculate oak, silver birch and sycamore prevail, with fronds of male fern prominent in the ground flora. The majority of the woodland habitat is of medium distinctiveness, however, there are areas of high and very high distinctiveness.

Burgess Wood (**22**), a BAS consisting of replanted and degraded ancient semi-natural woodland, is another large area of strategic habitat in the south-east of the parish. The woodlands are locally dominated by sessile oak and pedunculate oak, while rare species

among the ground flora include wild angelica, honeysuckle, bittersweet, yellow archangel, floating sweet-grass, yarrow, compact rush, common toadflax, greater stitchwort and yellow loosestrife. The majority of the woodland habitat is potentially locally irreplaceable, while the rest is of high distinctiveness. There are several small pockets of ancient woodland which are listed on the Ancient Woodland Inventory (**Map 7 – ID 31, 32, 36 and 37**)

Foxley Drumble is an area listed on the Ancient Woodland Inventory, which is currently undesignated. Historically, it was listed as a Grade 1 SBI (**Map 8 – Map ID H06**). A flat-bottomed valley, the greatest conservation potential is to be found in the neglected flushed and boggy areas where there is a good diversity of wetland species. The slopes have been invaded by bracken.

6.b. Grassland

Species-rich grasslands are an integral part of the semi-natural landscape and are of major importance for biodiversity in agricultural landscapes, as they provide a range of habitats to support a range of high biological diversity. However, the area of enclosed semi-natural Grasslands in England and Wales declined by 97% between 1930 and 1984 (Fuller, 1987). In 2011, only 2% of the UK's grassland area comprised high diversity semi-natural grassland (Bullock, *et al.* 2011).

Grassland, while more fragmented and smaller than woodland, also represents some of the strategic and semi-strategic habitat and potentially locally irreplaceable, very high and high distinctiveness habitat within Audley. These habitats are concentrated in the south-east of the parish and typically occur alongside woodlands in SBIs, including:

- Hayes Wood and Dismantled Railway (**6**), a semi-improved grassland north of the woodland and connected by a railway line. The sown grassland section is abundant with crested dog's-tail, frequent in marsh foxtail, rough meadow-grass and sheep's fescue. Species recorded of interest include cornflower, weld, kidney vetch, heather and common spotted orchid. The grassland within this site is of high distinctiveness.
- Podmore Pool (**11**), alongside the woodland is semi-improved grasslands which are scattered throughout the site on verges, spoil mounds and anywhere suitable that is not covered by ruderals or woodland. The two main areas are at the north end and the southern end of the site. The grassland in the north is characterised by false oat-grass, ribwort plantain, common knapweed, Yorkshire fog, common cat`s-ear and ox-eye daisy. Rare plants for the grassland include ragged robin, foxglove, gorse, common fleabane and common sorrel. The southern grassland has an abundance of common-spotted orchids and frequent yellow loosestrife, hay rattle, common yellow-sedge and meadow vetchling which are all locally found. This site forms part of Bateswood (North) LNR (**Map 5 – ID 1**). The grassland within this site is very high, high and medium distinctiveness.
- Bignall End Coal Yards (**15**), a 1,000-metre section of disused railway line, off which are areas of a variety of habitats and can be separated into subsites. Part of one subsite has been re-seeded to amenity grassland but is otherwise an area of semi-natural, acidic grassland with bramble and broom-dominated areas. This replaced heathland which was formally dominant. In another subsite, a species-rich, neutral grassland has developed,

diverse in trefoils and vetches, with one common spotted orchid spike observed during surveying. The grassland within this site is of very high and high distinctiveness.

Patches of grassland are also present in BASs, including:

- Bateswood Open Space (**18**), a range of habitats are present including mosaics of species-rich and species-poor semi-improved grassland, marshy grassland pockets, vegetated drains and a small lake. A diverse grassland sward occupies the slopes within the vicinity of the lake, including several plants of the uncommon grass vetchling. The southeast corner of the site is occupied by a low-growing, very open, fine grassland sward with a high concentration of forbs; in particular, frequent spikes of common spotted and early purple orchids are prominent throughout. A stand of marshy grassland is also present in this area. The remainder of the grassland occupying the site tends to be dominated by Yorkshire-fog and perennial-rye grass, with grasses being the main constituents of the sward. This site is adjacent to Podmore Pool (**11**) and Hayes Wood and Dismantled Railway (**6**), and forms part of Bateswood (North) LNR (**Map 5 – ID 1**) along with the former. The grassland within this site is mostly of high distinctiveness.
- Miles Green Farm Fields (**21**), a small area of semi-improved neutral grassland on a steep slope which is believed to be an old spoil heap, the land appeared to be used for the grazing of horses at the time of the survey. The gradient of the slope on the site suggests that no fertilizers have been applied and the site is unlikely to have been greatly improved. The sward is moderately diverse, however, the current grazing regime appears to be keeping the vegetation very short. This may be a detriment to the site but is needed to keep the scrub and less desirable species under control. The grassland within this site is of high distinctiveness.
- Burgess Wood (**22**), a south-facing bank reflecting acid grassland ground flora north of Burges Wood and Miry Wood. The grassland is frequent in mouse ear-hawkweed, crested dog's-tail, sheep's fescue, ribwort plantain, and selfheal. Less conspicuous are field wood rush, sweet vernal grass, bird's-foot-trefoil, daisy, cats' ear and clover. Gorse, hawthorn and rowan are present as scrub. Acid flushes contain a high proportion of tormentil, sheep's sorrel, matt grass, heath bedstraw and wavy hair-grass. The grassland within this site is of high and medium distinctiveness.
- Audley Castle Banks (**23**), unimproved acidic grassland situated on an east-facing slope. The site is situated on the northwest periphery of Audley adjacent to the local football ground and is a publicly accessible site well-used by dog walkers. The site was last surveyed in 1999 where it predominantly comprised of unimproved acidic grassland situated on an east-facing slope, with pockets of fen vegetation and occasional scattered scrub. When it was resurveyed in 2007, scattered scrub now occupied a greater part of the site and in places was particularly dense. An acid ground flora still exists in places with matt grass, sheep's fescue, sheep's sorrel, heath bedstraw, tormentil and mouse-eared hawkweed all present within the sward. The pockets of fen identified by the 1999 survey have since been invaded by scrub, with only tall stands of meadowsweet, common valerian and great willowherb remaining. This site represents the only potentially locally irreplaceable grassland habitat within the parish.
- Bignall End Road (**24**), the fields are poor semi-improved grassland, with large areas of marshy grassland around the sides of Brierly Brook. The site is situated northeast of

Bignall End. Soft rush is dominant in these marshy areas, with abundant hard rush. Cuckooflower and great willowherb are frequent. The grassland within this site is of medium distinctiveness.

There are also a few patches of non-designated grassland within the parish. This includes several areas of medium distinctiveness, marshy grassland near Wynbrook, directly south of Audley town and a patch of high distinctiveness, semi-improved neutral grassland near Dunkirk. While these areas are non-designated, they may provide a stepping stone for dispersing species between the areas of designated grassland described above.

6.c. Wetland

Staffordshire is unusual in that it covers three separate river basins, namely the Trent (draining to the North Sea via the Humber), the Weaver (draining to the Irish Sea via the Mersey) and the Severn (draining to the Bristol Channel and Atlantic Ocean). Thus, land use in Staffordshire has implications for a wide range of estuarine and marine environments elsewhere. In addition to this network of rivers and streams, there is a range of standing water wetland habitats, including, ponds, lakes, meres, mosses, peatlands and blanket bogs.

Audley lies predominately within the Weaver Upper Catchment area, with a small section within the Trent (Source to Sow Rivers) Catchment. It contains five smaller water bodies (**Map 9**; **Appendix II**):

- Valley Brook (Source to Englesea Brook) is the largest and most northerly of Audley's catchments. The main brook enters the parish near Dunkirk and flows approximately 3 km northwest through Foxley towards the Cheshire border, passing through Wrench's Coppice SBI.
    - The catchment is of poor ecological status. This is attributed to the invertebrate element, which is in poor condition. In addition, the macrophytes and phytobenthos[2] and ammonia elements are in moderate condition. The catchment does not support a good hydrological regime[3].
    - The reasons for not achieving good status and reasons for deterioration can be attributed to activities such as farm/site infrastructure, poor livestock management, poor nutrient management, poor soil management, continuous sewage discharge and urban development.
- Englesea Brook is the second largest catchment and contains two signification brooks. The first rises in in Audley Castle Banks BAS and flows approximately 3.7 km northwest towards the Cheshire border. It passes through Domvilles Wood SBI at the border. The second, Dean Brook, rises in Shortfields and flows approximately 1.5 km northwest to the

[2] Macrophytes are larger plants, typically including flowering plants, mosses and larger algae but not including single-celled phytoplankton or diatoms. Phytobenthos are bottom-dwelling multi-cellular and unicellular aquatic plants such as some species of diatom.

[3] Hydromorphology describes the hydrological and geomorphological processes and attributes of surface water bodies. For example, for rivers, hydromorphology describes the form and function of the channel as well as its connectivity (up and downstream and with groundwater) and flow regime, which defines its ability to allow migration of aquatic organisms and maintain the natural continuity of sediment transport through the fluvial system.

Cheshire border. It flows through Mill Dale SBI at the border. These brooks join in Cheshire, becoming Englesea Brook.

  - The catchment is of poor ecological status. This is attributed to the macrophytes and phytobenthos element, which is in poor condition. In addition, the phosphate element is in moderate condition.
  - The reasons for not achieving good status and reasons for deterioration can be attributed to activities such as farm/site infrastructure, poor livestock management, poor nutrient management, poor pesticide management and poor soil management.

- Checkley Brook is the most southerly catchment. An unnamed brook rises in Bateswood Open Space BAS and flows 2 km south, passing through Hayes Wood and Dismantled Railway SBI twice. This brook then joins with another unnamed brook that rose in Craddocks Moss SBI and flowed approximately 1 km south. This brook then flows through Walton's Wood West and enters Madeley Parish near the M6, later becoming Checkley Brook.
  - The catchment is of good ecological status. All biological elements are classed as good or high.
- A small section of Wistaston Brook catchment falls within Audley. No significant brooks flow through the parish.
  - The catchment is of bad ecological status. This is attributed to the fish quality element, which is in bad condition. In addition, the phosphate element is in poor condition and the dissolved oxygen and macrophytes and phytobenthos elements are in moderate condition.
  - The reasons for not achieving good status and reasons for deterioration can be attributed to activities such as farm/site infrastructure, incidents, poor livestock management, poor nutrient management, poor pesticide management poor soil management, continuous sewage discharge and urban development.
- A small section of Lyme Brook, part of the Trent catchment, also lies within Audley. No significant brooks flow through the parish.
  - The catchment is of poor ecological status. This is attributed to the macrophytes and phytobenthos element, which is in poor condition. In addition, the invertebrate element is in moderate condition.
  - The reasons for not achieving good status can be attributed to activities such as an abandoned mine, intermittent sewage discharge, trade/industry discharge and urban development.

All catchments failed chemical checks, based on the Mercury and Its Compounds and Polybrominated diphenyl ethers (PBDE) elements. Measures have been delivered to address the presence of these substances and are awaiting recovery[4].

[4] The assessment of chemical status was changed in 2019, which resulted in all water bodies in the country now failing chemical checks. In previous checks (2013 and 2014), all catchments bar Lyme

In addition to running freshwater, these upwellings within the parish also feed a series of pools, which in dense concentrations and close proximity act as a larger overall network. Small waterbodies are important refuges for wildlife in a landscape, especially for reptiles and amphibians.

Small pools occur frequently across the agricultural parts of the parish, especially in the north. Several SBIs and BASs also contain larger pools, including:

- Mill Dale (**9**). The 0.95 ha pool contains marginal areas abundant with yellow flag and amphibious bistort with yellow water-lily, soft rush, floating sweet-grass and bulrush.
- Podmore Pool (**11**). There are two pools on the site, one of which is dried out. The other has a few marginal and emergent vegetation species but the majority of the flora on the verges is more characteristic of grasslands than water margins. Of the flora yellow flag, reed canary-grass, lesser bulrush, marsh marigold, valerian and reed sweet-grass are characteristic of water bodies and wet areas. Common spotted-orchid, grass vetchling and yellow loosestrife are the notable species around the pools.
- Bignall End Coal Yard (**15**). The pool and its surrounding semi-natural vegetation attract several species of dragonfly and damselfly including the emperor, broad-bodied chaser, southern hawker and many common darters. The water is fished but retains a natural quality with a diverse marginal flora including several sedges, common spike-rush and small patches of floating aquatic plants.
- Burgess Wood (**22**). The site contains several pools, with invertebrate species including Emerald Damselfly, Migrant Hawker and Broad-bodied Chaser. In 2005, the great crested newt, a UK-protected species and SBAP priority species, was confirmed to be breeding within these pools (**Map 4**).

Several ditches are located within Craddocks Moss Woodland (**4**), a large drained peat bog, formerly of great botanical importance[5]. Purple moor grass, rough meadow grass, soft rush, creeping buttercup, common marsh-bedstraw, floating sweet-grass and creeping soft-grass are all locally frequent. Common hemp-nettle, common cotton-grass, tufted hair-grass and gorse are also present but rarely found. Common cotton-grass is uncommon in Staffordshire. The ditch on the far southwest of the site contains an array of different species. These include tormentil, marsh pennywort, marsh thistle, selfheal, greater birdsfoot trefoil, field forget-me-not, thyme-leaved speedwell and Yorkshire fog. The wetlands are listed as potentially locally irreplaceable.

6.d. Heathland

Lowland heathland is dominated by shrubs of the heather family and occurs below an altitude of 200 metres, normally on acidic, free-draining soils. It is internationally rare, with the UK containing 20% of the global total area (Newton et al, 2009). However, much of the lowland heathland has been lost over the past 150 years through agricultural development and the

Brook were given good status for chemical checks. Lyme Brook failed on Nickel and Its Compounds; it has since been given good status for this check (2015, 2016 and 2019).

[5] Since the latest assessment for Craddocks Moss was made, positive conservation measures have been made to the site, in an effort to restore it to its former botanical importance. Thus, this description does not accurately reflect the site in its current state.

planting of conifers. The small, fragmented patches that remained fell out of use and natural succession led to the development of secondary woodland, resulting in the loss of many specialist heathland species. In Staffordshire, there has been a 90% decrease in heathland habitat between 1775 and 1990 (Noake *et al*., 2016).

Heathland within the parish is limited to two sites approximately 450 m apart. The smaller, a patch of high distinctiveness habitat, forms part of Bignall End Coal Yards (**15**), which can be separated into subsites. Within one subsite, most of the area has developed into a Calluna-dominated heathland, and where quite damp in places, with soft rush. In many areas where heather has not yet achieved 100% cover, there is a very well-developed lower plant flora community of mosses and lichens, virtually 'lichen heath'. Within another subsite, heathland is now reduced to two small patches from a reported former extensive dominance and has been replaced by res-seeded amenity grassland and semi-natural, acidic grassland.

The second site, an area near the Wedgewood Monument, has no statutory or non-statutory designation. It is comprised of dry heath/acid grassland mosaic and is almost completely surrounded by poor semi-improved grassland. This area is of high distinctiveness.

6.e. Wildlife Corridor Network

Wildlife corridors are a key component of wider ecological networks as they provide connectivity between core areas of high wildlife value and habitats of high distinctiveness; enabling species to move between them to feed, disperse, migrate and reproduce. Two wildlife corridor networks have been built. The first focuses on the network of priority habitats (woodland, grassland, wetland and heathland) (**Map 13**). The second map shows the potentially locally irreplaceable, very high and high distinctiveness within the parish (**Map 14**).

The woodland network (**Map 16**) is the most extensive within Audley, with the majority of high distinctiveness habitat being woodland. The non-statutory designated woodlands are distributed fairly evening across the parish, however, the larger patches are more concentrated in the south of the parish, namely the woodland of Bateswood (North) LNR (**Map 5 – ID 1**) and Burgess Wood BAS (**Map 6 – ID 22**). These are connected by smaller patches of non-designated woodland, which act as stepping stones corridors. These are particularly prominent alongside brooks.

Another key feature of the woodland network is a large, triangular corridor within the centre of the parish. This is comprised of thin strips of woodland that borders the M6 and the A500. The third side follows the line of a disused railway that intersects the A500 at the border and travels southwest to where it intersects with the M6. Bignall End Coal Yards SBI (**Map 6 – ID 15**) and Hayes Wood and Dismantled Railway SBI (**Map 6 – ID 6**) form part of this site. Along the M6 side, two further SBIs, Mill Dale (**Map 6 – ID 9**) and Domvilles Wood (**Map 6 – ID 10**), are 150 m and 50 m of this corridor, respectively. With the exception of the southern tip of the triangle (where there is a large gap in vegetation), it is largely continuous and is currently approximately 10 km in length.

Connection to woodland habitat outside the parish is high to the south, with several other SBIs containing high distinctiveness woodlands present along the southern border. However, the woodland network is more limited north of the A500 and it is near Dunkirk in the far north of the parish that the most notable bottleneck of the woodland network is found. The north of the parish borders Cheshire so there is limited habitat data to make use of. However, when

examining the aerial maps, a continuation of the rolling arable landscape continues, suggesting there may be limited movement northwards of the parish. However, the continuation of the disused railway north may help woodland species colonising northwards. This is also suggested in the Condatis model created for the woodland network; the progress and flow of a woodland species colonising south to north through the parish will occur faster to the south of the parish and may experience fewer options for movement in the north of the parish.

The grassland network within Audley is more limited than the woodland network (**Map 17**), with habitat being found almost exclusively in the south-east of the parish. Only one patch of grassland, also near Dunkirk, is found north of A500. The gap between this and the grassland of Bignall End Coal Yards SBI (**Map 6 – ID 15**) forms the greatest bottleneck of the current grassland network. The Condatis model shows the flow and progress between grasslands is faster in the south of the parish. Colonisation to the north and west of the parish is going to be very limited.

Except for urban areas, the distribution of the wetland network is fairly even across the parish[6] (**Map 18**). Through the agricultural landscape, there is a network of ponds, which will act as stepping stones between the running freshwater in the north and south of the parish and the larger pools. There are two strong bottlenecks which could hinder distribution. The first, in the centre of the parish, is likely caused by the urban centre of Audley town. The second is caused by the steep slopes of the hill Wedgewood monument sites. A species colonising south to north may face problems if dispersing in the east of the parish due to these bottlenecks. However, in the west, this would be far easier.

The two patches of heathland within the parish occur near the eastern border of the parish (**Map 19**). As these sites are approximately 1 km apart, it is expected that flow between the two would be fairly strong, albeit dependent on a species' ability to disperse. However, colonisation to the north, south and west of these sites is hindered by the lack of habitat.

When these habitats are combined (**Map 15**), an ecological network is created: the larger woodlands of the south, wooded brooks of the north and large pools act as core habitat; woodlands surrounding major roads and a disused railway act as wildlife corridors; and smaller woodlands (both designated and non-designated) and grassland form stepping stones. The core areas are larger in the south of the parish. The large triangular woodland corridor in the centre of the parish facilitates movement for dispersing species across a large proportion of the parish.

However, dispersing wildlife will face several barriers. Arable land dominates within the northwest of the parish, which leads to a significantly reduced woodland and grassland network. The fields within this area are large and open. While the hedgerow network in this area has not been mapped specifically, aerial photography indicates that the hedgerows could be potentially heavily managed, lack diversity and individual trees rarely are allowed to protrude. This will further limit dispersal over this area. High inputs of agrochemicals associated with intensively managed land could potentially be negatively affecting the species

[6] When considering the wetland network map that was built by the Condatis model, it should be noted that brooks are often not built into the basemap, and so the network built may not accurately reflect the real wetland network.

composition, particularly at ground level. The A500 and M6 are both wide and busy roads. While wildlife such as birds and flying invertebrates may be able to cross these easily, others (especially mammals, reptiles and amphibians) may struggle. A complex network of country roads which crosses wildlife corridors. However, the resulting gap between corridors will rarely be more than 20 metres wide, and so mobile should not be affected.

6.f. Protection of the Wildlife Corridors

The potentially locally irreplaceable, very high and high distinctiveness habitat within the parish is shown in **Map 14**. These areas should function as the core areas of the network, as they have the highest potential for wildlife. A 15 metre has also been included in this map; this is necessary to protect core areas from the effects of encroachment by external pressures such as increased anthropogenic disturbance, light pollution, groundwater/aquatic pollution, domestic pet predation and the spread of invasive non-native plant species or garden cultivars.

Any potential development proposals in the parish must avoid high distinctiveness habitats, other large areas of semi-natural habitat that act as core wildlife areas and the larger wildlife corridor network. Any development adjacent or in close proximity to these areas must incorporate substantial mitigation to minimise the residual effects on wildlife. This also looks to enhance the overall condition of habitats to achieve a measurable net-gain for biodiversity. This can be achieved by:

- Prioritising a scheme design that retains and enhances important semi-natural habitats and key features for biodiversity, while also improving the permeability and function of the site for wildlife by creating new resources within and new connections to the wider landscape.
- Embedding out-of-bounds areas and dark corridors along watercourses, woodland edges and hedgerows into the environmental design of the scheme.
- Ensuring all external lighting is directional, low spillage and wildlife friendly.
- Ensuring the scheme drainage strategy directs runoff away from sensitive environmental assets and does not promote pollution propagation pathways. This is particularly important for habitats that are dependent on hydrology such as running or standing water, peatlands, and floodplain grazing marshes.
- Incorporating Sustainable Drainage Schemes (SuDS) which can provide additional wildlife habitat, provide measurable net-gains for biodiversity and prevent flooding. However, SuDs may hold polluted water so should not drain directly into running or standing water unless an extensive filtration or settlement system is in place.
- Ensuring only UK and Northern Ireland sourced and grown nursery stock of native plant and tree species be used in the landscaping of developments.
- Incorporating species-specific mitigation measures where appropriate such as:
    - Hedgehog-friendly fencing, purposely designed to allow the passage of hedgehogs from one area to another;
    - South-facing banks or bunds for reptiles, butterflies and other invertebrates, and;

- Bee bricks and bat or bird boxes, ideally made of highly durable material such as woodcrete.

There are also opportunities to enhance the wildlife corridor, such as those set out in the UK Government England Trees Action Plan. However, it is vitally important that tree planting should only occur in species-poor habitats away from existing (non-woodland) priority or semi-natural habitats, watercourses or aquatic habitats such as ditches and ponds and any other habitats of value to specific wildlife. Specialist ecological advice should always be sought before any tree planting is undertaken to ensure no unintended negative effects on biodiversity arise as a result.

Not all sections of the wildlife corridor provide high-quality habitat, and measures to improve its ability to support the movement of species is a priority. Enhancement of the corridor may be facilitated by opportunities arising through the planning process (e.g. Biodiversity Net Gain), through government incentives (Environmental Stewardship or Countryside Stewardship Schemes, as shown on **Map 26**[7]) or through the aspirations of the local community working with local businesses and landowners.

The network of field boundary hedgerows within the parish provides connectivity to the current network, especially in the north-west of the parish which is dominated by arable land. This potentially restricts the ability of wildlife to disperse throughout the area. While hedges are rarely identified as key components of ecological networks (including within this natural capital assessment), collectively they provide linear connectivity throughout the parish.

Old meadows supporting species-rich neutral, marshy or semi-natural grassland and wetlands are particularly important for a variety of invertebrates including pollinating insects and other species such as breeding and wintering birds, mammals, amphibians and some species of reptiles. Thus, even the highlighted 'medium distinctiveness' areas should be thoroughly evaluated when considering development. If they are found to support species-rich grassland or wetland habitats they should be re-classified as a 'high distinctiveness' priority habitat or habitat of principal importance. Where possible, these habitats should not be built on (as stipulated in the NPPF), as providing significant compensation for the loss of these habitats (in order to achieve 'net gain', such as mitigation strategies) is difficult to achieve.

6.g. Provision of Ecosystem Services

Demand for air purification (**Map 20**) is highest in the large urban centres of the parish, Audley town, Bignall End and Wood Lane. There is also demand in the smaller urban centres like Miles Green, Halmer End and Alsagers Bank. There is also demand along the M6 and A500, two major roads that intersect the parish. Maximum capacity for air purification is found within the large areas of woodland found in Bateswood (North) LNR (**Map 5 – ID 1**) and Burgess Wood BAS (**Map 6 – ID 22**). These areas may help with the demand for these ecosystem services within these urban centres, especially when adjacent to demand hotspots, such as Alsagers Bank and Halmer End. Smaller woodlands, such as Wrench's Coppice (**Map 7 – ID 40**), Foxley Drumble (**Map 7 – ID 33**), Mill Dale (**Map 7 – ID 35**) and Hayes Wood (**Map 7 – ID 34**), also offer capacity for air purification.

[7] This map shows the land within government schemes as of Nov 2023. To access the up-to-list data, access Defra's Magic Map website**.**

Capacity for carbon capture (**Map 21**) is focused on the network of woodlands within the parish. As such, the hotspots are found within found in Bateswood (North) LNR (**Map 5 – ID 1**) and Burgess Wood BAS (**Map 6 – ID 22**) as well as the smaller patches of woodland discussed in **section 6.a.** Woodland Capacity for carbon capture within the arable and urban areas is very low.

Like air purification, the demand for climate regulation (**Map 22**) is focused on the urban centres of the parish. There is also demand for this ecosystem service along the M6 and A500, albeit to a lesser extent than the urban areas. Capacity for climate regulation is also highest in the woodland network of the parish. In particular, Bateswood (North) LNR (**Map 5 – ID 1**) and Burgess Wood BAS (**Map 6 – ID 22**) are major hotspots for climate regulation capacity. Maximum climate regulation capacity requires large areas of woodland, and thus while the smaller areas of woodland within the parish offer some capacity, it is far less than their capacity for air purification. Within the arable and urban habitats, there is very little capacity for climate regulation.

Demand for noise regulation (**Map 23**) is centred on the two major roads that intersect the parish, the M6 and A500. In particular, there are two junctions within the parish (Junction 16, where the M6 and A500 meet and Alsager Road junction on the A500), which are hotspots for noise regulation demand. Other hotspots are the urban centres, in particular Audley Town and Bignall End. Capacity for noise regulation is centred on the large woodlands of the parish, Bateswood (North) LNR (**Map 5 – ID 1**) and Burgess Wood BAS (**Map 6 – ID 22**). Like capacity for climate regulation, large areas of woodland are required for noise regulation capacity. Thus, outside these areas, the parish has very little capacity for noise regulation.

The capacity for pollination (**Map 24**) within the parish is high. The large network of country roads, with vegetative road verges and hedgerows, helps facilitate the movement of pollinator species. These species are generally unable to fly over the large areas of homogenous vegetation typically seen in agricultural land. In the urban centres of the parish, where the cultivated plants of private and public gardens offer ample opportunity for pollinator species, there is also high capacity. The lowest capacity areas within the parish for pollination are large areas of agricultural land outside Lower Foxley and Park End.

Flood mitigation (**Map 25**) within the parish generally ranges from medium to high capacity. Capacity is highest within woodland areas at greater altitudes, namely Bateswood (North) LNR (**Map 5 – ID 1**) and Burgess Wood BAS (**Map 6 – ID 22**). Capacity is lowest when following the valleys created by the small brooks of the parish.

7. Recommendations

Based on the mapping presented in this natural capital assessment, SWT advises the following recommendations be actioned to protect and enhance habitats which contribute to a coherent ecological network:

1. **Protect and expand the network of currently designated wildlife conservation sites.**

Ensuring that the current wildlife corridor network is protected through legislation is vital to ensuring its longevity. The current network of designated wildlife sites is strong, particularly in the south-east of the parish, as shown in **Map 6**. However, there may be other sites within the

parish that meet the criteria for an SBI or BAS designation. When the selection criteria are met, these sites should be designated, affording them greater protection. Priorities and opportunities for protecting and expanding the network of currently designated wildlife sites include:

- Ensuring that woodland sites, particularly those that are ancient and high-quality grasslands remain in positive conservation management.
- Avoiding the incorporation of key woodlands and grassland habitats into development sites. This is achievable through mitigation hierarchy in the biodiversity offsetting system.
- Ensuring that the dales and wet woodlands are protected from development pressure to prevent degradation of the woodland quality, including water quality. Natural flood management and other 'working with natural processes' techniques could be targeted within the woodlands to enhance the existing mitigation and benefit biodiversity.
- Encouraging relaxed management on the fringes of woodlands to provide a softer edge (e.g. scrub formation) habitat which can support both more and a wider diversity of species, particularly birds and butterflies.
- Reconsidering the designation of Foxley Drumble as a Local Wildlife Site. If the woodland still has not met the selection criteria, consider a management plan which would strive to improve the quality of the woodland. This will help protect the most notable area of woodland within the arable-dominated north-west of the parish and provide a vital corridor for dispersing species northwards into Cheshire.
- Ensuring that the high-quality grasslands are buffered from potentially detrimental neighbouring land uses such as intensive farming practices. This could be achieved through encouraged uptake of agri-environment schemes and landowner liaison/education.
- Enhancing existing non-designated grassland sites or restoration of degraded sites so that they may achieve Local Wildlife Site Status and ensure that the management of these sites persists to ensure that they remain diverse. This includes marshy grassland areas near Wynbrook and an area of semi-improved neutral grassland near Dunkirk.
- Ensuring that the grasslands at Bateswood Nature Reserve, which is managed by local authority ownership, are maintained.
- Protecting existing areas of high-quality Lowland Heath through sympathetic management and ensuring that positive management continues and prevents degradation due to neglect. Ensure that the existing areas of heathland around Wedgwood's Monument are conserved and seek to expand the area of current heathland through creation and restoration. If the selection criteria for heathland are met, designating the site as a Local Wildlife Site will afford it greater protection.
- Identifying environmental issues facing designated wetlands, for example, pollution from agricultural run-off and subsequent remediation for instance through Rural SuDS. These sites should be buffered from any potential sources of damage both through the creation of habitat around key sites to provide a 'soft edge' habitat and landowner liaison to address issues.

- Formally recognising Craddocks Moss and adequately protecting it from developmental pressure, both in terms of its statutory designation and through local planning policy. Restore these degraded peat sites through re-wetting, sympathetic habitat creation and working with natural processes. Engage and work with landowners within the wider catchment area to ensure that land practices are sensitive and sympathetic to the core site as well as seeking to create or restore additional beneficial habitats. Securing appropriate nutrient and water management systems both in the direct vicinity and the wider catchment of Craddocks Moss will be crucial for its long-term survival.
- Ensuring that appropriate sensitive management is in place for the core areas of wetland within the parish, ideally managed by bodies or individuals with a proven track record of managing sensitive nature conservation sites.
- Newcastle Borough has a rich pondscape network which supports one of the best populations of Great Crested Newt in the county, so ensuring that any developments that could impact the ponds within the parish are effectively mitigated is vital.

2. Create new habitat to enhance the current wildlife corridor network.

Corridors and stepping stones improve the functional connectivity between the designated wildlife sites. This enables species to move between them to feed, disperse, migrate or reproduce. There is currently good connectivity between wildlife sites. However, creating new areas of suitable habitat in strategic locations will continue to help the flow of species around the parish. To achieve this,

- Plant further future woodlands on sites which do not already support a priority habitat to improve connections of existing areas of high-quality woodland and increase the area of woodlands which are ecologically functional for the species that they support. Woodland expansion and creation must not be detrimental to other high-quality habitats, for instance, diverse grassland habitats. This could be done by using historical maps and data to determine the past extent of woodland areas, particularly where there may still be a rich ground flora in the seed bank for the restoration and expansion of ancient woodland sites.
- Use Light Detection and Ranging (LiDAR) imagery to identify historical field patterns and features i.e. ridge and furrow to indicate where grassland restoration may be most successful as these areas have not or are unlikely to have undergone any serious agricultural improvement in the past.
- The reversion of arable land to diversify grassland where soils dictate (note, this is usually only carried out in certain circumstances due to the difficulty and cost associated).
- Linking existing semi-natural habitats through the creation of habitat corridors and networks using hedgerows, arable field margins and watercourses where possible. Hedgerows could be managed less intensively including less frequent cutting or cutting on rotation with additional trees planted or managed as standards to increase species and structural diversity.
- Using historical maps and LiDAR information to identify historical wetland and river features, sluices, water meadows etc. which could potentially be restored to deliver both flood risk mitigation and habitat improvements.

- The regeneration of post-industrial sites into highly diverse biological sites, to help engage and educate the public on the importance of brownfields on a range of different species. Within these sites, provide habitat for species which rely solely on these kinds of habitats, for example, Dingy and Grizzled skipper butterflies.

3. Enhance high distinctiveness areas within the current wildlife corridor network.

Ensuring the quality of currently designated sites, as well as habitat outside the designated sites will help provide optimal breeding, foraging and commuting for the species that currently utilize the site, as well as those colonizing it. Opportunities should be explored to restore, expand, and create more wildlife-friendly habitat, especially where connectivity with other areas of valuable habitat can be achieved or where important sites can be buffered. Larger areas of better-connected habitat support larger and more resilient species populations while helping to prevent local extinctions. Site-specific management opportunities should be determined by a qualified ecologist. However, some general opportunities include:

- Restore Planted Ancient Woodland Sites (PAWS) to native broadleaf woodland or diversify coniferous woodlands, including more native species planting.
- Identify veteran trees, and promote their importance both in woodland and in the wider landscape.
- Look for opportunities to carry out river reprofiling/naturalisation, improve flood storage and provide additional habitats suitable for a range of species, particularly breeding waders and wintering wildfowl.
- Cutting or grazing of all semi-natural grassland should be carried out to retain the wildlife value. This will enable more herb growth within the sward, prevent more competitive species from taking hold and prevent grasslands from eventually scrubbing over. Where cutting is used as a method of management it should be carried out after flowering plants have set seed. Where farmland birds such as skylarks are breeding, cutting outside of the nesting season (March to September inclusive) will avoid the destruction or abandonment of nests. Under the Wildlife and Countryside Act 1981 it is an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs.
- Clearing field ponds which have become overgrown and choked with vegetation to allow light to penetrate, to provide areas of open water and allow a more diverse marginal flora to develop (with the remaining tree/scrub cover around 10 - 15%). These measures will also benefit amphibians, invertebrates and mammals. Ideally, no more than one-third of the pond should be dredged in a single year so that existing biodiversity is retained and enhanced. Waste vegetation should be left at the side of the ditch for 24 hours before removal to allow any fauna to return to the water[8].
- Invasive non-native species (listed on Schedule 9 of the WACA) should be prevented from colonising the parish's semi-natural habitats. Under the Wildlife and Countryside Act 1981

[8] Prior to any work professional advice should be sought and ponds should be assessed to ensure existing wildlife is not impacted, including great crested newts which use ponds for breeding and may also be present in rank vegetation or under brash piles around the banks, or roosting bats which may be roosting in trees surrounding ponds.

(as amended), it is an offence to plant or otherwise cause these species to grow in the wild. Records of both Himalayan balsam and Japanese knotweed have been found within the parish. These species colonise rapidly and will outcompete native woodland, grassland and wetland flora; any existing or future stands of these species should be managed by a specialist contractor to control their spread.

- Educate householders on the problems with the encroachment of invasive non-native species into semi-natural habitats, advising the avoidance of inadvertently planting these invasive species in their gardens, especially where they adjoin open areas, semi-natural habitats, or watercourses.

4. Enable permeability between urban and rural environments.

The key opportunity in urban areas is not to connect urban areas, but to enable permeability between rural and urban landscapes, especially where high-quality semi-natural habitats exist near or within these areas. This is vital in Audley, as even in the urban centres of the parish, you are rarely more than 500 metres from rural environments. Increasing the permeability could come from:

- The ecological enhancement of existing urban green spaces, for example through improving the diversity of amenity grassland in parks by seed sowing and green hay strewing.
- The creation of new habitats when planning new urban developments, including green roofs/green walls, wildlife-friendly sustainable drainage systems (SuDS) which can be planted with native wetland species, and rain gardens to slow the flow of water.
- Ensure that urban green spaces are managed appropriately to provide the best benefits for wildlife and people, including relaxing mowing regimes to create and maintain more diverse grasslands and thinning of plantation woodlands to improve structural diversity or invasive species control.
- Provide suitable opportunities in existing and new developments for protected and Biodiversity Action Plan (BAP) species for example bats, hedgehogs and pollinators. For example, ensuring new developments provide wildlife permeable fencing as standard and encouraging householders to make holes in the bottom of their fences.

5. Enhance arable landscapes to provide more ecological opportunities.

There is a wide range of opportunities for more intensively farmed agricultural land ranging from very small interventions (such as leaving one corner of an arable field as set aside to provide feeding opportunity for farmland seed-eating birds) to large whole farm scale interventions (for example reversion of large areas of arable land into diverse grassland). The scale of the intervention is down to what is practical, desirable, cost-effective and sustainable in the eyes of landowners and land managers. Key opportunities include:

- Planting new and maintaining existing hedgerows to better connect smaller isolated woodlands benefits species migration and chances of breeding.
- Buffering hedgerows in intensively farmed land by semi-natural areas to provide additional wildlife-friendly habitat (2 metres from the centre of the hedge is the minimum requirement

under cross-compliance regulations, however, 4 - 6 m is recommended) and improve the diversity of ground flora species.

- Any proposals that involve the removal of hedgerows, sections of hedgerows or their associated features (e.g. ditches, banks and standard trees) should be supported by an assessment to ascertain their status concerning The Hedgerow Regulations[9]. If the Local Planning Authority grants permission for removal, compensatory hedgerows should be required to be planted. Like-for-like replacement is considered the minimum level of compensation, but high-value hedges in good condition will likely require a 3:1 replacement ratio.
- The reversion of arable to other habitats with a higher biodiversity value, for example, species-rich grassland.
- Encouraging the uptake or movement toward organic production methods or holistic grazing management over-reliance on supplementary feeding or indoor systems for example.
- Where developments are likely to impact large areas of intensive farmland ensuring that, as a result, some of the developed area is dedicated to the provision of high-quality semi-natural habitats which may greatly improve habitat availability and connectivity within the landscape.

6. Ensure the requirement to secure a measurable biodiversity net gain is embedded into local environmental policies.

Providing a measurable net gain for biodiversity is embedded in NPPF (paragraphs 8, 32, 180d, 185b and 186d). To protect local natural assets, strong biodiversity net gain policies must form part of local environmental policy, such as in a neighbourhood plan. Any new green infrastructure arising as a result of biodiversity net-gain should take into consideration the recommendations set out in this report and how it can contribute to the wider ecological network.

8. Conclusions

This study has highlighted that the important wildlife habitat within Audley is predominantly associated with woodland habitats. This includes woodlands that run along several of the small brooks within the parish (Domvillles Wood SBI, Mill Dale SBI and Wrench's Coppice SBI) and larger areas of woodland within the south of the parish (Burgess Wood BAS, Hayes Wood and Dismantled Railway SBI and Podmore Pool SBI). The ages of these woodlands are also important, with several of these woodland LWS either being fully or partially ancient woodland. This network provides a continual corridor across the majority of the parish, which provides

[9] Hedgerows that meet certain criteria are protected by The Hedgerow Regulations (1997). Under the regulations it is against the law to remove or destroy 'Important' hedgerows without permission from the Local Planning Authority and the removal of a hedgerow in contravention of The Hedgerow Regulations is a criminal offence. The criteria used to assess hedgerows relate to their value from an archaeological, historical, landscape or wildlife perspective. The regulations exclude hedgerows that have been in existence for less than 30 years, garden hedges and some hedgerows which are less than 20 metres in length. The aim of the regulations is to protect 'Important' hedgerows in the countryside by controlling their removal through a system of notification.

habitat and enables movement for fungi, invertebrates, bats and hole-nesting birds. They also provide a large proportion of the ecosystem service provision for the parish, offsetting some of the demand created by the urban centres and major roads. The parish also contains important grassland, heathland and wetland sites which also provide a vital habitat for a range of species.

The study has also highlighted the wildlife corridor network, which provides ecological connectivity between four key habitats, woodland, grassland, wetland and heathland, throughout the parish. This includes a large corridor formed by the woodland of major roads and a disused railway and woodland that follows several small brooks. The parish also has a strong network of ponds and pools which act as stepping stones. This network is likely to support a wide range of birds, amphibians (including the protected Great Crested Newt), mammals (including at least six species of protected bat species), plants and nationally and locally important invertebrate species. 17 priority species/taxonomic groups on the SBAP have been observed at least once in the parish. These species depend on the existence and connectivity of semi-natural habitats highlighted in this report.

We recommend that the high distinctiveness wildlife corridor network (**Map 14**) is incorporated into local environmental policy and protected from development. This will ensure the core areas of the network are protected at a local level, as set out by the NPPF (paragraphs 180d, 181, 185a, 185b). The wildlife corridor network includes a buffer zone of 15 metres in places to protect the high distinctiveness habitats. If new habitats of high distinctiveness are subsequently identified within the parish, or identified habitats of medium distinctiveness are shown to be undervalued, these areas should also be protected by a 15-metre buffer zone to protect them from development. SWT has provided several recommendations that should be actioned to protect and enhance habitats, which will contribute to the creation of a coherent ecological network.

When future development lies adjacent to high distinctiveness habitats or wildlife corridors, substantial mitigation and avoidance measures must be undertaken to minimise the potential impact of wildlife (in line with NPPF Para 180a; the avoidance, mitigation and compensation hierarchy) and enhance the features where possible (in line with NPPF Para 185b; the provision of measurable biodiversity net gains). This can be achieved by prioritising a design scheme that retains and enhances a site's semi-natural habitat and key features of biodiversity. Improving the permeability and function of the site for wildlife by creating new features connecting it to the wider landscape is also vital. This should be supplemented with bespoke mitigation and additional protective measures.

Protecting and enhancing the local environment is vital for nature conservation, the provision of ecosystem services and the use and enjoyment of future generations. Future development in Audley should respect and prioritise its local natural environment, with a focus on its invaluable biodiversity, landscape and historical/cultural associations.

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Appendix I. Habitat Types

Habitat types included in the assessment of strategic habitat areas (habitats without an 'X' in a relevant habitat column were not used in the assessment).

Habitat survey type	HABCODE	Habitat description	Woodland	Wetland	Grassland	Heathland
UKBAP	CF1	Coastal floodplain grazing marsh		X	X	
UKBAP	WW	Wet Woodland (Where identified)	X	X		
Phase 1	A111	Broad-leaved semi-natural woodland	X			
Phase 1	A112	Broad-leaved plantation	X			
Phase 1	A121	Coniferous semi-natural woodland	X			
Phase 1	A122	Coniferous plantation	X			
Phase 1	A131	Mixed semi-natural woodland	X			
Phase 1	A132	Mixed plantation	X			
Phase 1	A21	Dense continuous scrub	X			
Phase 1	A22	Scattered scrub	X		X	
Phase 1	A31	Broad-leaved parkland/scattered trees	X		X	
Phase 1	A32	Coniferous parkland/scattered trees	X		X	
Phase 1	A4	Recently felled woodland				
Phase 1	A5	Orchard	X		X	
Phase 1	B11	Unimproved acidic grassland			X	
Phase 1	B12	Semi-improved acidic grassland			X	
Phase 1	B21	Unimproved neutral grassland			X	
Phase 1	B22	Semi-improved neutral grassland			X	
Phase 1	B31	Unimproved calcareous grassland			X	
Phase 1	B32	Semi-improved calcareous grassland			X	
Phase 1	B4	Improved grassland				
Phase 1	B5	Marsh/marshy grassland		X	X	
Phase 1	B6	poor semi-improved grassland				
Phase 1	C11	Continuous bracken				
Phase 1	C31	Tall ruderal			X	
Phase 1	C32	Non-ruderal				
Phase 1	D11	Acid Dry dwarf shrub heath				X
Phase 1	D2	Wet dwarf shrub heath				X
Phase 1	D3	Lichen/bryophyte heath				X
Phase 1	D4	Montane heath/dwarf herb				X
Phase 1	D5	Dry heath/acidic grassland mosaic			X	X
Phase 1	D6	wet heath/acid grassland mosaic				X
Phase 1	E11	Sphagnum Bog		X		
Phase 1	E2 (any)	Flush and Spring		X	X	
Phase 1	E3 (any)	Fen		X	X	
Phase 1	F (any)	Swamp, marginal and innundation		X		
Phase 1	G (any)	Open Water		X		

Phase 1	I21	Quarry				
Phase 1	I22	Spoil				
Phase 1	I24	Refuse tip				
Phase 1	J11	Arable				
Phase 1	J112	Allotments				
Phase 1	J113	Set-aside (field margins)			X	
Phase 1	J12	Amenity grassland				
Phase 1	J13	Ephemeral/short perennial				
NVC	A (Any)	Aquatic Communities		X		
NVC	CG02	Festuca ovina–Avenula pratensisgrassland			X	
NVC	CG03	Bromus erectusgrassland			X	
NVC	CG07	Festuca ovina–Hieracium pilosella–Thymus praecox/pulegioides grassland			X	
NVC	H08	Calluna vulgaris–Ulex galliiheath				X
NVC	H09	Calluna vulgaris–Deschampsia flexuosa heath				X
NVC	H09/MG 10	Calluna vulgaris–Deschampsia flexuosa heath / Holcus lanatus–Juncus effususrush-pasture		X	X	X
NVC	H09/U05	Calluna vulgaris–Deschampsia flexuosa heath / Nardus stricta–Galium saxatile grassland			X	X
NVC	H09/U2	Calluna vulgaris–Deschampsia flexuosa heath / Deschampsia flexuous grassland			X	X
NVC	H09a	Calluna vulgaris–Deschampsia flexuosa heath				X
NVC	H09b	Calluna vulgaris–Deschampsia flexuosa heath				X
NVC	H09c	Calluna vulgaris–Deschampsia flexuosa heath				X
NVC	H09e	Calluna vulgaris–Deschampsia flexuosa heath				X
NVC	H12	Calluna vulgaris–Vaccinium myrtillus heath				X
NVC	H12a	Calluna vulgaris–Vaccinium myrtillus heath				X
NVC	H12c	Calluna vulgaris–Vaccinium myrtillus heath				X
NVC	M22	Juncus subnodulosus–Cirsium palustre fen-meadow		X		
NVC	M23	Juncus effusus/acutiflorus–Galium palustrerush-pasture		X		
NVC	M24	Molinia caerulea–Cirsium dissectumfen-meadow		X		
NVC	M25	Molinia caerulea–Potentilla erectamire		X		
NVC	M26	Molinia caerulea–Crepis paludosa mire		X		
NVC	MG04	Alopecurus pratensis–Sanguisorba officinalis grassland			X	
NVC	MG05	Cynosurus cristatus–Centaurea nigragrassland			X	
NVC	MG08	Cynosurus cristatus–Caltha palustris grassland			X	
NVC	MG09	Holcus lanatus–Deschampsia cespitosa grassland			X	
NVC	MG10	Holcus lanatus–Juncus effusus rush-pasture		X	X	
NVC	S (Any)	Salt-marsh communities		X		
NVC	U01	Festuca ovina–Agrostis capillaris–Rumex acetosella grassland			X	
NVC	U02	Deschampsia flexuosa grassland			X	
NVC	U03	Agrostis curtisii grassland			X	
NVC	U04	Festuca ovina–Agrostis capillaris–Galium saxatile grassland			X	
NVC	W (any)	Woodlands and Scrub	X			

Appendix II. Environmental Agency Water Frame Directive

The table below shows the ecological and chemical classifications for each water body within the parish for cycle 2 in 2019. The full open-source report for each catchment if further information is also given.

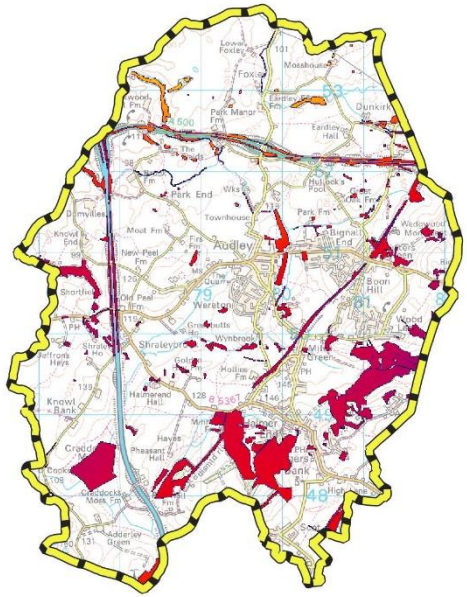
Classification Element	Valley Brook (Source to Englesea Brook)	Englesea Brook	Checkley Brook - Upper	Wistaston Brook	Lyme Brook
Link to the full report	**Report**	**Report**	**Report**	**Report**	**Report**
Ecological	**Poor**	**Poor**	**Good**	**Bad**	**Poor**
Biological quality elements	**Poor**	**Poor**	**High**	**Bad**	**Poor**
Fish				Bad	Good
Invertebrates	Poor	Good	High	Good	Moderate
Macrophytes and Phytobenthos Combined	Moderate	Poor	High	Moderate	Poor
Macrophytes Sub Element	Moderate	Poor	High	Moderate	Poor
Physico-chemical quality elements	**Moderate**	**Moderate**	**High**	**Moderate**	**Good**
Acid Neutralising Capacity	High				
Ammonia (Phys-Chem)	Moderate	High	High	High	High
Biochemical Oxygen Demand (BOD)	High				
Dissolved oxygen	Good	High	High	Moderate	High
Phosphate	Good	Moderate	High	Poor	Good
Temperature	High	High	High	High	High
pH	High	High	High	High	High
Hydromorphological Supporting Elements	**Supports good**	**Supports good**	**Supports good**	**Supports good**	**Supports good**
Hydrological Regime	Does not support good	Supports good	Supports good	High	Supports good
Morphology	Supports good	Supports good	Supports good	Supports good	Supports good
Specific pollutants	**High**				**High**
Chromium (VI)	High				
Copper	High				High
Iron	High				High
Manganese					High
Triclosan					High
Zinc	High				High
Chemical	**Fail**	**Fail**	**Fail**	**Fail**	**Fail**
Priority hazardous substances	**Fail**	**Fail**	**Fail**	**Fail**	**Fail**

Benzo(a)pyrene	Good	Good	Good	Good	Good
Benzo(b)fluoranthene					Good
Benzo(g-h-i)perylene					Good
Benzo(k)fluoranthene					Good
Cadmium and Its Compounds					Good
Dioxins and dioxin-like compounds	Good	Good	Good	Good	Good
Heptachlor and cis-Heptachlor epoxide	Good	Good	Good	Good	Good
Hexabromocyclododecane (HBCDD)	Good	Good	Good	Good	Good
Hexachlorobenzene	Good	Good	Good	Good	Good
Hexachlorobutadiene	Good	Good	Good	Good	Good
Mercury and Its Compounds	Fail	Fail	Fail	Fail	Fail
Perfluorooctane sulphonate (PFOS)	Good	Good	Good	Good	Good
Polybrominated diphenyl ethers (PBDE)	Fail	Fail	Fail	Fail	Fail
Priority substances	**Good**	**Good**	**Good**	**Good**	**Good**
Cypermethrin (Priority)	Good	Good	Good	Good	Good
Fluoranthene	Good	Good	Good	Good	Good
Lead and Its Compounds	Good				Good
Nickel and Its Compounds	Good				Good
Other Pollutants	**Does not require assessment**	**Does not require assessment**	**Does not require assessment**	**Does not require assessment**	**Does not require assessment**

Appendix III. Additional Habitat Local Connectivity Maps

Map III.a – Local Habitat Connectivity (All Habitats – Medium Colonisation)

Flow



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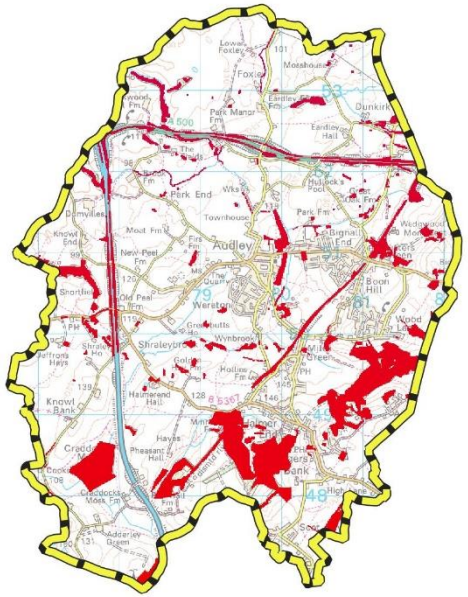
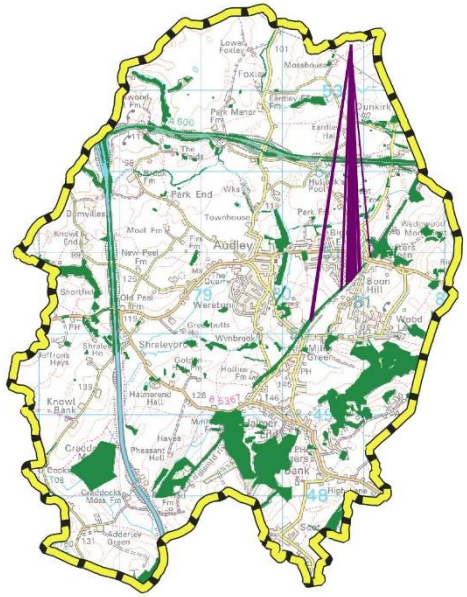


Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Habitat Connectivity - Medium Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 1000 individuals per km2
Dispersal Distance:5 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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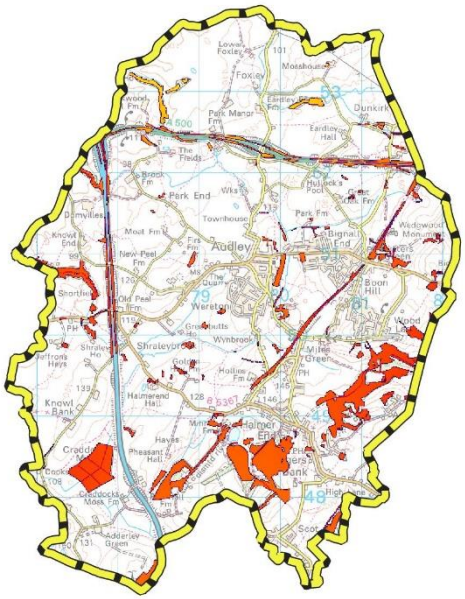
SER/24/209

Map III.b – Local Habitat Connectivity (Woodland – Medium Colonisation)

Flow



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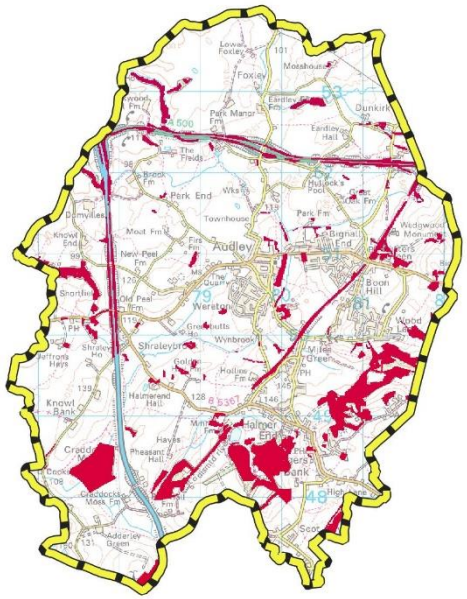
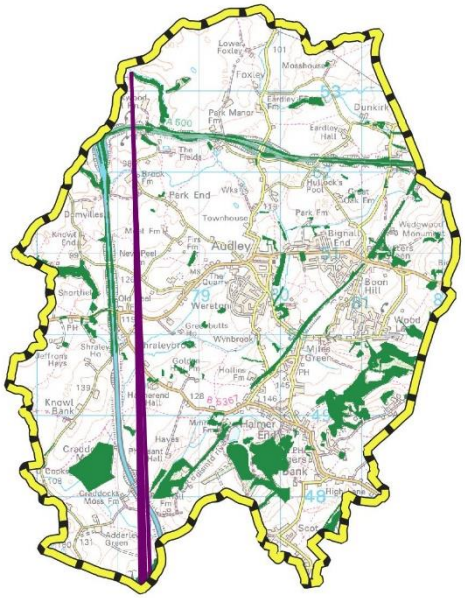


Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Woodland Connectivity - High Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 2000 individuals per km2
Dispersal Distance:10 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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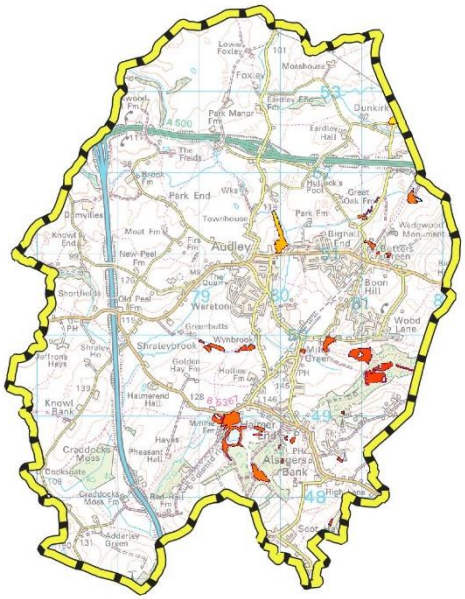
Map III.c – Local Habitat Connectivity (Grassland – Medium Colonisation)

Flow



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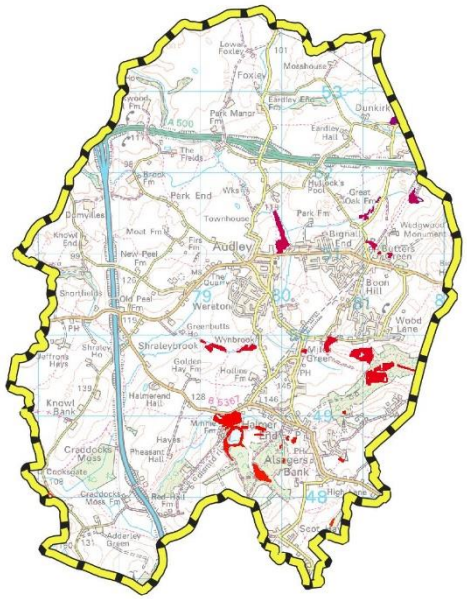
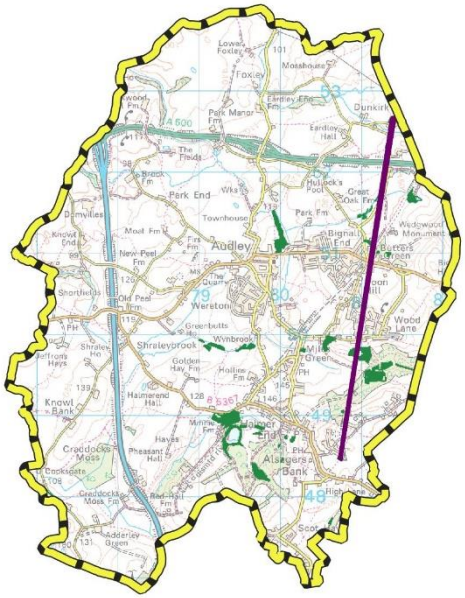


Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

Ens

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Grassland Connectivity - Medium Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 1000 individuals per km2
Dispersal Distance:5 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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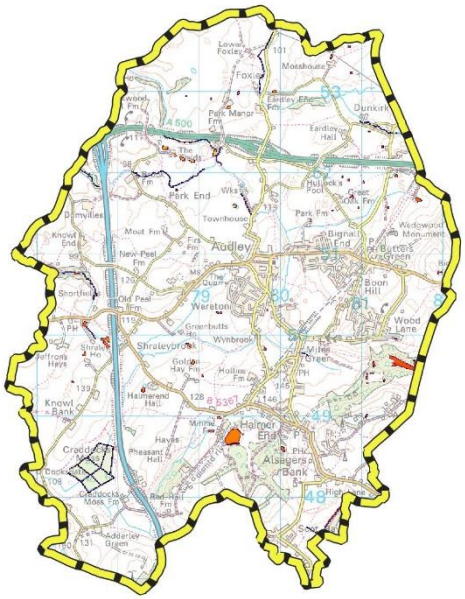
Map III.d – Local Habitat Connectivity (Wetland – Medium Colonisation)

Flow



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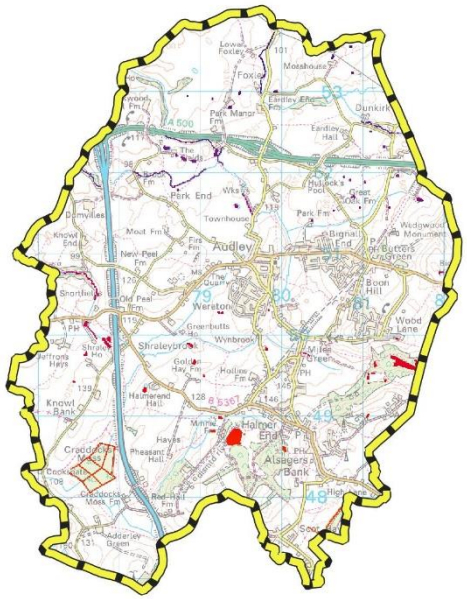
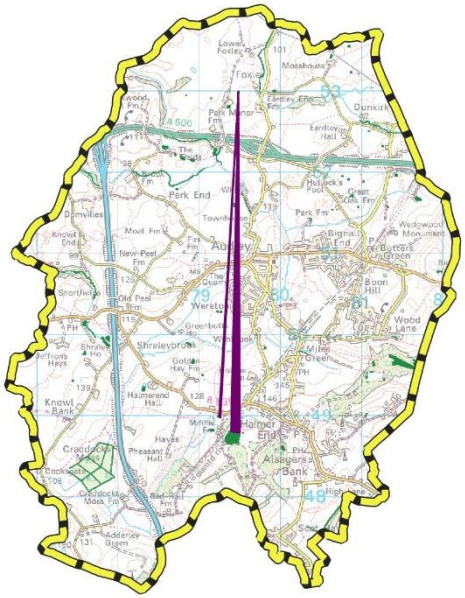


Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Wetland Connectivity - Medium Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 1000 individuals per km2
Dispersal Distance:5 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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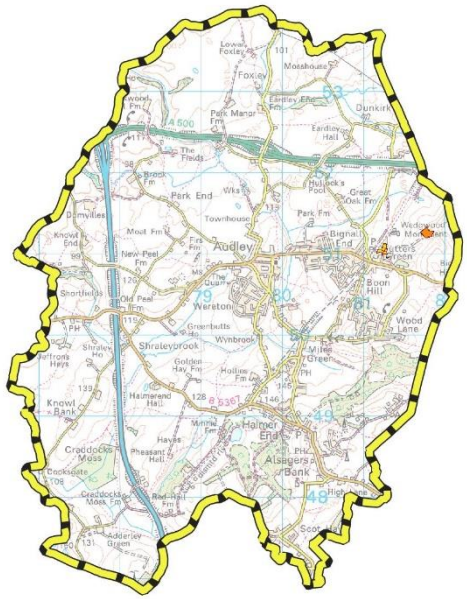
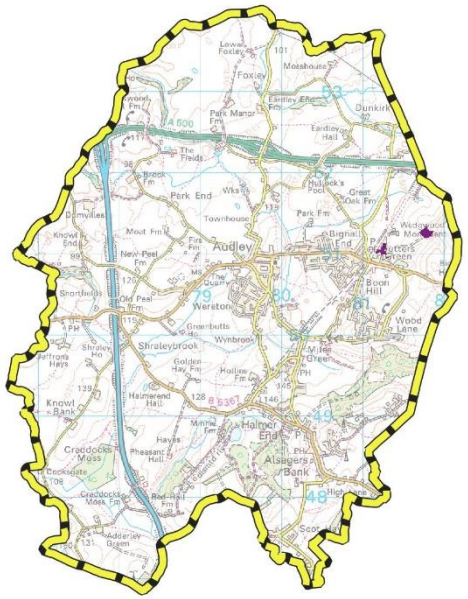
Map III.e – Local Habitat Connectivity (Heathland – Medium Colonisation)

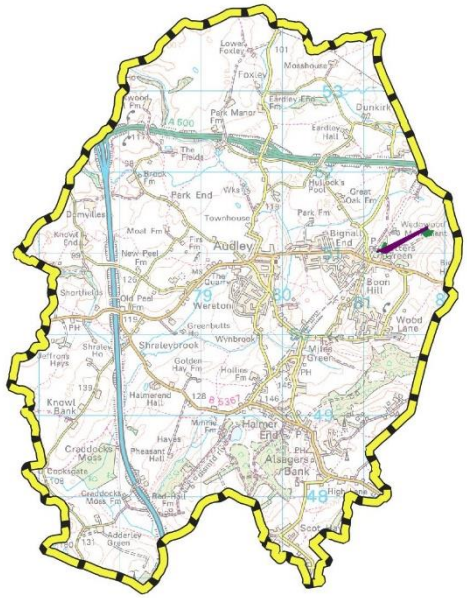
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Heathland Connectivity - Medium Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 1000 individuals per km2
Dispersal Distance:5 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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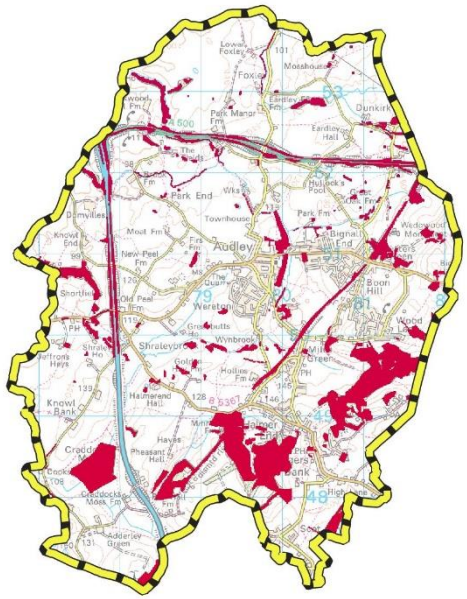
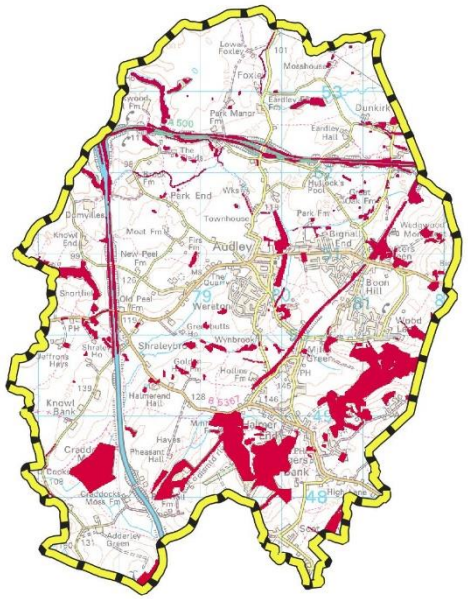
Map III.f – Local Habitat Connectivity (All Habitats – High Colonisation)

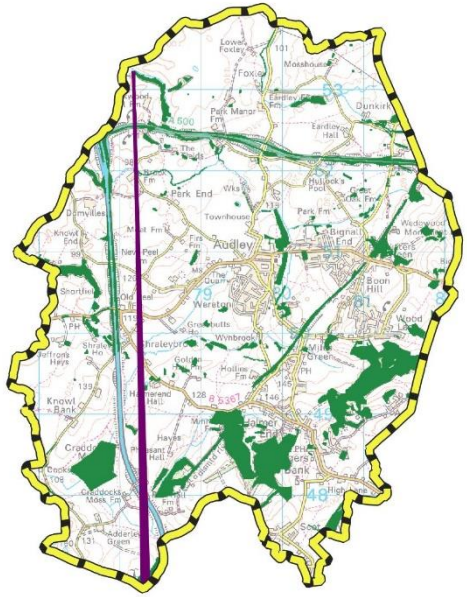
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Habitat Connectivity - High Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 2000 individuals per km2
Dispersal Distance:10 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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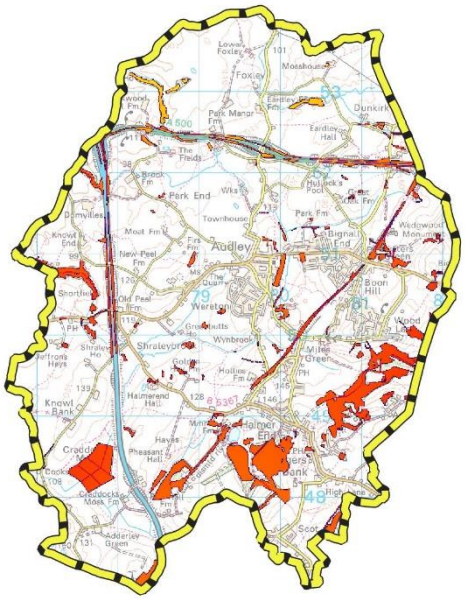
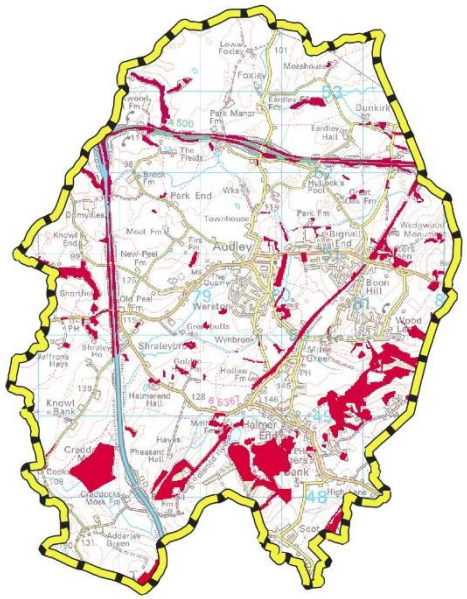
Map III.g – Local Habitat Connectivity (Woodland – High Colonisation)

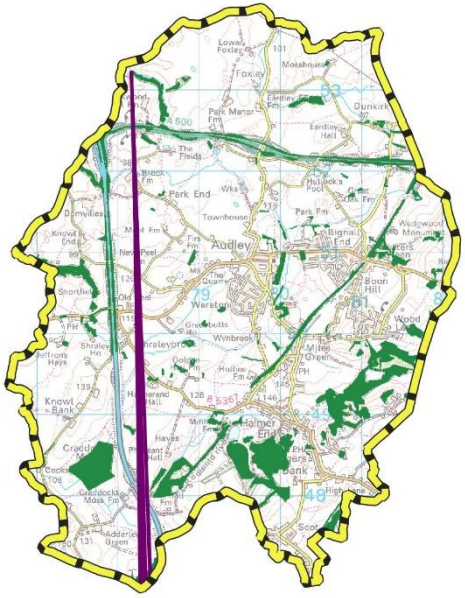
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Woodland Connectivity - High Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 2000 individuals per km2
Dispersal Distance:10 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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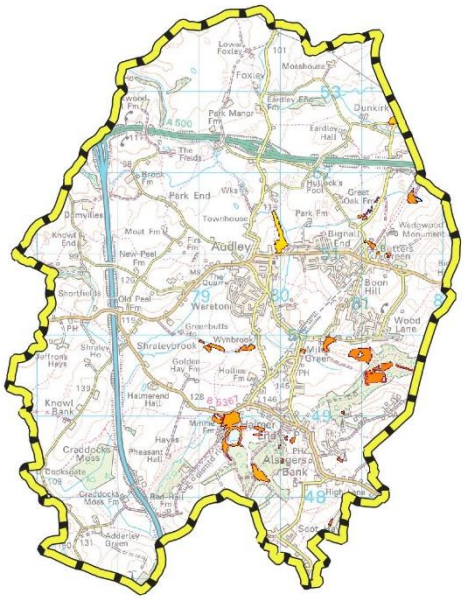
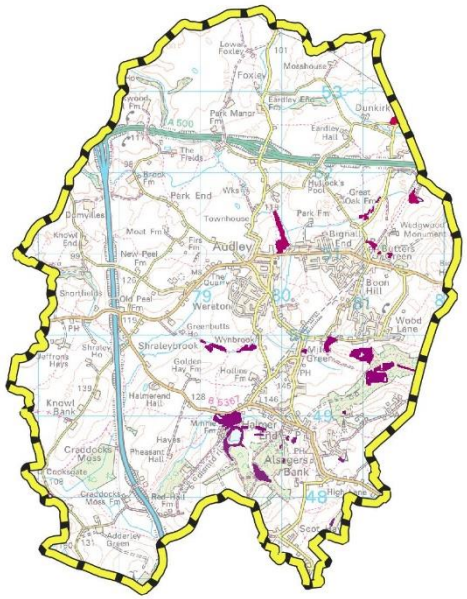
Map III.h – Local Habitat Connectivity (Grassland – High Colonisation)

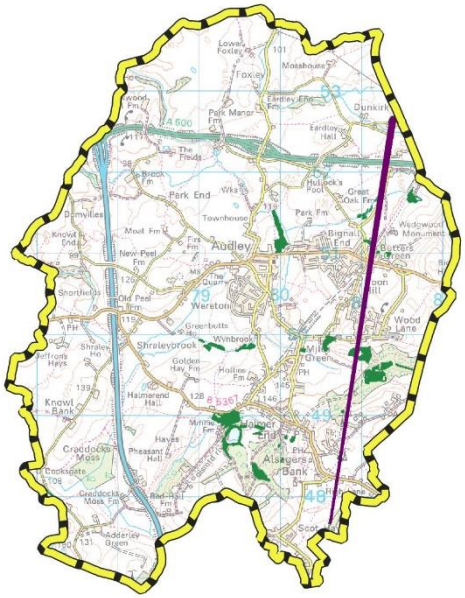
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Grassland Connectivity - High Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 2000 individuals per km2
Dispersal Distance:10 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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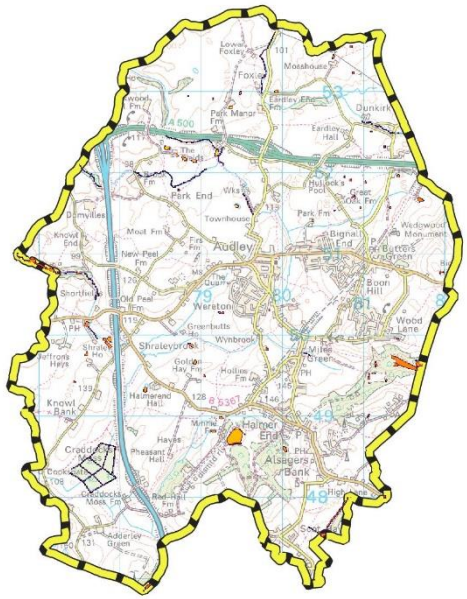
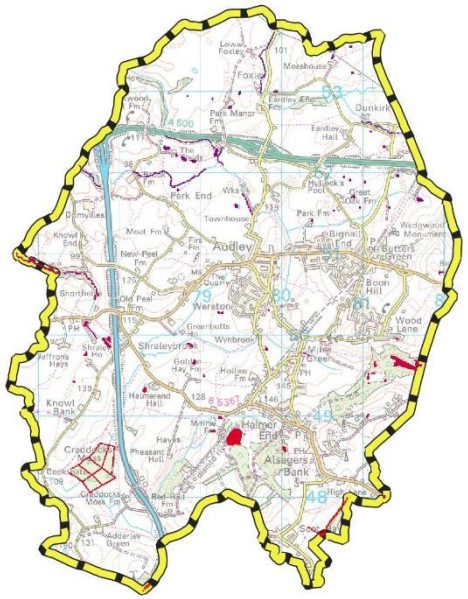
Map III.i – Local Habitat Connectivity (Wetland – High Colonisation)

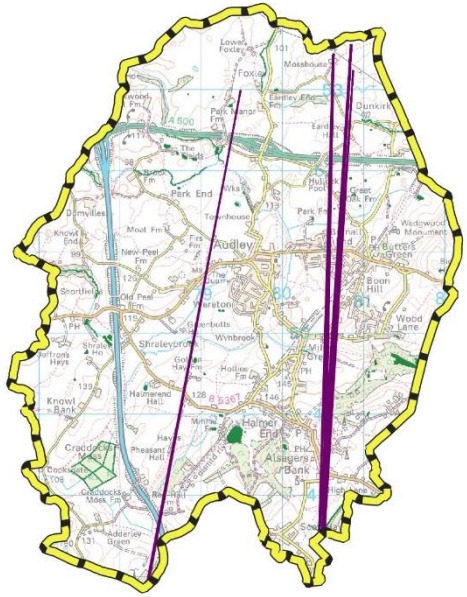
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Wetland Connectivity - High Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 2000 individuals per km2
Dispersal Distance:10 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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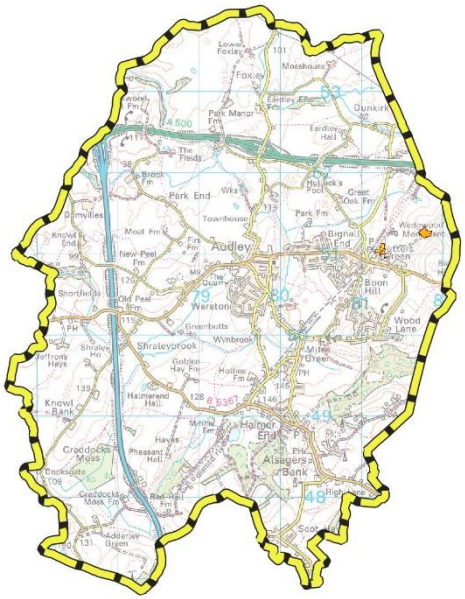
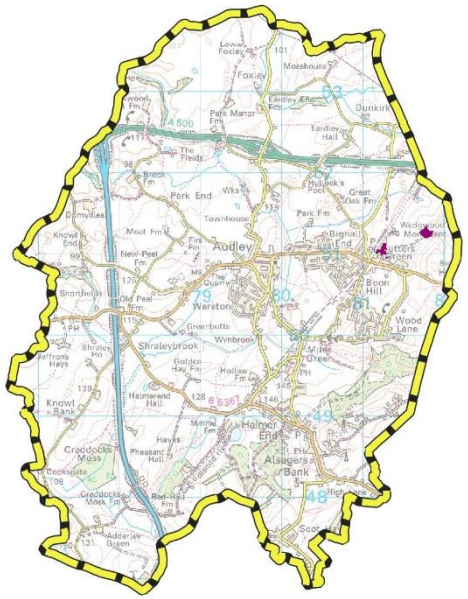
Map III.j – Local Habitat Connectivity (Heathland – High Colonisation)

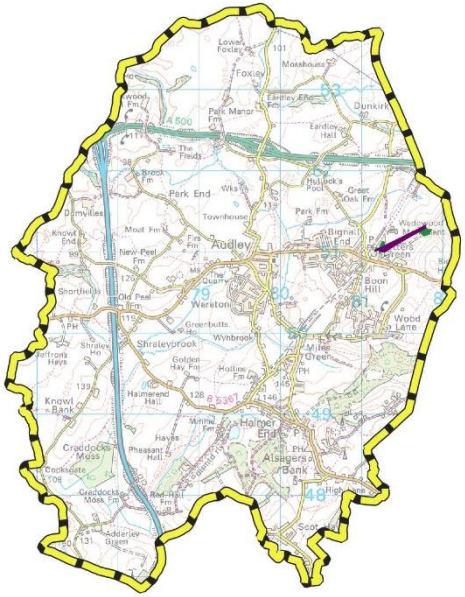
Flow



Progress



Bottlenecks



Key

Audley Rural CP Boundary

Flow

Max

Min

Progress

Start

End

Possible Bottlenecks

Habitat

Staffordshire Ecological Record

Audley Rural CP

Local Heathland Connectivity - High Colonisation

Note: Calculated using Condatis (Hodgson, et al. 2016).
The inputted values were:
Raster Cell Size: 10 m2
Reproductive Rate: 2000 individuals per km2
Dispersal Distance:10 km
Source to Target Direction: South to North
No. Bottlenecks: 50

Date Produced: 04/06/2024

0 1.5 3 km

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