

Environmental Character Area Profile for the Minerals Local Plan: 15. Bow Brook South

1. Introduction

- 1.1. Minerals development usually takes place on previously undeveloped land and can therefore result in permanent change to the natural environment and green spaces in Worcestershire. The impacts of both the working and the restoration of mineral sites need to be considered in detail in the development of the Worcestershire Minerals Local Plan (the MLP).
- 1.2. The Council will take a 'green infrastructure' (GI) approach to considering these impacts. The GI approach is a different way of thinking about the green spaces in Worcestershire. It moves beyond solely considering the environmental benefits of green spaces and integrates the consideration of economic, health and social benefits in the planning and management of green spaces. Rather than considering each green space in isolation it looks at the ways in which individual sites and corridors of green space collectively form the distinctive character of Worcestershire that attracts both visitors and business to the County.
- 1.3. The components of GI include biodiversity, landscape, historic environment, access and recreation and water (also known as blue infrastructure). The GI approach requires thinking about the environment as an integrated system of stepping stones or nodes in a wider network¹.

Green infrastructure and mineral workings and restoration

- 1.4. There is significant potential for mineral workings to destroy existing networks of green infrastructure if the nature and character of these networks is not taken into account. However there is also significant potential to contribute positively to green infrastructure through the restoration of mineral workings.
- 1.5. The GI approach extends beyond thinking about designated sites of biodiversity or historic interest. This means that the impact of a mineral working on the wider environment and the integrated system of stepping stones or nodes in a wider network² will need to be considered.

Environmental Character Areas³ and the Minerals Local Plan

- 1.6. The Worcestershire Green Infrastructure Partnership has undertaken an analysis of the landscape character, biodiversity and the historic environment of Worcestershire to identify 30 distinct GI Environmental Character Areas (ECAs). Details about how these were developed is set out in *Planning for a Multifunctional Green Infrastructure Framework in*

¹ Green Infrastructure Guidance – Natural England.

² Green Infrastructure Guidance – Natural England.

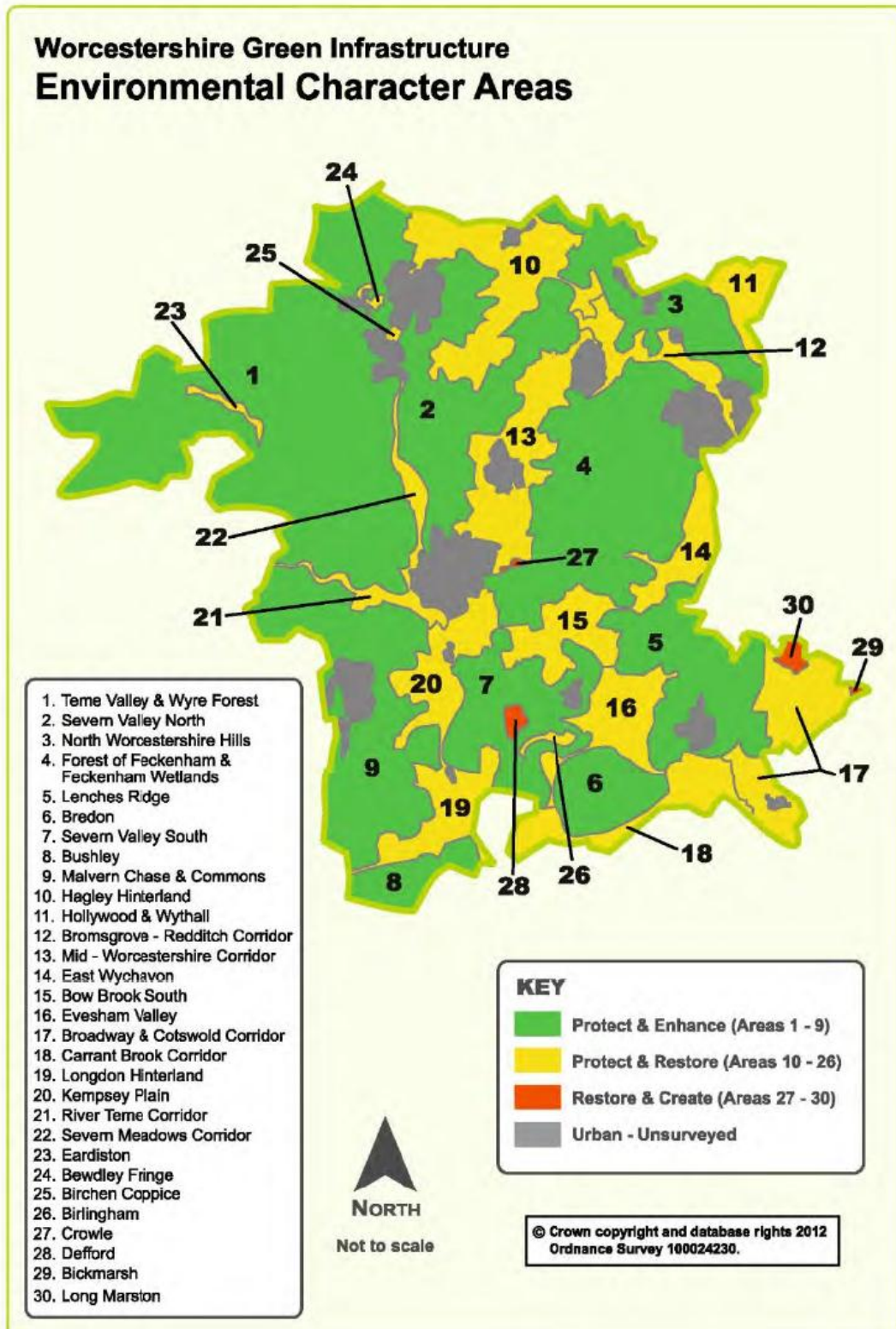
³ Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

Worcestershire: Green Infrastructure Framework 2 (2012) available at www.worcestershire.gov.uk/GI

- 1.7. These underlie the distinctive character of Worcestershire and it is the Council's intention that the unique characteristics of each area will drive the restoration strategy for the Minerals Local Plan.
- 1.8. This is one of 30 profile documents which set out the characteristics and priorities for the each ECA. It sets out the mineral resources in the ECA and the GI priorities identified by the Worcestershire GI Partnership. These priorities are structured around biodiversity, historic environment, landscape character, water environment (also known as blue infrastructure) access and recreation and transport. The document is also supplemented by other locally relevant information as appropriate.
- 1.9. This information will be used to develop the spatial strategy and restoration priorities for each ECA.
- 1.10. Profiles for each of the following ECAs are available on our website www.worcestershire.gov.uk/mineralsbackground:
- 1.11. The Environmental Character Areas are:
 1. Teme Valley & Wyre Forest
 2. Severn Valley North
 3. North Worcestershire Hills
 4. Forest of Feckenham & Feckenham Wetlands
 5. Lenches Ridge
 6. Bredon
 7. Severn Valley South
 8. Bushley
 9. Malvern Chase and Commons
 10. Hagley Hinterland
 11. Hollywood & Wythall
 12. Bromsgrove – Redditch Corridor
 13. Mid-Worcestershire Corridor
 14. East Wychavon
 15. Bow Brook South
 16. Evesham Valley
 17. Broadway & Cotswold Corridor
 18. Carrant Brook Corridor
 19. Longdon Hinterland
 20. Kempsey Plain
 21. River Teme Corridor
 22. Severn Meadows Corridor
 23. Eardiston
 24. Bewdley Fringe
 25. Birchen Coppice
 26. Birlingham
 27. Crowle
 28. Defford
 29. Bickmarsh
 30. Long Marston

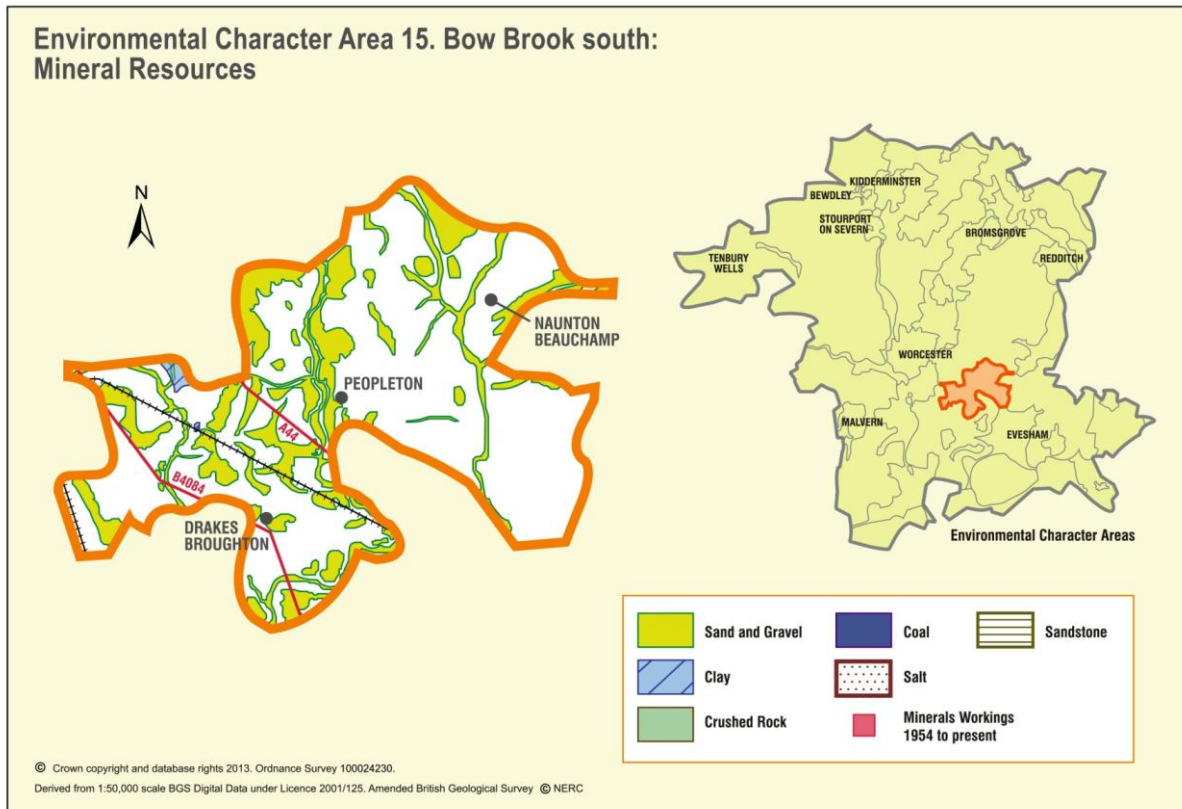
These are illustrated on Figure 1. Environmental Character Areas.

Figure 1. Environmental Character Areas



2. Characteristics and priorities of the Bow Brook South ECA 15

Figure 2. Environmental Character Area 15 Bow Brook South: Mineral Resources



Mineral Resources

Aggregates

2.1. Details about the aggregate resources in this ECA are given in the background report "Analysis of Mineral Resources in Worcestershire" available on www.worcestershire.gov.uk/mineralsbackground. The following is therefore only a simple summary.

Sand and gravel

2.2. ECA 15 contains 18 resource areas containing about 480Ha fluvio-glacial, 1st, 2nd, 3rd and 4th terrace deposits. These could potentially produce about 5.1m³ of sand and gravel but almost all are smaller than has been worked in the county in modern times. Borehole evidence is poor and the quality and quantity of these deposits may be low. There is no history of significant working in this ECA.

Hard rock

2.3. There is no evidence of potential crushed rock resources in this ECA.

Industrial minerals

Clay

2.4. There is no evidence of potential clay resources in this ECA.

Silica sand

2.5. There is no evidence that suitable materials are present in this ECA.

Brine

2.6. There are no records of brine working in this area but the memoir for Worcester suggests that Halite deposits may be present at depth to the east of the Smite-Pirton-Tewkesbury fault system.

Lime

2.7. Old overgrown Limestone pits are recorded at Churchill Wood farm and at Broughton Hackett but details of the deposits suggests that the resource is only about 2m deep and consists of fragmentary material.

Future Growth

2.8. The key driver for mineral extraction is to provide the raw materials required for the economy to function properly and for homes and infrastructure to be built. Minerals are unevenly distributed. Some of the minerals that we need are not found in Worcestershire and will need to be imported from outside the County. Many minerals are expensive to transport, particularly aggregates as they are a relatively low value and bulky material, and they are likely to be used close to their source, meaning that some local mineral extraction will be needed to support local growth in housing and the associated infrastructure that is required, or to provide raw materials for local industry. On average, about 80 per cent of mineral products are used within 30 miles of the quarry but this section considers the likely levels of development within 10 miles of the ECA.

2.9. This ECA is a largely rural area within Wychavon District, to the north of Pershore and within easy reach of Droitwich to the north, Malvern to the west and Evesham to the south east. Wychavon anticipates the development of 5,807 homes, 18.5 ha of employment land and a new neighbourhood centre in the next 14-18 years⁴.

2.10. The ECA incorporates the Category 2 village of Drakes Broughton and the Category 3 village of Pepleton which are proposed for some development in the South Worcestershire Development Plan proposed submission document⁵.

⁴ Information gathered by Worcestershire County Council in early 2013. This gives a good indication of the likely levels of development which can be expected, but for the latest figures please refer to the relevant City, District or Borough Council.

⁵ Category 1, 2 and 3 villages are fourth in the five tier settlement hierarchy set out in the South Worcestershire Development Plan proposed submission document. Their role is predominately aimed at meeting locally identified housing and employment needs. They are therefore suited to accommodate market and affordable housing needs alongside limited employment for local needs. The scale of allocated development is significantly less than that

- 2.11. These and other areas beyond the boundary of the ECA could create demand for minerals in this Environmental Character Area.

Green Infrastructure priorities⁶

- 2.12. All Environmental Character Areas (ECA's) have been placed into one of three categories based on their overall score for Green Infrastructure.

These are:

1. Protect and enhance
2. Protect and restore
3. Restore and create

- 2.13. The category is based on an assessment of the ECAs landscape character, biodiversity and the historic environment characteristics. These characteristics were each attributed a score, with biodiversity being given a greater weighting than landscape and the historic environment, each of which were given equal but lower weightings.

- 2.14. The strategic GI approach for the Bow Brook South ECA is to *protect and restore*. The overarching principle identified by the GI partnership is to enhance the Bow Brook, its water quality and valley.

Biodiversity and landscape

- 2.15. This ECA falls wholly or partially within the Forest of Feckenham Biodiversity Delivery Area and the Bow Brook Biodiversity Delivery Area, two of the priority opportunity areas determined by the Worcestershire Biodiversity Partnership for the delivery of county Biodiversity Action Plan targets. The key feature of this ECA is the Bow Brook, which flows through the corridor to join the Avon in the south of the county. The river is classed as failing under water framework directive standards, as a result of high levels of diffuse nitrate pollution. Other significant issues include the loss of bank side riparian habitats and aquatic invertebrates, primarily as a result of agricultural intensification.

- 2.16. The southern reach of the Bow Brook, after which the ECA is named, dissects the area in a north to south direction and marks a noticeable change in character between the landscape to the west and that to the east. The latter is classified by the county Landscape Character Assessment as Village Claylands, a planned landscape of medium-to-large fields and pastoral land use on heavy, poorly draining soils. There are often remnants of medieval ridge and furrow preserved by the permanent grassland. Woodland is not characteristic of these rather open landscapes and in this ECA the Throckmorton disused air field occupies the south-eastern part.

for the urban areas and is aimed at helping to address housing needs and support local services.

⁶ Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

- 2.17. To the west of the Bow Brook, the ECA is occupied by the much more intimate and wooded areas around Peopleton, Stoulton and White Ladies Aston where the character of the landscape is a mix of Landscape Types Principal Timbered Farmlands and Wooded Estatelands.

GI Priorities:

- 2.18. The landscape and biodiversity priorities identified for the Bow Brook South ECA are⁷:
- Generally, conserve and enhance tree cover along watercourses, especially the Bow Brook and Piddle Brook.
 - Take opportunities to create wetland habitats associated with the river corridor.
 - Restore and enhance neutral grasslands and orchards. The existing fragmented remnants of traditional orchards form an important habitat, combining characteristics of woodland and grasslands.
 - To the west of the Bow Brook encourage the planting of new woodlands, reflecting the scale, shape and composition of the existing ancient woodland character.
 - Seek to bring about coalescence of fragmented relic ancient woodlands.
 - Maintain the tree cover character of hedgerow oaks and enhance the age structure of the hedgerow oak population.
 - To the east of the Bow Brook, conserve all areas of permanent pasture and distinctive ridge and furrow and investigate possibilities to convert arable land back to pasture.
 - Resist any proposals to create woodland in the planned, unwooded landscapes but encourage hedgerow trees and planting of tree groups associated with settlements.

Geodiversity

- 2.19. There are no geological SSSIs or local geological sites in this ECA.

Historic Environment

- 2.20. The North East of this area contains some of the best preserved medieval earthworks (settlement and cultivation) in the county, and further examples of these are scattered across this character area, especially over the heavier soils. Where lighter soils occur over the bands of sands and gravels there is increased evidence in the form of surface artefact scatters, for earlier occupation sites dating from the prehistoric and Romano British periods. Such sites are not however exclusive to the lighter soils, as a significant Iron Age and Romano British settlement has been recorded beneath Throckmorton Airfield.
- 2.21. The wider historic landscape character is strongly influenced by medieval nucleated villages with clustered farmsteads and field systems that derive mainly from the 18th and 19th century enclosure of former medieval open-field farming.

⁷ Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

GI Priorities:

- 2.22. The historic environment priorities identified for the Bow Brook South ECA are⁸:
- Buffer historic landscape features, such as earthwork boundaries, ridge and furrow and abandoned medieval settlement remains.
 - Protect the setting of the extensive relic medieval landscapes surrounding Naunton Beauchamp.
 - Protect historic water features and buffer key sites, such as moats, fishponds and millponds.
 - Protect and enhance diverse multi-period historic field patterns and hedgerows.
 - Explore opportunities to conserve below ground settlement sites on arable land bordering White Ladies Aston and the terraces above the Bow Brook.
 - Protect below ground deposits of high palaeoenvironmental potential associated with the Bow Brook corridor.

Blue Infrastructure

- 2.23. The principal watercourse in this ECA is the Bow Brook itself but the Piddle brook and its tributary, the Whitsun Brook, are also important. Other, un-named watercourses also flow through it.
- 2.24. Wychavon LPA considers that Pinvin is not defended from flooding from the Bow Brook to a satisfactory standard. Surface water flooding from sewers and overland flow are also a problem in Wychavon district generally.
- 2.25. The geology can have an effect on the runoff, and the flooding, within a catchment as a result of the permeability of the strata. The geology within South Worcestershire is variable. Impermeable clays and mudstones dominate the Warwickshire Avon sub-catchment and **Groundwater flooding** is not considered to be a major issue in the South Worcestershire Joint Core Strategy area.
- 2.26. The River Severn Catchment Flood Management Plan makes this a Policy 3 area where it will "Continue with existing or alternative actions to manage risk at the current level.
- 2.27. Almost all the ECA, apart from a very small area near Pinvin is categorised as having water company point source and agricultural/rural diffuse pollution pressure. The Bow Brook and the River Avon both are currently classed as having a moderate ecological potential. The Piddle Brook upstream of the A4538 has a good ecological status, downstream of the A4538 (the former A44) to the confluence with the River Avon the quality declines to a moderate status. Both Bow Brook and the River Avon do not achieve good status under the WFD as they contain unacceptable levels of phosphorus.

⁸ Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

- 2.28. The River Avon and the lower reach of Piddle Brook have failed the chemical assessment, this is due to unacceptable levels of Benzo(ghi)perylene and indeno (123-cd) pyrene.
- 2.29. Groundwater status is good in this ECA.
- 2.30. The Bow Brook to the west of Pershore is over abstracted and existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions.

GI Priorities:

- 2.31. The blue infrastructure priorities identified for the Bow Brook South ECA are⁹:
- Reduce dependence on raised flood defences, as this is unsustainable in the long term, by taking opportunities to restore sustainable natural storage of floodwater on undeveloped floodplains.
 - Make more space for rivers through urban areas via 'blue corridors' (i.e. Restoring access for floodwater onto key strips of floodplain. This requires redevelopment to be limited to flood-compatible land-uses e.g. parkland).
 - Some designated 'aquatic conservation' sites are in unfavourable condition. Activities that affect these sites must be changed to improve their condition.
 - Ensure that the run-off from all proposed development is minimised. For example, SUDS must be encouraged and targeted within planning approvals.
 - Encourage the retro-fitting of SUDS where surface water flooding is already a problem.
 - Support ecological improvements. Examples of this include Severn & Avon Wetlands Project; Natural England's three fluvial SSSIs.

Access and informal recreation

- 2.32. This ECA is in Wychavon District. Only 3.6% of the Wychavon District is accessible natural greenspace, this is the lowest proportion across all districts in Worcestershire. As a whole accessibility to greenspace is poor with only 20% of households in Wychavon are within 5km of 100ha+sites and 2% of households within 10km of 500ha+sites.
- 2.33. There are no sub-regional recreation assets in this ECA, with the closest sub-regional recreation assets being Evesham Country Park and Worcester Woods.
- 2.34. There are deficiencies in opportunities for access and recreation across the Vale of Evesham, with the Rights of Way network being less dense than in any other area of the County. There is also a lack of sites such as Country Parks, picnic places and Registered Commons. Few nature

⁹ Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

reserves exist although there are a number of smaller community sites such as Village Greens and Millennium Greens.

- 2.35. Provision is required at both a strategic and neighbourhood level. At a neighbourhood or local scale there is scope for towns and villages to address natural greenspace needs within the rural communities. This should be a requirement of development and other options should be explored for existing communities such as stewardship agreements.

GI Priorities:

- 2.36. The access and recreation priorities identified for the Bow Brook South ECA are¹⁰:
- Consider the proximity to and ability to integrate with the rights of way network, recreational way-marked routes and the cycle network;
 - Accommodate associated facilities necessary for the use and enjoyment of the site in a manner that is appropriate and able to integrate with the landscape character, wildlife and cultural interests.
 - Act as a greenway from town into the countryside and utilise existing canal, former railway lines, river corridors and wherever possible link with public transport routes.
 - Adopt minimum quality standards, (commensurate with its location and scale) that sites and routes should be expected to achieve will be those from the Green Flag Award Programme, and the Country Parks Accreditation Scheme, as appropriate.

Transport

Road

- 2.37. The main road through this ECA is the A44 which runs through the centre of the ECA to connect Worcester in the north west to Pershore and Evesham in the south east. Other roads in this Environmental Character Area are more minor.
- 2.38. The Worcestershire Advisory Lorry Route Map does not show any low bridges which would restrict the movement of vehicles over 16'3" (4.95m) on the lorry route network. Local roads may have further restrictions and will need further assessment if they are to be used for accessing mineral resources.

Rail

- 2.39. The Cotswold Line runs through this Environmental Character Area, connecting Worcester and Evesham. Pershore Station is just outside the ECA to the south east and the intersection of the Cotswold Line with the Birmingham-Bristol line near Norton is just outside the ECA to the north west.

¹⁰ Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

Water

2.40. There are no major waterways within this ECA.

GI Priorities:

2.41. The GI transport priorities identified for the Bow Brook South ECA are¹¹:

- Opportunities should be sought to protect, enhance and create green infrastructure that promotes sustainable movement by walking and cycling, reducing the need to travel by car by providing pleasant environments that promote sustainable transport as a means to minimise the impact of transport on the natural environment and mitigate the impacts of climate change.

LTP Priorities:

2.42. The LTP 3 transport priorities identified for the Bow Brook South ECA are:

- **A44 Worcester-Pershore-Evesham interurban corridor maintenance and improvement scheme** - a programme of improvements to transport infrastructure on this route, which is likely to be progressed in the short term and will include junction enhancements, street furniture decluttering, replacement and enhancement. This scheme includes major investment in Pinvin Crossroads and junction, to improve the capacity and operation of this facility.
- **South Worcestershire Minor Transport Improvements Scheme** – minor complementary transport improvements to enhance safety, accessibility, information and travel choice. The scheme will be integrated with other schemes in South Worcestershire in the short term.
- **Worcester to Evesham rail line dualling** - A proposed scheme to reinstate dual track between Worcester and Evesham, to further increase capacity on the Cotswold Line route. Dependent on the rail industry to progress this in the long term.

Agriculture/Forestry

2.43. The majority of the land use in this ECA is mixed farming, with some pastoral use and cash cropping.

2.44. Agricultural land quality varies across the area, but is dominated by grade 3 land. Small areas of high quality grade 2 land are present in the south western end of the ECA and an area of low quality grade 5 land is present at Throckmorton Airfield in the south east of the ECA as shown in Figure 3.

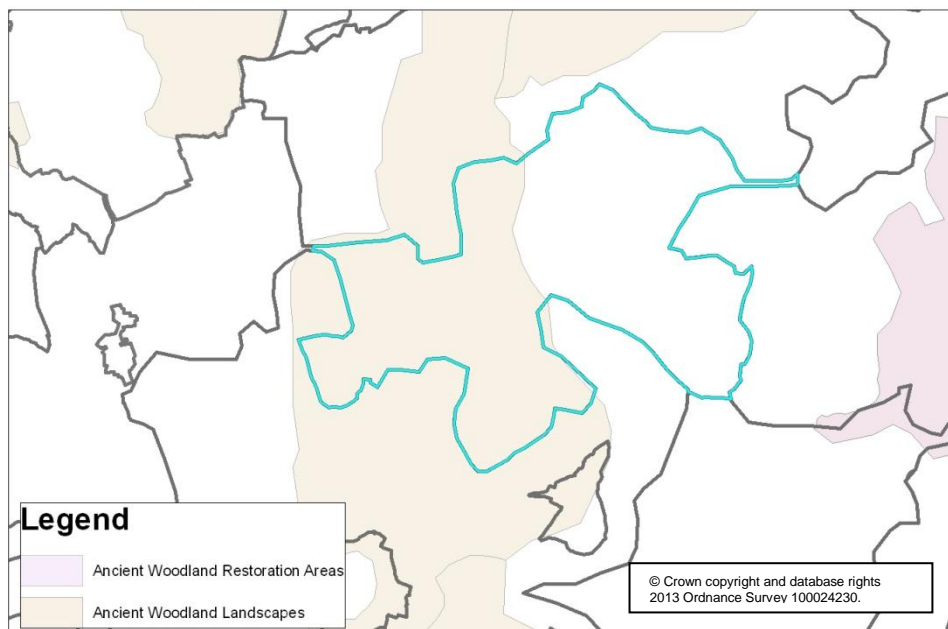
¹¹ Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

Figure 3. Agricultural land quality



2.45. The forestry commission's woodland opportunity maps show that the western half of this ECA is listed as priority 1 for woodland creation which could benefit landscape character, biodiversity, cultural heritage and/or public access. They also show that this area is an ancient woodland landscape, but do not indicate it as a woodland restoration priority area (Figure 4Error! Reference source not found.).

Figure 4. Ancient woodland landscape and restoration



Climate Change

2.46. Some effects of climate change will be similar across the whole county and many of the issues which can be addressed are likely to be common to all ECAs, such as:

- Improving air quality
- Providing flood risk management solutions
- Preventing water and soils pollution as a result of climate change related extreme weather conditions
- Promoting energy efficient and low carbon solutions
- Contributing to renewable energy production

Opportunities and issues

- 2.47. Green Infrastructure features such as buffering of watercourses provide a way of minimising fluvial flooding. Planned landscaping incorporating flood defences could provide both and short term benefits and sustainable drainage schemes (SUDS) are a mechanism for managing both fluvial and pluvial flood risk.
- 2.48. Agricultural and horticultural businesses could face damaging water shortages in the coming decades as a result of climate change. In many parts of Worcestershire, water resources are under severe pressure. The majority of catchments in which horticultural production is concentrated have been defined by the Environment Agency as being either over-licensed and/or over-abstracted. Well executed water storage facilities could not only provide water supply for the business in the dry periods but a wide range of green infrastructure benefits such as biodiversity or landscape and opportunities for increased physical activity and exposure to nature.
- 2.49. The soil types in parts of this ECA are inherently at risk of subsidence and heave. It is possible that changes in weather patterns as a result of climate change may worsen these tendencies.

Socio-economic considerations

- 3.50. The analysis of the socio-economic situation in Worcestershire in this strategy considers the economy and health & well-being at a high level. It is not intended to draw a full picture of the economy or health and well-being in the county, instead it focuses only on the indicators which are of most relevance to green infrastructure:
- **Economy:** unemployment, household income and deprivation levels.
 - **Health and well-being:** health deprivation, heart diseases, obesity, mental health problems and respiratory conditions.
 - **Access to sites for informal recreation:** considers links between informal recreation opportunities and mental and physical well-being.
- 2.51. There is thought to be a link between green infrastructure and some aspects of health. The issues of obesity, respiratory conditions, mental health, heart disease and health deprivation have been considered in this context.
- 2.52. 26% (120,000) of the Worcestershire's adult population is obese and another 40% is overweight. The adult obesity levels in Worcestershire are

higher than the national average. The level of childhood obesity is around the national average, at 10% of five year olds and 18% of eleven year olds. In terms of land cover, most of the Worcestershire area has some problems with obesity.

- 2.53. Obesity and respiratory problems in this county generally follow the same geographical pattern. Mental health problems, by contrast, tend to be found in the and around major settlements. Although mortality rates from cardiovascular diseases are significantly lower than the national rate, patterns of heart diseases are more dispersed than the other health indicators assessed and poor performance is found across the county. Contrary to other health indicators, heart diseases are least prevalent in some of the urban areas.
- 2.54. The overarching principles identified by the GI partnership regarding socio-economic matters for this ECA are:
 - Enhancements across both health and economic GI related issues.