Worcestershire County Council

Minerals Local Plan Habitats Regulation Assessment

Scoping Assessment - Consultation Draft

October 2013

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Contents

1. Executive Summary

1.1. This document is intended to outline the processes involved and guide the preparation of a sound Habitats Regulations Assessment Screening Assessment for the Worcestershire Minerals Local Plan.

1.2. Comments are invited from stakeholders and partners to refine a Screening Assessment in conjunction with the formulation of the Minerals Local Plan and a set of questions have been included to assist in this process.

Questions for Consultees and Stakeholders

1. Do you feel that there are any other European sites/Natura2000 sites which should be considered within this document?

...

2. Do you have any comments with regards the described European sites/Natura2000 site sensitivities, likely impact pathways or condition assessment reports?

...

3. Are there any impacts which you feel should be included within Table 5 either for generic quarrying activities, or specific mineral extraction methodologies?

...

4. Could you suggest any additional plans or policies which should be considered within the 'in-combination' test?

...

5. Do you agree that the mitigation and best practice approaches set-out here are adequate, or would you like to see inclusion of other approaches, methods or guidance documents?

...

6. Do you agree with the conclusions of the Scoping Assessment or do you foresee other requirements for Appropriate Assessment which have not been identified within this document?

...

7. Are you satisfied with the general breadth and detail of the draft HRA Scoping Document or do you have any general comments you would like to share at this stage?

...

2. Introduction

Background to HRA

2.1. Habitats Regulations Assessment (HRA) is the process that competent authorities must undertake to consider whether a proposed development plan or programme is likely to have significant effects on a European site designated for its nature conservation interest. HRA is often referred to as 'Appropriate Assessment' (AA) although the requirement for AA is first determined by an initial 'Screening' stage undertaken as part of the full HRA.

2.2. The purpose of this Scoping document is therefore to set-out to stakeholders the methodology and approach in preparing a Screening Assessment for the Minerals Local Plan Habitats Regulations Assessment; to gather initial opinions and set out recommendations and to establish an appropriately robust and sound screening assessment of the Minerals Local Plan.

Legislation

2.3. The European Directive (92/43/EEC) on the Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive) protects habitats and species of European nature conservation importance. The Habitats Directive establishes a network of internationally important sites designated for their ecological status. These are referred to as Natura2000 (N2K) sites or "European Sites".

2.4. Natura2000 is the centrepiece of EU nature & biodiversity policy. It is an EU-wide network of nature protection areas. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive. Natura2000 is not a system of strict nature reserves where all human activities are excluded. Whereas the network will certainly include nature reserves most of the land is likely to continue to be privately owned and the emphasis will be on ensuring that future management is sustainable, both ecologically and economically. The establishment of this network of

protected areas also fulfils a Community obligation under the UN Convention on Biological Diversity. Natura2000 applies to both 'Birds Sites' and to 'Habitats Sites', which are divided into biogeographical regions. It also applies to the marine environment.

2.5. In the UK, the Habitats Directive is implemented via the protection of Habitats and Species Regulations, 2010 (Statutory instrument 2010/490). Articles 6 (3) and 6 (4) of the Habitats Directive require the application of HRA to all land use plans and an AA to be undertaken on proposed plans or projects which are not necessary for the management of the site but which are likely to have a significant effect on one or more European sites either individually, or in combination with other plans and projects.

2.6. The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. The treaty was adopted in the Iranian city of Ramsar in 1971 and the Convention's member countries cover all geographic regions of the planet. The UK has designated 170 Ramsar sites covering 927,748 hectares.

2.7. The government's policy[1] is to afford Ramsar sites the same level of protection as that provided for Natura 2000 sites and therefore Ramsar sites are considered alongside European sites in this assessment. In the UK, many Ramsar sites are also SPAs and most have statutory underpinning as Sites of Special Scientific Interest ('SSSIs') which are protected under the Wildlife and Countryside Act, 1981 (as amended by the Countryside and Rights of Way Act, 2000).

Guidance

2.8. The Habitats Directive and the Habitats Regulations set the requirement for HRA but do not prescribe how HRA/AA should be undertaken. Guidance on HRA of plans has been produced for Local Authorities in England by the Department for Communities and Local Government (DCLG).

[1] www.defra.gov.uk/rural/protected/internationally-designated-sites/

Habitats Regulations Assessment Process

Table 1 - Habitats Regulations Assessment: Key Stages

Stage 1 **Screening for likely significant effect**	• Identify international sites in and around the plan/ strategy area in search area/ buffer zone agreed with the Statutory Body Natural England. • Examine conservation objectives of the interest feature(s)(where available) • Review policies and proposals and consider potential effects on European sites (magnitude, duration, location, extent) • Examine other plans and programmes that could contribute to 'in combination' effects. • Produce Screening Assessment • If no effects likely – report no significant effect (taking advice from NE as necessary). • If effects are judged likely or uncertainty exists - the precautionary principle applies proceed to **stage 2**

Stage 2 **Appropriate Assessment**	• Complete additional scoping work including the collation of further information on sites as necessary to evaluate impact in light of conservation objectives • Agree scope and method of AA with NE • Consider how plan 'in combination' with other plans and programmes will interact when implemented (the Appropriate Assessment) • Consider how effect on integrity of site could be avoided by changes to plan and the consideration of alternatives • Develop mitigation measures (including timescale and mechanisms) • Report outcomes of AA including mitigation measures, obtain guidance from statutory consultees and wider [public] stakeholders as necessary • If plan will not significantly affect European site proceed without further reference to Habitats Regulations *If effects or uncertainty remain following the consideration of alternatives and development of mitigations proceed to* **stage 3**
Stage 3 **Procedures where significant effect on integrity of international site remains**	• Consider alternative solutions, delete from MLP or modify, • Consider if priority species/ habitats affected • Identify 'imperative reasons of overriding public interest' (IROPI) economic, social, environmental, human health, public safety • Notify Natural England • Develop and secure compensatory measures

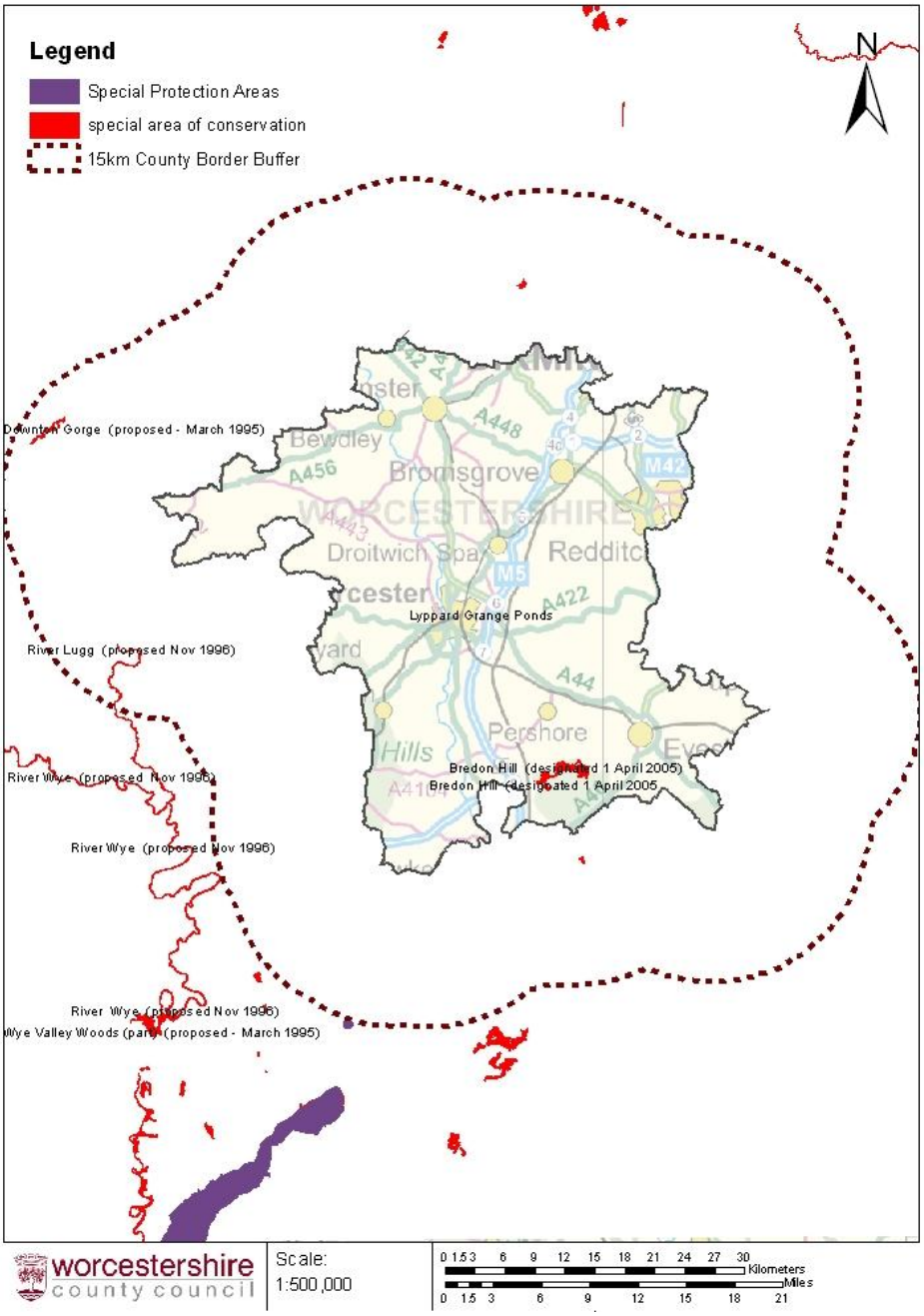
Scoping Assessment remit

2.9. The aim of the emerging Worcestershire Minerals Local Plan (MLP) is to set out a long term vision for the extraction and restoration of minerals sites in the county, objectives to address the issues and a delivery strategy to make it happen. The emerging MLP does not set out specific sites for development. It proposes areas of search for mineral development which are subject to refinement through an iterative process which is in-step with the refinement of the Habitats Regulation Assessment. Although high-level mineral resource areas are known at this stage (refer to Appendix 2 for further information) they will be refined as the plan progresses to assess viability and this will help to inform the development of the HRA.

2.10. As the MLP has yet to identify specific extraction sites and the areas of search proposed at this stage are not final, a high level filtering approach has been followed looking at likely effects in broad areas alone and in combination with other plans and policies outside the MLP.

2.11. This Scoping Assessment document is **not** intended to make an assessment of Likely Significant Effect (either alone or in-combination) of the Minerals Local Plan on European sites, but is intended to inform the development of the HRA Screening process (Table 1: Stage 1) which will in turn influence the preparation of the MLP. Further iterations of the HRA assessment will be required throughout the process of developing the MLP.

3. Identified European Sites (Natura2000 and RAMSAR Sites)



3.1. The scope of the Habitats Regulations Screening Assessment of the emerging Worcestershire County Council Minerals Local Plan will encompass all of the European sites in Worcestershire (2 sites: Lyppard Grange Ponds SAC and Bredon Hill SAC) and within a 15 km buffer of the County (4 sites: Fens Pools SAC, Dixton Woods SAC, Downton Gorge SAC and River Wye/Afon Gwy SAC). A 15km buffer is considered the upper limit of

dry deposition of pollutants (e.g. dispersal of dust from a mineral extraction site) and follows Environment Agency Guidance under the Habitats Regulations[2].

3.2. Walmore Common SPA and Ramsar, located just over the 15 km buffer have also been included within this assessment. In addition, the Severn Estuary SAC, SPA and Ramsar (approximately 20km south of Worcestershire's borders, but hydrologically linked to the Rivers Severn, Avon, Wye and Teme), has also been considered; given the importance of the estuary in a regional context and the potential hydrological pathway for mineral workings along these catchments to impact this downstream site.

3.3. These sites are listed in the Table below with a description of their location in relation to Worcestershire County boundary.

Table 2 - European Sites to be Considered within the HRA Screening Assessment

European Site	Location in relation to Worcestershire County	Qualifying Feature
Lyppard Grange Ponds SAC (1.09 ha)	Central	Great Crested Newt population.
Bredon Hill SAC (359.86 ha)	South central	Violet Click Beetle population
Dixton Wood SAC (13.14 ha)	2 km from the central southern boundary	Violet Click Beetle population
Fens Pools SAC (20.4 ha)	7 km from the central northern boundary	Great Crested Newt population
River Wye / Afon Gwy SAC (2234.89 ha)	10 km from western boundary	Habitats: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; Rivers with floating vegetation often dominated by water-crowfoot. Transition mires and quaking bogs; very wet mires often

[2] Environment Agency (2010) Horizontal Guidance Note H1- annex F "Air Emissions"

		identified by an unstable 'quaking' surface. Species: White-clawed crayfish(*Austropotamobius pallipes*) Sea lamprey(*Petromyzon marinus*) Brook lamprey (*Lampetra planeri*) River lamprey(*Lampetra fluviatilis*) Twaite shad (*Alosa fallax*) Allis shad (*Alosa alosa*) Atlantic salmon (*Salmo salar*) Bullhead (*Cottus gobio*) Otter (*Lutra lutra*)
Downton Gorge SAC (69.3 ha)	12km from northwest boundary	Habitats: *Tilio-Acerion* forests of slopes, screes and ravines; mixed woodland on base-rich soils associated with rocky slopes.
Walmore Common SPA (52.85 ha)	15 km from southern boundary	Supports overwintering (non-breeding) population of Bewick's swan (*Cygnus columbianus bewickii*)
Walmore Common Ramsar (52.85 ha)	As above	Internationally important population of overwintering (non-breeding) *Cygnus columbianus bewickii*
Severn Estuary SAC (73,715.4 ha)	20 km from the southern boundary	Habitats: Estuaries Mudflats and sandflats Saltmarsh Species: Sea lamprey (*Petromyzon marinus*) River lamprey (*Lampetra fluviatilis*) Twaite shad (*Alosa fallax*)

Severn Estuary SPA (24,700.01 ha)	As above	Supports overwinter populations of: *Cygnus columbianus bewickii* Curlew (*Numenius arquata*) Dunlin (*Calidris alpina alpina*) Pintail (*Anas acuta*) Redshank (*Tringa totanus*) Shelduck (*Tadorna tadorna*) Supports Ringed plover (*Charadrius hiaticula*) on passage.
Severn Estuary Ramsar (24,662.98 ha)	As above	Regularly supports an assemblage of at least 20,000 waterfowl

3.4. It is recognised that designations for some of the sites are based predominantly on species rather than habitats, however supporting habitats are also given due consideration within this assessment, as they underpin the Conservation Objectives.

3.5. The River Clun SAC is located just outside the 15km buffer (at approximately 16km from the northwest border of Worcestershire) however as the site has no obvious hydrological link to mineral resource areas in Worcestershire we have excluded this site from the assessment process.

3.6. Although the Severn Estuary is also located beyond the 15km radius of focus, we have screened this site in both for its clear hydrological link to riverine terraces within Worcestershire and for its importance in both a local and regional context.

3.7. For plans showing the location and boundaries of the Natura2000 sites please refer to Appendix 1.

Conservation Objectives

3.8. Conservation objectives of European sites are set by Natural England[3] to ensure that the obligations of the Habitats Directive are met, particularly to ensure that

3 Refer to: www.naturalengland.org.uk/ourwork/conservation/designatedareas/sac/conservationobjectives.aspx

there should be no deterioration or significant disturbance of the qualifying features from their condition at the time the status of the site was formally identified. The conservation objectives are also essential in determining whether the effects of a plan or project are likely to have a significant effect (Article 6.2 of the Habitats Directive).

Table 3 - Conservation Objectives for the European sites

European Site	Conservation Objectives
Lyppard Grange Ponds SAC	To maintain the designated habitats in favourable condition for great crested newts, which is defined in part in relation to a balance of habitat extent (extent attribute). Habitat Types represented (Biodiversity Action Plan categories) Lowland ponds and neutral grassland/ parkland
Bredon Hill SAC	To maintain the presence of dead ash wood and pollards for Violet click beetle (*Limoniscus violaceus*). The Conservation Objectives (COs) for Bredon Hill SAC are focussed on the component Site of Special Scientific Interest (SSSI): Bredon Hill. The COs for the European interest on the SSSI are: • to maintain, in favourable condition, the habitats for *Limoniscus violoceus*, with particular reference to the wood-pasture and ancient ash woodland.
Dixton Wood SAC	The Violet click beetle (*Limoniscus violaceus)* was discovered at Dixton Wood in 1998 and it has been found at the site on a single occasion subsequently. It is a small site with large number of ancient ash *Fraxinus excelsior* pollards, and supports a rich fauna of scarce invertebrate species associated with decaying timber on ancient trees. The Conservation Objectives (COs) for Dixton Wood SAC are focussed on: • maintaining, in favourable condition, the habitats for the population of violet click beetle; • principal risks to the site's integrity are lack of future replacement pollards (age-class skewed to older generation) and game management practices. • These are issues addressed through provision for the creation of new pollards as well as management of existing resource to prevent loss through senescence and wind-blow.
Fens Pools SAC	To maintain the extent of the amphibian habitat (terrestrial and aquatics). • No loss of area or fragmentation of site (through significant barriers to amphibian dispersal) compared with status at

	designation.
River Wye / Afon Gwy SAC	The Conservation Objectives for the River Wye SAC are focussed on the component SSSIs: • River Lugg • Lower Wye The COs for the European interest on the SSSIs are to maintain, in favourable condition, the: • floating formations of water crowfoot (*Ranunculus*) of plain and sub-mountainous rivers and populations of: • Atlantic salmon (*Salmo salar*) • Allis shad (*Alosa alosa*) • Twaite shad (*Alosa fallax*) • Bullhead (*Cottus gobio*) • Brook lamprey (*Lampetra planeri*) • River lamprey (*Lampetra fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • White-clawed crayfish (*Austropotamobius pallipes*) and the river and adjoining land as habitat for populations • Otter (*Lutra lutra*)
Downton Gorge SAC	The site is potentially vulnerable to the effects of air- and water-borne pollution, particularly in respect of its significant lichenological interest. However these effects are not related to the management of the site. • ensure no loss of ancient semi-natural stands, no loss of ancient woodland or wood-pasture and no reduction in the number of veteran trees.
Walmore Common SPA	Internationally important bird assemblage of *Cygnus columbianus bewickii* • no significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline • significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure; • relevant attribute: disturbance in feeding or roosting areas; • measure: reduction or displacement of wintering birds.
Walmore Common Ramsar	Internationally important bird assemblage of *Cygnus columbianus bewickii* • no significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline. • maintain no less than 43 individuals, representing an average of 0.5% of the GB population (i.e. the 5 year peak mean 1998/9-2002/3)
Severn Estuary SAC	The COs for the European interest are to maintain, in favourable condition, the: • estuaries • mudflats and sandflats not covered by seawater at low tide • atlantic salt meadows
Severn Estuary	• no significant reduction in numbers or displacement of wintering

SPA	birds attributable to disturbance from an established baseline • significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure; • relevant attribute: disturbance in feeding or roosting areas; • measure: reduction or displacement of wintering birds. "Supporting habitats" are identified which describe the key habitats within the European marine site necessary to support the interest features i.e. the qualifying bird species. The "favourable condition table" contains further detail on habitat conditions. • subject to natural change, maintain in favourable condition the habitats for the internationally important populations of the Annex 1 and migratory species • intertidal mudflats and sandflats (Annex 1 species, migratory species and waterfowl assemblages); • saltmarsh communities (Annex 1 species, migratory species and waterfowl assemblages); and • shingle and rocky shore (migratory species and waterfowl assemblages).
Severn Estuary Ramsar	No less than 68,026 individuals in the assemblage (i.e. the 5 year peak mean between 1988/9 – 1992/3). • Relevant attribute which may cause deterioration: Nonphysical disturbance, noise (e.g. coastal development); visual (coastal development). Non-toxic contamination: changes in nutrient loading and changes in organic loading (industrial outfalls). • No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline. Target number of Annex II species: • Dunlin >41,683; • Shelduck >2,892; • Redshank >2,013; (i.e. the 5 year peak mean between 1988/9 – 1992/3). Maintain in a favourable condition the habitats for the internationally important assemblages of waterfowl listed, in particular: • saltmarsh - Upper and lower saltmarsh provide important feeding and roosting areas. The European white-fronted geese graze on a range of saltmarsh grasses and herbs. The birds feed on the saltmarsh and the transition to coastal grazing marsh in front of the sea defences in the upper estuary. • mudflats and sandflats; and • coastal lagoons.

Key Site Sensitivities

3.9. The key site sensitivities for each habitat type were established by reviewing information provided within the conservation objectives for each site and identifying the main sensitivities / vulnerabilities for each habitat or species.

3.10. The key sensitivities of the habitat types associated with each group of European sites are listed. Where sites are primarily designated for their faunal interest, they have been included in the category which best represents the habitat type used by the species in question, but it is recognised that these species will also utilise other habitat types. A summary of identified key sensitivities for each site is presented in Table 10 at Section 8.

Table 4 - Key European Site Sensitivities

Habitat Type and Species Associated European Site	Key Sensitivities Represented Across the European sites by habitat type (assuming no direct habitat loss)
Ponds and Pools • Lyppard Grange Ponds SAC – Great Crested Newt • Fen Pools SAC – Great Crested Newt	• Water quality - eutrophication is a threat, particularly from point source pollution (e.g. sewage outfalls) but also from surface runoff or groundwater pollution and atmospheric deposition • Water levels – a high and stable water table is fundamental. • Siltation (e.g. excessive poaching of lake margins by stock, suspended sediments leading to transport of nutrients) • Scrub or tree encroachment (leading to shading, nutrient and hydrological effects) • Maintenance of appropriate grazing regime • Spread of introduced non-native species • Recreational pressure / disturbance (particularly on-water activities with potential to disturb sediment and increase turbidity in lakes) • Development pressure • Diffuse air pollution from traffic and agriculture.
Woodland • Bredon Hill SAC • Dixton Wood SAC • Downton Gorge SAC	• Water quality – e.g. pollution through groundwater and surface run-off sources • Water level – maintenance of water table essential e.g. restrict new drainage ditches around wet woodlands • Maintenance of appropriate grazing regime • Heavy recreational pressure

	• Spread of non-native / invasive species • Scrub encroachment • Atmospheric pollution (nutrient deposition and acidification) ○ *Of these sites only Downton Gorge is considered sensitive to air pollution due to its sensitive lower plants (lichens and bryophytes); the site is currently in exceedence of its critical loads and therefore considered at risk from further diffuse air quality impacts* • Development pressure
<u>Rivers</u> • River Wye / Afon Gwy SAC • Severn Estuary SAC	• Water quality – pollution through agricultural run-off and sewage outputs is a problem • Flow (flow regime should be characteristic of the river). Abstraction should be regulated. • Suspended sediments/siltation – through intensification of agricultural practices and other disturbance e.g. soil degradation around stock feeding points. • Inappropriate dredging • Recreational pressure and disturbance – can lead to disturbance, damage and increases in suspended sediment e.g. footpath erosion, water-based activities • Atmospheric pollution - deposition of oxides of nitrogen & sulphur, acidification of river water (deposition of nitrogen & ammonia) • Climate change - change in rainfall patterns and transpiration rates, including temperature – more algal blooms, reduced summer flow. Including high rainfall – more erosive runoff and sedimentation. • Illegal fish poaching • Spread of introduced non-native species • Artificial barriers to fish migration
<u>Wet Grassland</u> • Walmore Common SPA and Ramsar	• Maintenance of appropriate grazing regime • Water level – maintenance of hydrological regime (grassland communities are strongly influenced by the quantity and base status of the groundwater) • Water quality – nutrient enrichment from fertiliser run-off etc • Scrub encroachment (often due to undergrazing) • Development pressure • Spread of introduced non-native species • Human disturbance (off-road vehicles, burning (vandalism)) • Atmospheric pollution e.g. nitrous oxides from vehicle exhausts.
<u>Estuarine Habitats</u> • Severn Estuary SAC/SPA/Ramsar	• Water quality – pollution • Recreational/tourism disturbance • Development e.g. dock/harbour creation, coastal defence works

- Erosion
- Siltation
- Dredging
- Over-fishing
- Maintenance of appropriate grazing regime
- Spread of non-native species
- Disturbance to bird feeding and roosting habitat (noise / visual)

4. Key Potential Impacts

4.1. Minerals extraction and its associated infrastructure has the potential to cause severe damage to the conservation interests of Natura2000 sites through the loss, degradation and fragmentation of valuable habitat areas and a reduction in biodiversity. However, there may be potential benefits through restoration of minerals working in habitat creation and improving connectivity, Table 5 (below) summarises the potential impacts of minerals developments.

Table 5 - Generic Minerals Impacts Associated with Different Materials

Material	Activities associated with minerals development	Environmental Impacts
All materials	Site operations will normally include: • Extraction of minerals by blasting or mechanical extraction etc. • Development of ancillary infrastructure. • Processing of the materials. • Transportation of materials around the site. Transportation of minerals by road, rail, waterway, conveyor or pipeline. Site restoration (either during and/or after workings) and	Land take & Habitat Loss/Fragmentation • From continued extraction of aggregates and the development of ancillary infrastructure. Any land take within a Natura2000 site is likely to have an adverse impact upon site integrity. It is likely to impact on species populations and species movements. • The impact may also relate to habitat features beyond the designated site boundary. For example, any fragmentation or loss of habitat associated with a SAC woodland, or equally any significant areas of woodland or hedgerows (or other habitats valuable in the context of the SAC's conservation objectives) in

	aftercare.	the vicinity of the SAC may have an adverse effect on species through the loss of foraging or commuting habitat. Similarly, removal of a habitat adjacent to or within vicinity of an SAC or SPA habitat may have a negative impact on the designated site through a reduction in buffering, changes to local hydrology, severance and barrier effects or edge effects. • Restoring quarries to biodiversity can be positive for nature conservation. Partial and full restoration of extraction sites has the potential to improve the SACs and SPAs through increasing the robustness of sites. This could be either through enhancing buffers or improving the connectivity of sites (refer to Table 6 for further details). Disturbance • Noise and light pollution from extraction, ancillary facilities, transportation and some types of restoration may impact upon fauna such as bats and birds. For example, restoration for amenity (dog-walking/water sports) or primarily for agriculture or afforestation can have a detrimental effect on the conservation value of local sites (e.g. modification of foraging value, or may promote the deterioration of nearby botanically rich grasslands). • Biological disturbance can also include factors such as: o Direct mortality (increased vehicular activity on and nearby sites), o Out competition by non-native species (introduced via

		after-use such as the introduction of *Dikerogammarus villosus* through boating on amenity lakes, but an equal risk through forestry or development end-uses), ○ Selective extraction of species (e.g. through fishing) ○ Introduction of new species or habitats (e.g. through inappropriate restoration landscaping proposals) ○ Changes in predator/prey numbers (e.g. restoration to woodland/heathland), ○ Introduction of disease, ○ Rapid fluctuations in populations, ○ Natural succession, ○ Loss/damage of plant species (e.g. by operational activities such as dredging, and inappropriate restoration after-uses). Water pollution • Contamination of habitats may occur from a number of sources. • Impacts may include reductions in prey species with subsequent impacts on the food chain, bioaccumulation of toxins in the food chain or eutrophication. • Contaminants can be transported large distances with surface or ground water. Impacts may depend on the strength of the pathway between the source and the site. • Wetland habitats are particularly vulnerable to pollution from surface or ground water sources.

		Air pollution • From on site operations and transportation may result in reduced condition and integrity of European sites. • The impacts of nitrogen and nitrogen oxides deposition on vegetation growth are of particular concern. • Other pollutants including sulphur dioxide, ozone and particulates. • Air pollution has been linked to ill health amongst trees, particularly over-mature specimens, and also a failure to regenerate, either from coppice, pollard or seed. • Air pollution may also cause changes in species assemblages, for example in lichens. Dust • Dust from extraction and on site operations may have an impact on habitats and species. • Potential for affecting the growth of plants. • Dust could also get into water sources. Soil pollution • Pollution or contamination of watercourses during initial ground investigation works (e.g. boreholes may provide pathways for contaminated water), • Operational activities: previously contaminated aggregates, transport of aggregates, industrial processes on site (especially

		processing of fuels, oils and solvents), dewatering may bring in contaminated water from off-site. • After-use such as industrial, commercial or residential development may cause soil pollution, as may future use as landfills through leachate or extractant pollution. Hydrology • Decreased (for example as a result of extraction) or increased water quantity (for example due to impeded water flow or restoration) ground or surface water levels may impact upon designated habitats. • This could impact on the integrity of the site by causing alterations in the species composition or reducing the extent of target habitats. • Reduced water levels in water courses and water bodies could have direct impacts on wetland habitats and designated wildfowl populations. • Reduced volumes of water would increase the concentration of contaminants. • Any significant or long term changes in ground water levels may also affect woodland sites, either having a direct effect on species (canopy, basal flora or epiphytes) or indirectly by increasing stress and vulnerability to other factors. • Introduced/invasive species Restoration and mitigation could potentially lead to the

		introduction or increased abundance of potential invasive species which could comprise an adverse impact on integrity of Natura2000 sites. Other non-toxic contaminants • Nutrient enrichment (of water and soils) through processes such as dredging, dewatering, agricultural and infilling end-uses. • Changes in salinity (e.g. ground works/boreholes causing pathways for contaminated water), • Changes in turbidity (e.g. through stockpiling finings escaping to watercourse, through industrial processes including sand pumped as slurry to processing plants and water returned to lakes, through production and inappropriate storage of secondary aggregates, by transport of aggregates (via road or conveyor), and by agricultural after-use (e.g. effects of fertiliser) or development (industrial, commercial or residential).
Sand and gravel (land won)	Extracted by hydraulic elevators following the stripping of soil. Crushed, screened and washed. Silt is disposed of. While transport by barge using watercourses such as the River Severn Special Wildlife Site are viable routes from extraction to processing points, transport is often by road because of the small amounts being transported and cost of infrastructure such as wharfs. However, the fact that the material is relatively low value, bulk materials, for	• Higher land take from extraction and development of ancillary infrastructure (than crushed rock). Likely to impact on species populations and species movements. Noise levels relatively low (compared to hard rock quarries). • Silt disposal capacity is important – water impacts. • Soil stripping in summer can cause dust problems. • Road/waterway transport impacts. • Potential for hydrological modifications of adjacent land influenced through cone of depression during extraction

	which transport costs make up a large proportion of the market price can make water transport more attractive.	phases.
Limestone	Extracted through blasting or mechanical extraction, crushing and screening / washing.	• Noise and dust impacts during blasting or mechanical extraction. • Working can be below the water surface so can have water pollution impacts and other hydrological consequences. • Quarries are often located in areas of landscape value.
Sandstone	Extracted through blasting or mechanical extraction, crushing and screening / washing.	• Noise and dust impacts during blasting or mechanical extraction. • Quarries are often located in areas of landscape value. • This can generate large volumes of associated waste material.
Igneous rock	Extracted through blasting, crushing and screening. Material is not washed so no need for silt disposal.	• Noise and dust impacts during blasting. • Quarries are often located in areas of landscape value. • Amounts of waste material
Clay	Mechanical stripping and excavation	• Land take • Road transport impacts • Noise associated with extraction and transport • Dust, especially if clay stockpiles are left out to dry.

Coal	(underground mining) Deep coal is typically reached via a vertical shaft, extracted coal is removed via roadways to be processed via screening, crushing, homogenising and onward transportation to coal preparation plants. The majority of surface tipping comprises spoil heaps immediately adjacent to the point of origin, comprising discard or a mixture of coarse and dewatered treated fines. (surface mining) Modern technology allows extraction to reach depths in excess of 200 metres, although 80 metres is more commonplace. The ratio of overburden to coal is high; consequently, extraction involves massive earth moving operations in order to recover relatively small quantities of coal. Soils and overburden are stripped and stored in large mounds. Once extracted, coal is normally taken by lorry to the nearest blending centre for processing. At large sites traffic generation can therefore be considerable. Most opencast coal sites can be reclaimed to their original or near original levels. This is because of the high overburden to coal ratio and the 'bulking up' effect of	• Land take - Surface development of the pithead and disposal of colliery waste • Road transport impacts • Noise • Dust • Lighting • Subsidence • Surface water pollution from contaminated run-off • Land take • Road transport impacts • Noise • Dust • Waste piles created during the mining process can contribute sediment to water ways • If mining takes place below the water table then drainage can result in a lowering of the water table as well as land subsidence

	returned material.	
Brine	The Worcester Basin is one of a small number of Triassic saltfields in the UK which are economically the most important and account for some 90% of total production (most derived from the Cheshire Basin). In addition to salt, white salt, brine and chlorine production, saltfields in excess of 100m thick are also used for underground storage of gases. Because of dissolution by groundwater, most salt-bearing strata are absent to depths of about 70 meters. Almost all solution mining is now controlled by brine pumping which reduces risk of subsidence. The process, typically developed through a single borehole, recovers up to 25% of the total salt reserve.	• Land take - Surface development and infrastructure associated with boreholes and multiple wells. • Road transport impacts • Noise • Dust • Lighting • Subsidence/settlement • Surface water pollution from contaminated run-off • Hydrological modifications (groundwater/contamination/salinity)

5. Assumptions proposed for Use at Screening Stage in Predicting Likely Significant Effects of Potential Minerals Sites on Natura2000 Sites

5.1. The Minerals Local Plan is emerging in parallel and will be informed by the environmental screening processes, as such at this early stage only mineral resource areas have been identified within Worcestershire (refer to Appendix 2 for further information). 'Areas of search' are being developed from these broader resource areas. This section sets out the assumptions that will be used to assess impacts and help to refine these areas.

First Assumption: Geographical Proximity to Natura2000 Sites.

5.2. Screening for likely significant effects can be determined on a proximity basis for many of the types of impacts, using GIS to determine the proximity of the potential minerals site to each Natura2000 site. However, there are many uncertainties associated with using set distances as there are very few standards available as a guide to how far impacts will travel.

5.3. As a very initial indicator of the potential for likely significant effects on a Natura2000 site, potential mineral sites within the Minerals Resource Areas lying within 2.5 km of a Natura2000 site were identified. This distance reflects a distance used in the draft Appropriate Assessment Report for the Surrey Minerals Plan Preferred Option (December 2006)[4].

5.4. This approach is considered reasonable, as Circular 06/2005 Biodiversity and Geological Conservation15 summarises the need for planning authorities to consult Natural England before granting any planning permission to a development that is within a 2km consultation area around a Site of Special Scientific Interest (SSSI) notified to the planning authority by Natural England (stemming from a requirement set out in the Town and Country

[4] *Habitat Regulations Assessment & Appropriate Assessment of the Surrey Minerals Plan – November 2009*

Planning (General Development Procedure) Order 1995). Circular 06/2005 then states that Natural England may also advise a planning authority that it would want to be consulted about other types of development (for example, a major industrial facility) beyond the 2km maximum for a consultation area. While this requirement relates specifically to SSSIs, most Natura2000 sites contain a number of component SSSIs. It was therefore considered to be a reasonable indicator for identifying where a Natura2000 site is proximate to potential mineral sites that may have significant effects. A second distance of 500m was used to indicate 'close' proximity of potential minerals sites to Natura2000 sites.

5.5. However, different types of impacts can travel different distances, and the assumptions and distances to be used in HRA Screening, and justification for them are set out below.

Second Assumption: Likely Pathway to Impact Model

5.6. Plans such as the Worcestershire Minerals Local Plan can have spatial implications that extend beyond the intended red-line boundaries of mineral extraction sites. In particular, it is recognised that when considering the potential for effects on European sites, distance in itself may not be a definitive guide to the likelihood or severity of an impact. Other factors such as inaccessibility/ remoteness, the prevailing wind direction, river flow direction, and ground water flow direction will all have a bearing on the relative distance at which an impact can occur. This means that a plan directing development some distance away from a European site could still have effects on the site and therefore needs to be considered as part of the HRA screening process.

5.7. Therefore, rather than rely on distance alone, another effective mechanism for considering the scope of the HRA is to use a 'source-pathway-receptor' model (see below) which focuses on whether there is a pathway by which impacts from the plan can affect the identified sensitivities/ vulnerabilities of European sites' environmental conditions.

5.8. For instance, if works are proposed at a quarry (a 'source') which is neither proximate to nor linked hydrologically (i.e. upstream) to a SAC (a 'receptor') it could be proposed that certain impacts, such as increased levels of siltation, sedimentation or changes to water flow, are highly unlikely to be caused by the proposed operations.

5.9. Similarly if the conservation objectives indicate that a site shows no particular sensitivity to (for example) air pollution issues, then neither source nor pathway would be relevant in determining whether an impact due to modified air quality levels (for example an increase in nitrogen dioxide levels associated with quarry haulage traffic emissions) is likely.

5.10. While this approach cannot broadly exclude the potential of a quarry to have a Likely Significant Effect on a Natura 2000 site, it is a useful tool in narrowing the scope of focus to specific sensitivities of sites and the likelihood of a certain operations being able to cause an impact. Once this is established, this process also allows refinement of appropriate and proportionate mitigation.

Third Assumption: Broad Mitigation and Best Practice

5.11. Project-related HRA often requires bespoke survey work and novel data generation in order to accurately determine the significance of adverse effects, that is, to look beyond the risk of an effect to a justified prediction of the actual likely effect and to the development of avoidance or mitigation measures.

5.12. However, the draft CLG guidance[5] makes it clear that when implementing HRA of land-use plans, the Appropriate Assessment (AA) should be undertaken at a level of detail that is appropriate and proportional to the level of detail provided within the plan itself:

> "*The comprehensiveness of the [Appropriate] assessment work undertaken should be proportionate to the geographical scope of the option and the nature and*

[5] CLG (2006) Planning for the Protection of European sites, Consultation Paper

extent of any effects identified. An AA need not be done in any more detail, or using more resources, than is useful for its purpose. It would be inappropriate and impracticable to assess the effects [of a strategic land use plan] in the degree of detail that would normally be required for the Environmental Impact Assessment (EIA) of a project."

5.13. In other words, there is a tacit acceptance that HRA can be tiered and that all impacts are not necessarily appropriate for consideration to the same degree of detail at all levels.

5.14. For a Local Plan, the level of detail concerning the developments that will be delivered is usually insufficient to make a highly detailed assessment of the significance of effects. For example, precise and full determination of the impacts and significant effects of a new mineral extraction site will require extensive details concerning the specifications, methodology, phasing and restoration of the quarry, including layout of proposed restoration landforms and any associated development to be delivered in particular locations, yet this data will not be decided until individual site or project stages.

5.15. The most robust and defensible approach in the absence of fine grain detail at this level is to make use of the precautionary principle. In other words, the plan is never given the benefit of the doubt; it must be assumed that a policy/ measure is likely to have an impact leading to a significant adverse effect upon a European site unless it can be clearly established otherwise.

5.16. For this reason is it accepted that any proposals for mineral extraction which come forward will adopt and implement nationally recognised best practice to mitigate for any industry standard adverse environmental impacts.

5.17. By implementing the mitigation and best practice approaches outline in Table 6 below, there is a subsequent implication in determining a likely pathway to effect, as described above. It is important to note that mitigation for potential environmental impacts is distinct from compensation measures: a 2008 High Court judgment[6] confirmed that avoidance and mitigation

[6] Ref: The Queen on the application of Hart District Council v The Secretary of State for Communities and Local Government, Luckmore Ltd, Barratt Homes Ltd case CO/7623/2007, Mr Justice Sullivan, 1st May 2008 [2008] EWHC 1204 (Admin); 2008 WL 2148207

measures which form part of a project should be taken into account in the screening of projects for the likelihood of a significant effect. However, the purpose of compensatory measures is different and these should not be taken into account in assessing whether the proposal is likely to have significant effects on a European site.

5.18. It is assumed that the approaches outlined in Table 6 will be adopted within the Minerals Local Plan, as it emerges. Environmental mitigation must follow established national best practice and will contribute in ensuring no detrimental impact to Natura2000 sites.

Table 6 - Assumed Avoidance, Mitigation and Best Practice Approaches

Source	Typical Measures
General	• The National Planning Policy Framework (NPPF) includes the requirement to carefully consider applications for minerals exploration and extraction in terms of environmental impact. • The NPPF states that in granting planning permission for mineral development, that there must no unacceptable adverse impacts on the natural and historic environment. • Controlling the Environmental Effects of Recycled and Secondary Aggregates Production: Good Practice Guidance, DCLG 2000
Dust and Disturbance (e.g. light and noise)	• The NPPF requires planning policies and decisions to protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason, • The NPPF requires Local Authorities, when determining applications, to ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties • The NPPF requires the Local Authority to set out environmental criteria to ensure avoidance of unacceptable adverse impacts on the natural environment including noise, dust, visual intrusion, traffic tip-and quarry slope stability, differential settlement of quarry backfill, mining subsidence, increased flood risk, impacts on flow and quality of surface and groundwater and migration of contamination from the site. • The NPPF requires that planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation. • The Technical Guidance to the NPPF identifies that additional measures to control dust might be necessary if, within a site, the actual source (e.g. haul roads, crushers, stockpiles etc) is within 1,000m of a residential property or other "sensitive" [land] use. • The Technical Guidance to the NPPF establishes that mineral planning authorities should aim to establish a noise limit at the

	noise-sensitive property that does not exceed the background level by more than 10dB(A).
Water Pollution	Impacts from water pollution can be mitigated by following Environment Agency Pollution Prevention Guidelines (PPGs), including: • PPG 5 Works and maintenance in or near water • PPG 6 Working at construction and demolition sites • PPG 7 Refuelling facilities • PPG 8 Safe storage and disposal of used oils • PPG 13 Vehicle washing and cleaning • PPG 18 Managing fire water and major spillages • PPG 21 Pollution incident response planning • PPG 26 Storage and handling of drums and intermediate bulk containers Potential avoidance/mitigation measures include bunding of any liquid tanks and the storage of all materials to the requirements of Environment Agency guidance. Drainage and washdown water could be recycled on site and any excess be treated in a dedicated water treatment plant prior to release to the sewer system to the conditions set by an effluent discharge consent. Rainwater could be directed to the surface water drainage system, via separators/interceptors in the case of roads and parking areas, for subsequent discharge into infiltration ponds on the site.
Hydrology	• Water discharges from mining operations are regulated under the Environmental Permitting Regulations. • Any new abstractions will be considered by the Environment Agency or Local Planning Authority as appropriate. • In relation to specific operations like extraction of Coal Bed Methane where the fluids being injected contain pollutants and the injection is into rock formations that contain groundwater, or where the activity poses a potential risk of mobilising natural substances to cause pollution, the Environment Agency will require the operator to hold an environmental permit under the Environmental Permitting Regulations 2010 (EPR 2010). • The Environment Agency will also require a permit for activities associated with the surface works if these involve emissions to surface or groundwater. The permit will specify the limits of the activity and any requirements for monitoring and will place a

	general management condition on the operator to provide a written management system that identifies and minimises risks of pollution. • For aspects of the operation that would not normally be subject to EPR 2010 permits, such as the drilling of the borehole, the Environment Agency would also have powers to serve notices under those regulations to require the operator to cease an activity or apply for a permit if they consider it warranted. The Agency will separately consider potential impacts on water resources due to the effect on groundwater levels and flows. They expect industry to notify it of their intention to carry out drilling, at which time they will advise on measures that the Agency consider necessary to protect water resources. There may be a requirement for control under the Water Resources Act 1991 on abstraction of groundwater. Depending on the proposal, a groundwater investigation consent and abstraction licence may be required. Operators making such applications would need to provide a supporting hydro-ecological impact assessment.
Air Pollution	• Operations must be in accordance with the Air Quality (England)(Amendment) Regulations, 2002. • Effects from vehicle emissions can be reduced through measures such as regular vehicle maintenance and consideration of appropriate haulage routes.
Restoration (generic)	• Restoration can be controlled through planning conditions. Planting schemes should include the use of native species. Under section 14 of the Wildlife and Countryside Act 1981, it is an offence to introduce 'to the wild' a species included within Schedule 9 of the Act. • The Natural Environment and Rural Communities Act (2006) requires Local Authorities, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. It should therefore be ensured that in granting planning permission, adequate phased extraction proposals including appropriate restoration strategies are prepared in advance of operations commencing; strategies should aim to conserve (protect, restore and enhance) opportunities for locally important species and habitats (as set out in the Section 41 of the NERC Act).

Restoration (strategic)	Operation phases • Compliance with requirements of the Protection of Habitats and Species Regulations and Wildlife and Countryside Act will ensure protection or appropriate mitigation/compensation and enhancement of opportunities for species of conservation significance (including those specified within the NERC Act). This could be achieved by setting aside non-operational areas for species typically associated with habitats in which quarrying is undertaken, for instance: o protecting piles of sandy overburden where sand martins might nest, o creating/protecting cliff roosting opportunities for species of raptors, o minimising impact to existing woodland, scrub and hedgerows and the species these support and ensuring waterbodies in which wildlife (such as great crested newts) are known to occur are kept in favourable condition and remain terrestrially connected to surrounding networks of ponds; o trees with bat roost potential should maintained and protected (from indirect disturbance such as lighting and direct impact such as felling unless derogated through the EPS licensing regime). If sensitive procedures are employed throughout phased extraction, this can ensure that wildlife can continue to thrive alongside fully operational quarries. • Sensitive habitat management can also reduce the likelihood of invasive species (such as Himalayan balsam and Japanese knotweed) from spreading across sites or wider landscape. While ensuring compliance with the duty to prevent the spread of Wildlife and Countryside Act Schedule 9 plants 'to the wild', this also provide mineral operators with the opportunity to ensure favourable opportunities for a wider wealth of species reliant on native habitats which become outcompeted by such "invasives"[7]. • Restoration of sites during phased extraction provides time for habitats to establish and species (re)colonise opportunities; reconnecting or creating new wildlife corridors. Restored sites • It has been recognised that restoration strategies for mineral sites can make a significant contribution to Biodiversity Action Plan targets. Opportunities for positive, long-term site restoration will depend on the individual site capacities and capabilities.

[7] For further information see: www.plantlife.org.uk/uploads/documents/Invasives_and_the_law.pdf

	These factors will be dependent on factors such as location, topology, geology, fertility, connectivity to other habitats and the reservoir of on-site and local 'seedbanks'. Use of native species (preferably of local provenance) in restoration strategies is strongly advocated; an inexpensive method of restoration for nature conservation is often to simply permit habitats to regenerate on low-fertility ground in order to create natural opportunities for local wildlife). Opportunities exist for significant biodiversity gains, especially through wetland creation along riverine terraces – this could create off-river refuges for species of fish, otters and potentially for water-voles. Creation (or improvement of existing) watercourses could offer multiple conservation benefits, for instance through provision of new drainage ditches linking agricultural areas to reedbeds before joining main watercourses, the quality of discharged water can be significantly improved while reducing costs to the public for water remediation and providing opportunities for wildlife. Other benefits might include: ○ reduced sedimentation; ○ contribution to naturalising flow rates; ○ contribution to flood alleviation through provision of new flood reservoir opportunities; ○ contribution to improving downstream water quality & abstraction issues (for instance through temporarily or permanently reducing fertiliser run-off from mineral extraction sites currently in agricultural use and by creating water reservoirs to reduce local abstraction pressure); ○ amelioration or reversal of the effects of canalisation through naturalisation of watercourses and can reconnect or create new networks of ponds and watercourses valuable to a wide range of wildlife such as breeding and migratory waders and waterfowl, reptiles, amphibians and mammals. ○ Cumulatively these effects will also contribute to other targets such as compliance with the Water Framework Directive[8]. • In addition to biodiversity gain, multifunctional site restoration can also deliver wider benefits including: ○ Economical; e.g. through provision of eco-system services such as pollinator services, new orchards, provision of clean air and water, timber, seeds, crops and potentially new sources of renewable energy such as short rotation coppice, wind power or creating a source of fuel for local woodchip boilers,

[8] http://ec.europa.eu/environment/water/water-framework/index_en.html

	○ Amenity; e.g. provision of new public open space, corridors for movement and enjoyment of the natural and landscaped environments which will can also promote public health & wellbeing and provision of public open space (particularly 'green space') has been correlated with an increase in property value[9], creating new amenity resources may also potentially draw visitor pressure away from Natura2000 sites in the locality, ○ Historical; protection of archaeological and geological resources and provision of new opportunities for public education and enjoyment of these features, ○ Community integration and cohesion; building partnerships to manage locally restored sites in a successful and sustainable manner, ○ Climate change amelioration, adaptation and mitigation; restored sites can contribute to the Worcestershire Climate Change Strategy[10] through supporting a wide range of eco-system services as described above, Cumulatively, these beneficial effects could directly and indirectly potentially contribute to the Conservation Objectives of local Natura2000 sites.

[9] The Economic Value of green Infrastructure, AMION, 2008.
[10] /www.worcestershire.gov.uk/cms/sustainability/climate-change.aspx

Fourth Assumption: Specific Mitigation and Best Practice

5.18 Direct impacts to European Sites brought about by mineral extraction can potentially be scoped out of the HRA assessment if certain practices can be embedded within the policies of the Minerals Local Plan. In assessing Likely Significant Effects we have assumed that the MLP will aim to avoid direct impacts by employing the following principles.

Physical Loss of Habitat

5.19. For direct loss of habitat it was assumed that effects from minerals extraction or other associated development (aggregate processing plants, conveyors, wharves and so forth) would not be significant unless the minerals site extends within the boundary of the Natura2000 site. Increased pressure leading to habitat loss and/or habitat degradation might be anticipated through mineral extraction activities in the locality of a European site (2500m is a widely accepted 'proximity' figure in national Mineral Local Plans, as described below).

Physical Damage to Habitat

5.20. There were no standard distances able to be used for this impact as it includes a variety of different effects such as sedimentation/siltation, habitat severance, erosion and settlement of ground surface. Therefore, the screening analysis involved consideration of the types of activities that would occur on the individual potential mineral sites (from information provided by Worcestershire County Council) within 2.5km of the Natura2000 sites, as well as a closer look at their location on the map in relation to the Natura2000 site to determine whether they might result in physical damage. For example, if a potential mineral site was very close to a Natura2000 site, e.g. adjacent or within 2500m, there was considered to be a higher likelihood of potential edge effects e.g. habitat degradation from movement of machinery, and human trampling associated with after-uses.

5.21. While at this stage only mineral resource areas have been established, it will be possible in later iterations to highlight where, if there were a number of potential mineral sites (i.e. >10) within 2500m of a Natura2000 site,

it could be considered that fragmentation or severance of local habitat networks could occur. Where this can be highlighted as a likely impact, further (higher resolution) assessment utilising the Worcestershire Habitat Inventory and ground-based habitat assessments can be undertaken to inform the HRA.

5.22. Likely Significant Effects from sedimentation or changes in sediment dynamics associated with wharf activities were considered to be uncertain as the specific numbers of shipping movements and location of dredging activities associated with each wharf site were not known.

Hydrological Issues

5.23. Potential impacts on hydrology are also relevant and could impact on sites outside the plan area if there is a hydrological connection.

5.24. The European sites identified within Worcestershire are Bredon Hill and Lyppard Grange Ponds. Bredon Hill is an extension of the Cotswold escarpment and consists of Lias clays and silts overlain by iron-rich sandy limestone of the Middle Jurassic Inferior Oolite. The clays form an impenetrable barrier to water which seeps naturally through the porous limestone above, forming a natural spring-line around the southern flanks of Bredon Hill. It is difficult to see therefore how a downstream minerals proposal could have any impact to the SAC due to hydrological barriers from any surface waters within the downstream catchment.

5.25. The conservation objectives of Lyppard Grange on the other hand focus on the favourable conservation status of its population of great crested newts and are therefore inexorably entwined with issues pertaining to water quality and level. Focusing initially on water level alone, the River Severn is a major source of water for the West Midlands region. The Stratford-on-Avon District Consultation Core Strategy HRA (March 2010) states the following:

> *"There are currently five major abstraction points. Water levels in the Severn Estuary cSAC/SPA/Ramsar site and Lyppard Grange SAC could be affected if water from the River Severn is over-abstracted, and the River Wye SAC could be affected if water from the River Wye*

is over-abstracted. There are already significant in-combination impacts on the Severn Estuary sites and the other SACs due to water abstraction, and further impacts are expected in the future. Increased abstraction from the River Severn at Ombersley was proposed in Severn Water's draft Water Resources Management Plan but was withdrawn because of its potential to affect the Severn Estuary sites (Treweek Environmental Consultants, 2009)".

5.26. For other hydrological changes (e.g. in salinity, thermal regime, nutrient enrichment and turbidity of water etc), it was not possible to use a set distance as these effects will depend on hydrological continuity between a minerals site and a Natura2000 site.

5.27. Whilst Bredon Hill SAC might be screened out from Likely Significant Impact caused by hydrological changes brought about by operations at sites outside the geographical proximity buffer (see above) or which have no clear hydrological continuity to the SAC, without more detailed consideration it is clearly difficult to screen other sites out at this stage.

5.28. The following extract is from a response by Natural England to consultation on the HRA for Hampshire Minerals Plan (2007)[11]. It acknowledges the difficulties associated with assessing such effects at the plan level9:

"We acknowledge that for water related impacts it is not possible to use a set distance as these effects depend on hydrological continuity between minerals and the Natura2000 site. In terms of determining likely significant effects it is not possible to determine significant effects at this stage as site specific data, including actual groundwater flow direction, groundwater levels, gradients, volumes and details of the proposed activity including depth in relation to water table, necessity for dewatering, depth of proposed abstraction, potential for migration and ability to redirect localised groundwater flows are required in order to determine significance of any impact. ***This data is unlikely to be available until an application for the proposed activity is submitted and fully assessed and supporting data is provided. There is the potential for significant effect in all areas where mineral sites have been identified within reasonable***

[11] Hampshire Minerals Plan: Habitats Regulations Assessment Screening Report, Response by Natural England 31st August 2007

proximity to Natura2000 sites however the actual significance will be determined by the specifics of the proposed activity and the ability to implement appropriate mitigation or enhancement as part of the works*".*

5.29. This suggests that if the Core Strategies have a policy that highlights this issue and the need for projects to demonstrate that they will **not** significantly affect the integrity of a European site through changes in hydrology, the HRA should be able to conclude that the Core Strategies will not significantly affect a European site. This is **not** to suggest that the issue is screened out, but that (in line with draft CLG guidance[12]) the appropriate response is to highlight potential effects of a strategic land use plan, which would then be more appropriately and practically assessed in detail within a project Environmental Impact Assessment.

5.30. The HRA will clearly have a role in demonstrating that relevant policies in the Core Strategies are sufficiently robust to allow the issue to be cascaded to an appropriate level to later be assessed in detail.

5.31. This screening work will need to be revisited as the Plans are developed, in order to ensure that the conclusions are still valid but if that is the case it should help focus the later stages of the assessment.

Non-Physical Disturbance

5.32. From a review of minerals policy statements (in particular MPS2), Environment Agency internal guidance on HRA and various websites (e.g www.goodquarry.com), it was considered that effects of vibration and noise are more likely to be significant if a minerals site is within 500m of a Natura2000 site with qualifying features sensitive to non-physical disturbance.

5.33. For biological disturbance (e.g. increased predation, out-competition and introduction of non-native species), the 5km 'buffer' suggested in Environment Agency internal guidance on HRA was applied around Natura2000 sites where bird species have been identified as a qualifying feature (SPA/Ramsar). This approach will also assist in gauging biological disturbance when considering restoration to mixed, amenity or recreational uses for minerals sites, where such use will increase pressures

[12] CLG (2006) Planning for the Protection of European sites, Consultation Paper

such as human disturbance on the conservation objectives of a Natura2000 site.

Toxic Contamination

5.34. For deposition of air pollutants associated with transport, the Highways Agency guideline measure of 200 metres from a road[13] was applied with respect to minerals transported via road networks. In addition, where sites sensitive to air pollution (identified via the APIS website) might be affected by air pollution due to proximity to the minerals site, it was also noted if the Natura2000 site was identified as at risk from air pollution using data set-out in the West Midlands Regional Spatial Strategy "Phase 3 Habitats Regulations Assessment of the Interim Policy Statement on Construction Aggregates".

Non-Toxic Contamination

5.35. In the absence of data from UK sources, a reference document found on the US Environmental Protection Agency's website[14] gave average dust particle sizes from crushed rock, sand and gravel extraction and clay processing as being less than or equal to 10 micrometres. Minerals Policy Statement 2[15] (now replaced by the National Planning Policy Framework) stated that:

> *"Effects of dust will depend on the prevailing wind direction and the transport distance is related to particle size;*
>
> - *Large particles (>30 micrometres) will mostly deposit within 100m of the source*
> - *Intermediate particles (10-30 micrometres) are likely to travel up to 200 - 500m*
> - *Smaller particles (<10 micrometres) can travel up to 1km from the source."*

5.36. The Technical Guidance for the National Planning Policy Framework requires Local Authorities to request dust assessment studies in agreement with mineral operators to establish baselines and identify site activities which might lead to dust emissions, appropriate mitigation and monitoring efforts. The Guidance also establishes

[13] Highways Agency (2003) *Design Manual for Roads and Bridges, Volume 11*. HA.

[14] *Compilation of Air Pollutant Emission Factors. Volume 1: Stationary Point and Area Sources. AP-42, 5th Edition.* U.S. Environmental Protection Agency, January 1995.

[15] *Minerals Policy Statement 2: Controlling and Mitigating the Environmental Effects of Minerals Extraction in England*, ODPM, March 2005.

tranches of sensitivity with regards impact of dust emissions and, for sensitive sites, states that additional measures are likely to be required if sources of dust emission are located within 1,000m of a residential property or other "sensitive use", which for the purposes of the HRA is thought to include Natura2000 sites where it has been identified that the site's conservation objectives may be compromised by poor air quality.

5.37. It was therefore assumed that effects from dust would be more likely to be significant within 1,000m of a Natura2000 site as most of dust particles are likely to be deposited within this distance from the source.

Summary

5.38. For plans which show the network of Natura2000 sites under consideration within this assessment and the proximity buffers discussed within this section, please refer to Appendix 3.

5.39. If the aforementioned mitigation and best practice can be embedded and secured within the Minerals Local Plan, the risk of Likely Significant Effects (LSE) on a European site and subsequent requirement for Appropriate Assessment will be minimised. If it becomes apparent that these approaches cannot be embedded or secured through the MLP, there will be a higher probability of LSE to European sites and consequently the requirement for a more detailed Appropriate Assessment is likely to be triggered.

5.40. The following table highlights where potential conflict between imposing the geographical proximity buffers to Natura2000 sites (within Worcestershire and therefore within the influence of the Minerals Local Plan) and the presence of an identified Mineral Resource Area may occur (refer to Appendix 4 for further details).

Table 7 – European sites located within 2.5km of Worcestershire Mineral Resource Areas

	Minerals Resource Area					
Natura2000 site	**Salt**	**Sandstone**	**Sand & Gravel**	**Clay**	**Crushed Rock**	**Coal**
Bredon Hill SAC	X	X	✓	✓	✓	X
Lyppard Grange SAC	X	X	✓	✓	X	X

6. The 'In Combination' Scope

6.1. It is a requirement of the Habitat Regulations that the impacts and effects of any land use plan being assessed are not considered in isolation but in combination with other plans and projects that may also be affecting the European site(s) in question.

6.2. In practice, in combination assessment is of greatest relevance when the plan would otherwise be screened out because its individual contribution is inconsequential.

6.3. Although revoked in April 2013, the evidence base presented within the West Midlands RSS[16] stated that the housing and infrastructure development are key drivers in the need for aggregate extraction in the West Midlands and that emerging policies and plans of neighbouring regions of England and Wales require consideration.

6.4. Plans in preparation by neighbouring Mineral Planning Authorities are at different stages of the planning process: for instance while Staffordshire's Minerals Core Strategy identified no LSE on the Natura2000 sites identified within their HRA, the Herefordshire County Council Minerals Policy Direction Paper (January 2010) identified that all options under consideration had:

> '"*likely local impacts on designated features including impacts upon water levels, water quality, clean gravel, sedimentation, disturbance, erosion, aggregate extraction, flood defence and dredging. Transport emissions were considered to be an issue for air quality over a wider area*".

6.5. The document highlights the sensitivity of the River Wye SAC to direct and indirect impacts from gravel extraction operations, particularly as there are active sand and gravel pits within 100m of the designated site borders. With this exception, the RSS document has not highlighted any anticipated impacts to other Natura2000 sites in consideration within this document. It does however highlight that plans are still emerging on a sub-regional level but that an increased demand for aggregate in the South-West region, the West Midlands region the North-West region and/or Wales *could* affect

[16] West Midlands RSS Phase 3 HRA of Regional Interim Policy Statement of Construction Aggregate, 2010.

the Severn Estuary if this translated into increased dredging from the estuary. For instance, in 2008 1.47 million tonnes of aggregate were dredged from the Severn Estuary and Bristol Channel from a total licensed dredging area of 130km^2.

6.6. Key issues pertaining to potential impacts arising from generic and specific mineral extraction operations likely to emerge through the Worcestershire MLP are likely to relate to increased site disturbance (e.g. human recreational or developmental pressure), and risk of air and/or water pollution events. The key plans and projects that may therefore require consideration in the Worcestershire Minerals Plan HRA process are likely to be:

Plan or Policy
Water catchment and management:
Severn Trent Water Resources Management Plan
Severn River Basin Management Plan
The Worcestershire Middle Severn Catchment Abstraction Management Strategy
The Severn Corridor Catchment Abstraction Management Strategy
The Teme Catchment Abstraction Management Strategy
The Warwickshire Avon Catchment Abstraction Management Strategy
Worcestershire Development Plan Documents:
Worcestershire County Council Waste Core Strategy
Wyre Forest District Council LDF Core Strategy
Bromsgrove District Council Core Strategy
South Worcestershire Development Plan
Redditch Borough Council Core Strategy
Adjoining Authorities Development Plan Documents:
Gloucestershire Minerals Local Plan
Gloucestershire County Council Minerals Core Strategy
Gloucestershire Waste Core Strategy
Forest of Dean District Council Core Strategy
Gloucester, Cheltenham and Tewkesbury Joint Core Strategy
Cotswolds District Council LDF Core Strategy
Warwickshire County Council Minerals Local Plan
Warwickshire County Council Waste Core Strategy
Stratford-on-Avon District Council LDF
Staffordshire County Council Minerals Local Plan
Staffordshire County Council Waste Core Strategy
South Staffordshire Core Strategy
Shropshire Council LDF Core Strategy
Shropshire & Wrekin Council Minerals Local Plan
Transport Plans:
Worcestershire County Council Local Transport Plan
Gloucestershire County Council Third Local Transport Plan
Herefordshire Council Second Local Transport Plan
Warwickshire Local Transport Plan
West Midlands Local Transport Plan
Staffordshire Local Transport Plan
Shropshire Local Transport Plan

Strategic developments:

Emerging wind turbine developments, especially in the flood plain which might pose the risk of displacement of wildfowl subject to the designation of the Severn estuary SAC/SPA/RAMSAR.

6.7 Focusing on predicted and potential impacts identified through HRA documents supporting these plans and policies (where available), we have tabulated potential in-combination effects with activities associated with the MLP which, cumulatively, may have the potential to cause a Likely Significant Effect on European sites.

Table 8 - Cumulative effects assessment

Impact identification	Assessment of potential cumulative effects.
Noise and vibration	Potential cumulative effects of construction and transport related activities such as those delivered through Development and Transport Plan Documents and Strategic developments. For example: Increased HGV movements from industrial and residential developments, as well as passenger vehicle traffic from urban areas and transport routes will increase noise levels, potentially impacting on the Natura2000 sites. Dependant on transport routes vibrations and visual disturbance may cause a nuisance on nesting and foraging birds.

Water resource reduction	Potential cumulative effects of water abstraction and water quality through activities delivered through Water Catchment and Management Strategies. For example: dewatering during extraction operations may impact on local sites of nature conservation importance (potentially including Natura2000 sites) through the lowering of water tables and settlement and this effect may be further compounded by abstraction of groundwater or surface water for use in agriculture, industry, domestic water supplies or tourism. Abstraction from aquifers has resulted in falling groundwater levels at a regional level in recent years. Increased density requires additional water resources which will further serve to increase pressure on the availability of water resources and habitat areas.
Air emissions	Potential cumulative effects may include compounding fugitive dust and emission from operation of machinery / plant and vehicle emissions (e.g. during haulage) with construction and transport related activities such as those delivered through Development and Transport Plan Documents, Strategic developments and Waste Core Strategies. For example: emissions from minerals extraction processes may be further compounded by particulate emissions including dust, vehicle emissions from transport, bio-aerosols, biogas emissions, organic compounds, principle emission components from technologies energy from waste processes include carbon dioxide, acid gases, heavy metals, particulates, dioxins and furans. The principal emissions from other forms of development relate to vehicle emissions, existing Air Quality management Areas (AQMA's) are likely to be exacerbated by additional development. Worcester City, Wychavon, Bromsgrove and Wyre Forest are designated AQMA's and have declared issues specifically relating to the control of Nitrogen Dioxide (NO_2) levels.
Chemical	Potential cumulative effects may include compounding chemical emissions from mineral extraction operations through diffuse pollution events within the catchment of the Rivers Severn,

emissions	Avon, Teme or Stour leading to a cumulative impact on the integrity of a downstream Natura2000 site. For example: Industrial development along the Severn may contribute towards chemical emissions to air, water and land in combination with those emissions associated with extraction of minerals. Where major roads pass near waterways, there is the possibility of exhaust emissions and other chemicals relating to transport (hydrocarbons – such as oils and petrol, traces of heavy metals associated with motor vehicles, Polycyclic aromatic hydrocarbons PAH's – from vehicle exhausts and asphalt roads, de-icing agents, etc) entering the watercourse in combination with those emissions associated with road haulage of minerals.
Land	Potential cumulative effects may include soil and watercourse contamination, land-take and fragmentation and disturbance of European sites. For example: urban extensions may require an increase in number of Sewage Treatment Plants which could potentially result in compounding soil and watercourse contamination. Restoration of previous minerals can result in point source pollution events, dewatering caused by extraction activities, subsidence, settlement issues, extractant/leachate contamination or additional pressure for land-take within the borders or in the locality of existing Natura2000 sites. This can be further compounded by development or industrial activities where permitted on adjacent sites. The value of the wetland systems depends on the connectivity of habitats; this makes them vulnerable to piecemeal loss as the loss of one habitat can have serious implications for others. Development may lead to increased fragmentation increasing stresses on smaller areas which in turn decreases the ability of the river corridor and its habitat areas to function. The increase in recreational use of the Severn, Avon, Teme or Stour (for instance by encouraging the restoration of riverine terrace quarries to green infrastructure/amenity resources) may increase the numbers of people and their dogs visiting local sites which may include Natura2000 sites. Increase in recreational pressure would also most likely be the result of

	housing developments and any associated improved access and recreation opportunities, which could in turn have a significant impact on breeding birds due to visual disturbance, trampling of habitat (particularly nesting sites) and disturbance and predation by dogs.
Pathway identification	Water is the primary potential cumulative pathway. Transfer of chemical pollutants, organic compounds and sediments to connecting waterways and water bodies within the Natura2000 sites and the potential impact of dewatering (lowering of water tables and settlement) on a Natura20000 site and surrounding local area (i.e. connecting habitat) are the primary potential impacts. Other potential pathways may include noise, vibration, and air quality. The spatial accumulation of effects has also been identified as a potential pathway. Urban extension and related development (i.e. residential, commercial, industrial, transport) may indirectly contribute towards reduction in water quality and increased pressure on the structure and function of a Natura2000 site (e.g. noise, air, visitation through recreation, fragmentation / loss of connectivity, etc). Spatial accumulation of effects regarding the indirect impacts from urban extension and related development are likely to manifest over time.
Prediction	Potential cumulative and in-combination impacts are identified here, primarily through watercourse pollution and increased vehicular activity. Although the magnitude/extent duration and reversibility of these potential effects is, at this stage, not ascertainable, in the absence of mitigation they may have the potential to disrupt the structure and function of Natura2000 sites. It is therefore important as the mineral resource areas are refined into preferred areas of search or sites that the in-combination assessment is further informed and refined by the scale, methodology and restoration aims of the preferred site allocations.

7. Consideration of potential Likely Significant Effects on European sites

Impacts and Sensitivities

7.1. In summary, the following categories of principal site sensitivities to impact, and likely impacts raised by mineral extraction operations have been identified[17]:

Table 9 - LSE Assessment (with consideration typical mitigation approaches)

Site	Broad Sensitivity Category	Key Site Sensitivity	Considerations for Plan Led Mitigation, or Escalation of Issue for Appropriate Assessment
Bredon Hill	Terrestrial Modification	• Land-take/developmental pressure • Inappropriate grazing regime	• No land take within the SAC borders should be advocated • No land take within proximity (<500 meters) of the SAC border should be advocated. • Where extraction areas are proposed within 2500m of a SAC, further exploration of potential for habitat severance from the local landscape should be investigated and, if an LSE is identified, appropriate mitigation formulated.

[17] Based on: Table B: Sensitivities of European sites to different types of impact, WMRSS Phase Three, Habitats Regulations Assessment of the Regional Interim Policy Statement for Construction Aggregates, Treweek Environmental Consultants, March 2010.

			• No likely pathway identified which would influence grazing regime.
	Disturbance	• Heavy recreational pressure • Spread of non-native / invasive species • Scrub encroachment	• Not highlighted as a key issue but increased human disturbance may impact decaying wood and opportunities for Violet Click Beetle. Recreational pressure unlikely to increase unless quarry restoration aims to introduce new amenity attractions which, in turn, could increase footfall to the nearby SAC. Alternatively, would a new amenity resource in proximity to the Natura2000 site draw visitor pressure away from the SAC? Further Green Infrastructure guidance will be required and input from stakeholders is welcome. • Introduction of new species or modification of habitat management practice/requirement can be avoided by excluding mineral sites from the proximity (i.e. <2.5km) of a SAC.
	Water quality/flow	• Groundwater and surface run-off pollution events, • Changes in water table.	• No hydrological connectivity anticipated. • Good practice guidance to be adopted in all sites to address risk of surface water ('point source') pollution events. • Sites known to be hydrologically linked to the SAC will require further (project based) EIA assessment of potential for LSE.
	Air Quality	• Breaching critical air pollution thresholds for vegetation, e.g.	• APIS identified that acid and nitrogen deposition currently exceeds vegetation thresholds.

		by increased oxides of sulphur, nitrogen compounds and/or ozone.	• Sites requiring road haulage should not be permitted within 200m of a SAC to address air pollutant issues. • Sites within 200m of a SAC should evaluate impact of vehicular activity on the nearby SAC.
Lyppard Grange	Terrestrial Modification & Disturbance	• Land-take • Physical damage, • Disturbance • Introduction of invasive species/scrub	• No land take within the SAC borders should be advocated, • No land take within proximity (<500 meters) of the SAC border – site is surrounded by existing residential and commercial development. • Where extraction areas are proposed within 2500m of a SAC, further exploration of potential for habitat severance from local landscape should be investigated and, if LSE identified, appropriate mitigation to be formulated. • No likely pathway identified which would influence current management (i.e. scrub control) requirements.
	Water Quality/Flow	• Increased siltation, turbidity or sedimentation, • Eutrophication, • Changes in water table.	• No direct hydrological links anticipated, so no direct impact to turbidity, siltation or sedimentation is expected. • Upstream quarries could potentially exacerbate existing invasive species issues (e.g. restoration to low intervention flood alleviation land could act as a reservoir for Himalayan balsam). However it is difficult to envisage invasive species such as

			balsam reaching the site via existing watercourses. • Appropriate ecological input should be required when considering quarry restoration schemes. • Good practice guidance to be adopted in all sites to address risk of surface water ('point source') pollution events. • Sites known to be hydrologically linked to the SAC will require further (project based) EIA assessment of potential for LSE.
	Air Quality	• Breaching critical air pollution thresholds for vegetation, e.g. by increased oxides of sulphur, nitrogen compounds and/or ozone.	• Diffuse air pollution from traffic (e.g. haulage) and agriculture (e.g. on restoration) to be avoided – quarry sites within 200m of the SAC should be avoided or vehicular emissions evaluated and appropriately mitigated.
Dixton Woods	Terrestrial Modification & Disturbance	• Land-take/developmental pressure • Inappropriate grazing regime	• No pathway anticipated due to distance of site from Worcestershire's borders. • Where extraction areas are proposed within 2500m of a SAC, further exploration of potential for habitat severance from local landscape should be investigated and, if LSE identified, appropriate mitigation to be formulated. • No likely pathway identified which would influence grazing regime.
		• Heavy recreational pressure • Spread of non-native / invasive species	• Not highlighted as a key issue but increased human disturbance may impact decaying wood and opportunities for Violet Click Beetle.

		• Scrub encroachment	Recreational pressure unlikely to increase unless quarry restoration aims to introduce new amenity attractions which, in turn, could increase footfall to the nearby SAC. Alternatively, would a new amenity resource in proximity to the Natura2000 site draw visitor pressure away from the SAC? Further Green Infrastructure guidance will be required and input from stakeholders is welcome. • Introduction of new species or modification of habitat management practice/requirement can be avoided by excluding mineral sites from the proximity (i.e. <2.5km) of a SAC. • No likely pathway identified which would influence current management (i.e. scrub control) requirements.
	Water quality/flow	• Groundwater and surface run-off pollution events, • Changes in water table to preserve wet woodland	• No hydrological connectivity anticipated. • Good practice guidance to be adopted in all sites to address risk of surface water ('point source') pollution events. • Sites known to be hydrologically linked to the SAC will require further (project based) EIA assessment of potential for LSE.
	Air Quality	• Breaching critical air pollution thresholds for vegetation, e.g. by increased oxides of sulphur, nitrogen compounds and/or	• Diffuse air pollution from traffic (e.g. haulage) and agriculture (e.g. on restoration) to be avoided – as the site is >200m from Worcestershire's borders, no pathway to impact is anticipated.

		ozone.	
Downton Gorge	Terrestrial Modification & Disturbance	• Development pressure • Inappropriate woodland management regime • Heavy recreational pressure • Spread of non-natives • Scrub encroachment to W8/W6 woodland communities	• No land take within the SAC borders or within proximity (<500 meters) of the SAC is anticipated due to its distance from Worcestershire's borders. • No pathway to modify maintenance regime or recreational pressure is identified. • No anticipated pathway for introduction of non-natives or increase in woodland scrub is identified.
	Air Quality	• Breaching critical air pollution thresholds for vegetation, e.g. by increased oxides of sulphur, nitrogen compounds and/or ozone.	• No likely pathway identified due to distance from Worcestershire borders; deposition of air pollutants from any increased vehicular activity is not envisaged.
	Water Flow/Quality	• Eutrophication • Acidification • Siltation/sedimentation/turbidity • Groundwater pollution events • Changes in water table	• No hydrological link between Worcestershire's mineral resource areas and the SAC has been identified and therefore no pathway to modify water levels or flow is anticipated.
Walmore Common	Terrestrial Modification & Disturbance	• Development pressure • Scrub encroachment (often due to undergrazing) • Maintenance of appropriate grazing regime • Spread of introduced non-native species	• No land take within the SAC borders or within proximity (<500 meters) of the SAC is anticipated due to its distance from Worcestershire's borders • Where extraction areas are proposed within 2500m of a SAC, further exploration of potential for habitat severance from local landscape should be investigated and, if LSE identified, appropriate

		• Human disturbance (off-road vehicles, burning (vandalism))	mitigation to be formulated. • No likely pathway identified which would influence current management (i.e. scrub control) requirements. • Introduction of new species or modification of habitat management practice/requirement is not anticipated due to the distance of this site from Worcestershire's borders. • Human disturbance pressure thought unlikely to increase unless restoration of a local quarry aims to introduce new amenity attractions which, in turn, could increase footfall to the nearby SAC. Alternatively, would a new amenity resource in proximity to the Natura2000 site draw visitor pressure away from the SAC? Further Green Infrastructure guidance will be required and input from stakeholders is welcome.
	Water quality/flow	• Maintenance of quantity and base status of the groundwater. • Water quality – nutrient enrichment from fertiliser run-off *etc*	• No hydrological connectivity anticipated. • Good practice guidance to be adopted in all sites to address risk of surface water ('point source') pollution events. • Sites known to be hydrologically linked to the SAC will require further (project based) EIA assessment of potential for LSE.
	Air Quality	• Breaching critical air pollution thresholds for vegetation, e.g.	• No pathway anticipated due to distance of site from Worcestershire's borders.

		by increased oxides of sulphur, nitrogen compounds and/or ozone.	
Fen Pools	Terrestrial Modification & Disturbance	• Development pressure • Recreational pressure / disturbance • Spread of introduced non-native species • Scrub or tree encroachment (leading to shading, nutrient and hydrological effects) • Maintenance of appropriate grazing regime	• No pathway to impact from development pressure, non-native introduction, modification of management regime or tree/scrub encroachment is anticipated due to the distance between this site and Worcestershire's borders.
	Water quality/flow	• Water levels, • Siltation • Eutrophication • Increased sediment and turbidity • Groundwater pollution events	• SAC is upstream of all mineral resource areas within Worcestershire and therefore there are no anticipated hydrological connections to proposed sites. As such there are no anticipated LSE on water quality or flow issues pertaining to this SAC. • Good practice guidance to be adopted in all sites to address risk of surface water ('point source') pollution events.
	Air Quality	• Breaching critical air pollution thresholds for vegetation, e.g. by increased oxides of sulphur, nitrogen compounds and/or ozone.	• No pathway anticipated due to distance of site from Worcestershire's borders.

River Wye	Water quality/flow	• Water quality (particularly sensitive to pollution/eutrophication) • Flow (flow regime should be characteristic of the river). • Abstraction sensitive. • Suspended sediments/siltation • Inappropriate dredging • Artificial barriers to fish migration • Atmospheric pollution - deposition of oxides of nitrogen & sulphur, acidification of river water (deposition of nitrogen & ammonia)	• As a tributary of the Severn the Wye is upstream of Worcestershire's mineral resource areas and as such impacts such as increased siltation, turbidity, abstraction or sedimentation by mineral extraction within Worcestershire is not anticipated. • Obstruction of the Severn (e.g. barriers to fish movement, or which would obstruct the flow of the river) should not be advocated within the MLP. • Where wharfs are advocated or required to transport materials from site to site, policies should be put in place which seek to maintain the normal river characteristics (including flow regime), to address risk of point source pollution events and eutrophication through enrichment of the watercourse.
	Disturbance	• Recreational pressure and disturbance – can lead to disturbance, damage and increases in suspended sediment e.g. footpath erosion, water-based activities • Illegal fish poaching • Spread of introduced non-native species	• Human disturbance pressure is thought to be unlikely to increase unless restoration of a local quarry aims to introduce new amenity attractions which, in turn, could increase footfall to the nearby upstream SAC. Alternatively, would a new amenity resource in proximity to the Natura2000 site draw visitor pressure away from the Wye SAC? Further Green Infrastructure guidance will be required and input from stakeholders is welcome. • Restored quarries could potentially exacerbate

			existing invasive species issues (e.g. restoration to low intervention flood alleviation land could act as a reservoir for Himalayan balsam which could spread upstream along the Wye). Appropriate ecological input to restoration strategies and planning conditions could help protect against the spread of invasive species into the SAC.
Severn Estuary	Water quality/flow	• Pollution events, for example through agricultural run-off or sewage, • Flow regime should be characteristic of the river. • Inappropriate dredging • Erosion • Siltation • Over-fishing • acidification of river water (deposition of nitrogen & ammonia)	• The HRA Screening Assessment for the Worcestershire Waste Core Strategy (ERM, 2009) identified no likely direct or indirect effects, alone or in combination, through disturbance, deposition of air or water pollutants to the saltmarshes of the Severn Estuary, predominantly due to the distance between potential sources and receptors. • Where proposals are thought likely to impact downstream habitats (i.e. by proposed dredging, changes to flow-regime, by introducing increased risk of siltation, eutrophication or turbidity of downstream SACs) a project based EIA will be required to determine whether they pose LSE on the SAC/SPA/Ramsar and appropriate mitigation must be formulated. • Obstruction of the Severn (e.g. barriers to fish movement, or which would obstruct the flow of the river) should not be advocated within the MLP. • Where wharfs are advocated or required to

			transport materials from site to site, policies should be put in place which seek to maintain the normal river characteristics (including flow regime), to address risk of point source pollution events and eutrophication through enrichment of the watercourse. • Extraction of minerals, especially in the riverine terrace (where return or creation of new agricultural land is proposed) should be subject to appropriate water quality control regimes. • The MLP should ensure that policies address risk(s) associated with working near water and advocate for extraction schemes in the riverine terrace which, through sensitive phased operations and aspiration restoration strategies, aim to enhance water quality and the network of wetland habitats in Worcestershire and which do not cause or contribute to water-course degradation, in line with the Water Framework Directive.
	Terrestrial Modification/Disturbance	• Maintenance of appropriate grazing regime, • Recreational/tourism disturbance • Development e.g. dock/harbour creation, coastal defence works	• Any mineral extraction proposals will be in excess of 5km from the SAC borders and therefore no pathway for impacts such as noise or vibrations or increased tourist pressure on restored sites is foreseen which could otherwise impact the bird feeding and roosting habitats for which, in part, this SAC/SPA/Ramsar has been notified.

		• Illegal fish poaching • Spread of introduced non-native species • Artificial barriers to fish migration • Disturbance to bird feeding and roosting habitat (noise / visual)	• Restored quarries could potentially exacerbate existing invasive species issues (e.g. restoration to low intervention flood alleviation land could act as a reservoir for Himalayan balsam which could spread downstream along the Severn). Appropriate ecological input to restoration strategies and planning conditions could help protect against the spread of invasive species into the SAC/SPA/RAMSAR. • Obstruction of the Severn (e.g. barriers to fish movement, or which would obstruct the flow of the river) should not be advocated within the MLP. • Where wharfs are advocated or required to transport materials from site to site, policies should be put in place which seek to maintain the normal river characteristics (including flow regime), to address risk of point source pollution events and eutrophication through enrichment of the watercourse.
	Air Quality	• Breaching critical air pollution thresholds for vegetation, e.g. by increased oxides of sulphur, nitrogen compounds and/or ozone.	• No pathway anticipated due to physical distance between source and receptor; deposition of air pollutants from proposed works is not anticipated.

8. Scoping Conclusions

Summary of primary SAC/SPA/Ramsar Sensitivities[18] and Pathways

8.1 A summary of identified European sites sensitivities and likely pathways to impact from the activities outlined in Table 5 is presented in below, in Table 10.

Table 10 -

Consideration of Natura2000 sites: impact sensitivities and potential pathways to a Likely Significant Effect (in the absence of direct land-take and with embedded appropriate mitigation measures as per Table 6**).**

	Terrestrial Modifications e.g. habitat fragmentation, severance, erosion, subsidence, development pressure. etc..		**Disturbance** e.g. lighting, noise, vibration, recreational pressure, introduction of non-natives, selection of plants or animals, inappropriate grazing etc...		**Water Levels & Quality** e.g. enrichment, contamination, siltation, turbidity, flow modification, sediment, dredging etc...		**Air Pollution** e.g. diffuse pollution, acidification, nitrogen oxide/sulphur dioxide levels, ozone etc...	
	Sensitivity	**Pathway**	**Sensitivity**	**Pathway**	**Sensitivity**	**Pathway**	**Sensitivity**	**Pathway**
European sites within Worcestershire								
Bredon Hill SAC	X	X	✓	X	X	X	X	X
Lyppard Grange Ponds	✓	X	✓	X	✓	X	X	X
European sites within 15km of Worcestershire								
Dixton Woods SAC	X	X	✓	X	X	X	X	X
Downton Gorge SAC	X	X	✓	X	✓	X	✓	X
Walmore Common SAC	X	X	X	X	✓	X	X	X
Fen Pools SAC	✓	X	✓	X	✓	X	X	X
River Wye/Afon Gwy SAC	✓	X	✓	X	✓	X	X	X
European sites within 20km of Worcestershire								
Severn Estuary SAC/SPA/RAMSAR	X	X	✓	X	✓	X	X	X

[18] Based on: Appendix B: Sensitivities of European sites to different types of impact – West Midlands RSS Phase 3 HRA of Regional Interim Policy Statement on Construction Aggregate, March 2010. Also based on data in: Table A.1.1 "Summary Sensitivity Matrix", Worcestershire County Council Waste Core Strategy HRA Screening Document, August 2009. Also based on transcript of letter 34045-South Worcestershire: Feedback on draft HRA for South Worcestershire Development Plan, provided by Natural England dated 18th November 2011.

9. Summary and Invitation for Comments

9.1. The HRA Scoping Assessment has identified potential effects of mineral working and highlighted potential in-combination effects with other plans and policies on SACs within a 15km radius of Worcestershire's borders.

9.2. This assessment is based on broad mineral resource areas (refer to Appendix 2) and not on individual site allocations, specific Minerals Local Plan policies, or on the details of individual proposals which will emerge over time.

9.3. This assessment is based on a set of assumptions and presents a range of appropriate avoidance/mitigation measures and best practice approaches aimed to ensure the effects identified here can be avoided. If these cannot be embedded into the MLP it is much more likely that a LSE to one or more Natura2000 site(s) will occur. An Appropriate Assessment would be required to examine the likely interactions in more detail.

9.4. This Assessment does not remove the need for later Habitats Regulations Assessment of any other plans, projects, or permissions associated with, or arising out of, the measures identified in the MLP. Acceptance that the MLP is consistent, so far as can be ascertained, with the Habitats Regulations does not guarantee that any plan or project derived from the Plan will also be found consistent.

9.5. These findings are subject to consultation comments and advice from Natural England and wider stakeholders.

Appendix 1. Location and boundaries of local Natura2000 sites.

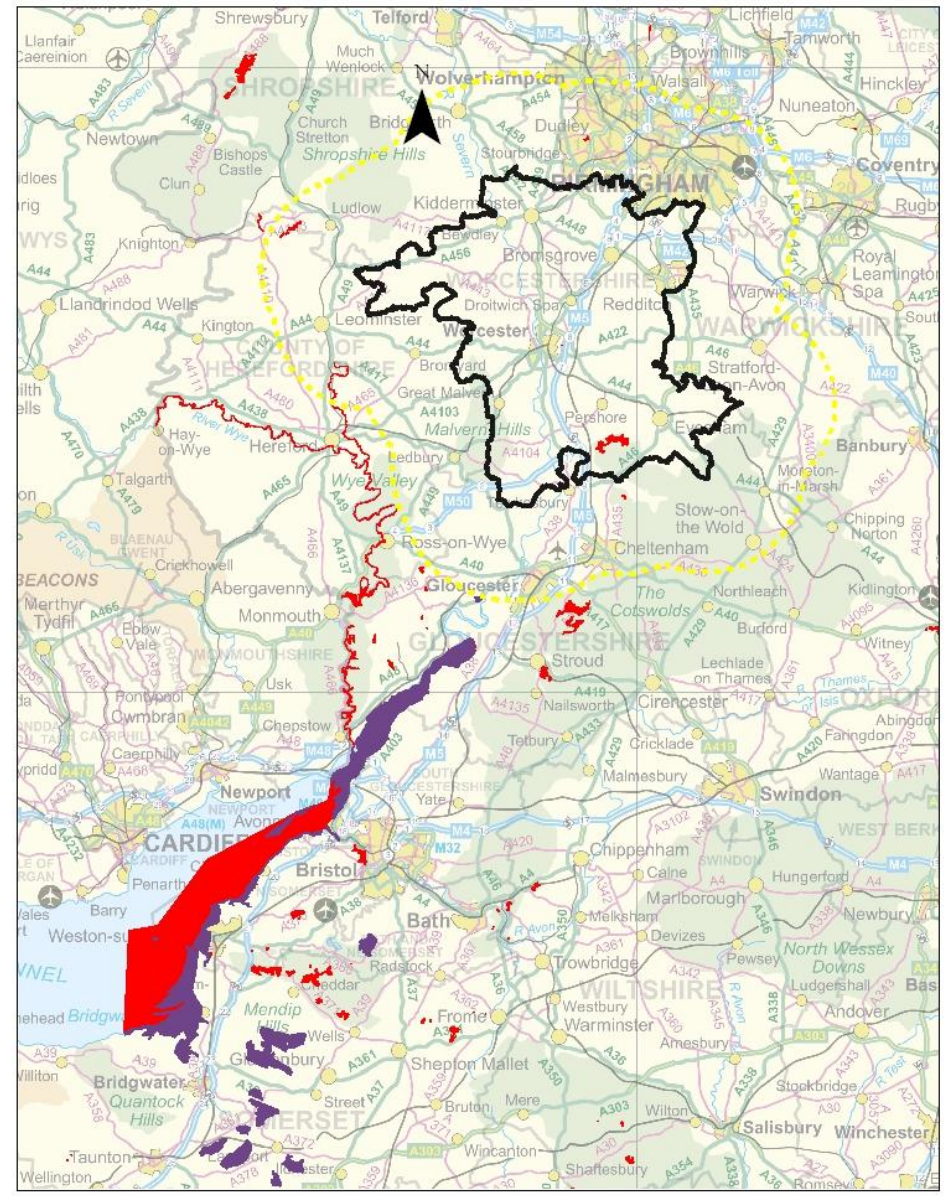
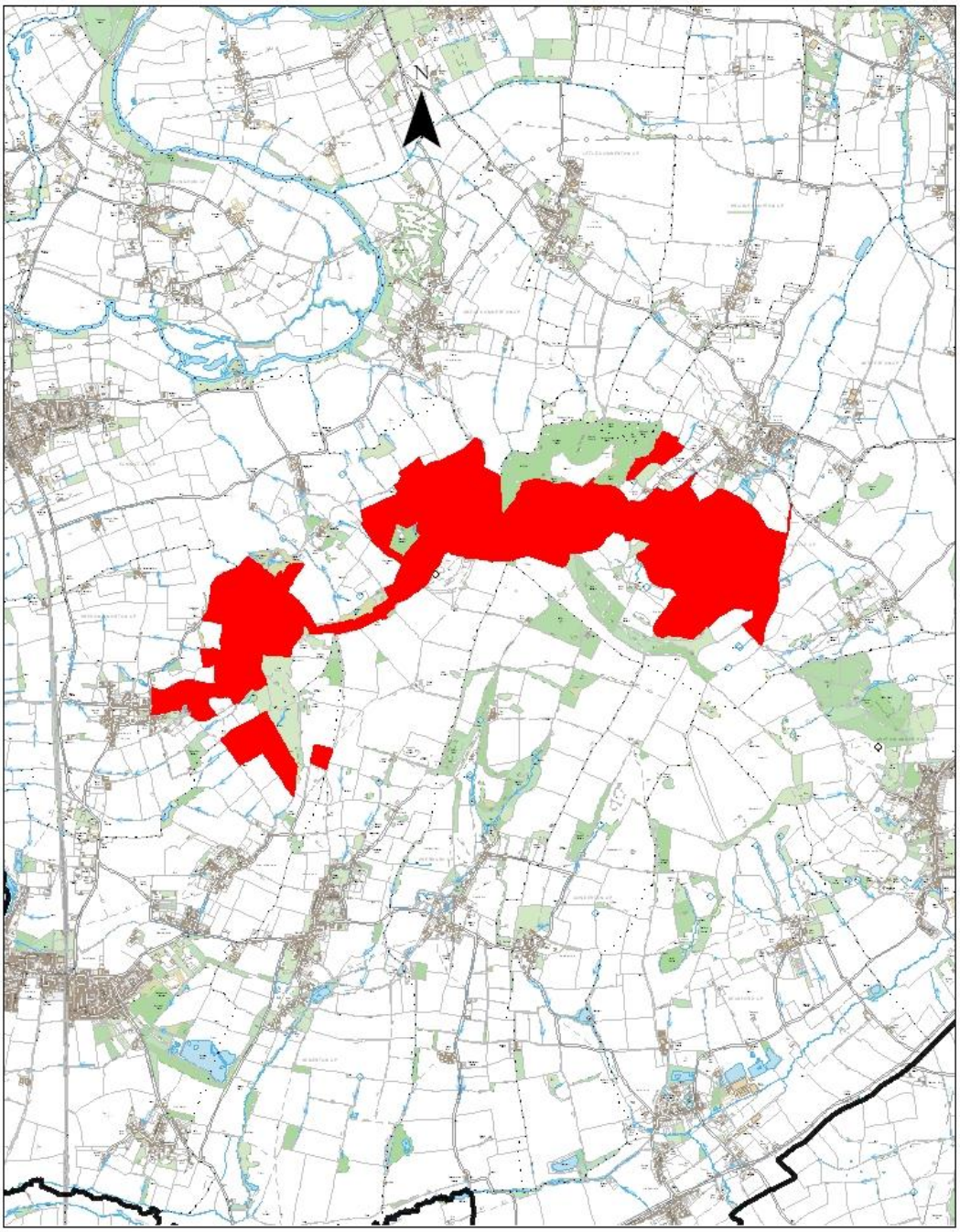


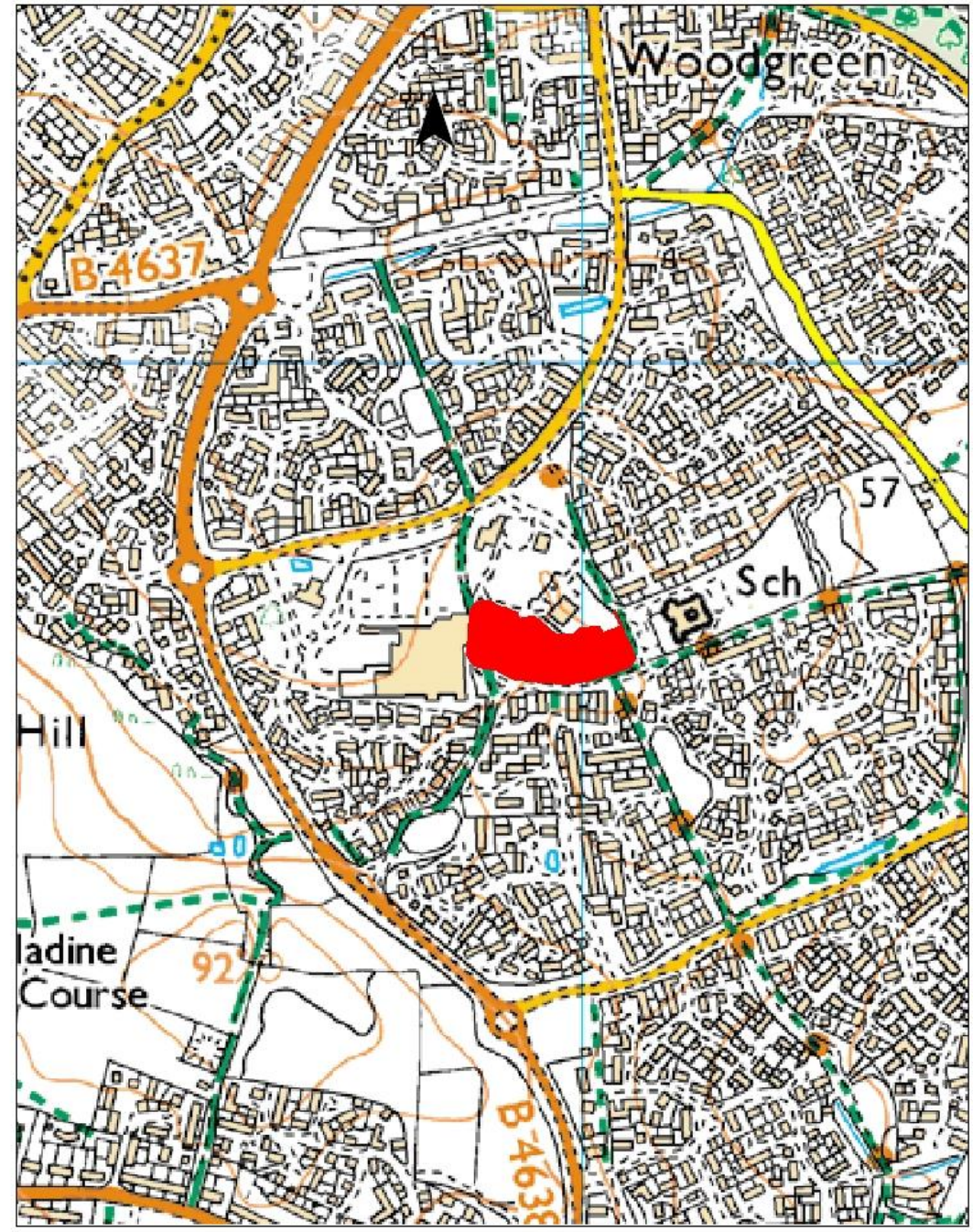
Figure 1: Showing overview of Worcestershire and surrounding Natura2000 sites identified within this report. SACs marked in red, SPAs marked in purple, 15km County boundary marked in yellow. Detailed plans below.



worcestershire county council
County Hall
Spetchley Road
Worcester
WR5 2NP

0 0.15 0.3 0.6 0.9 1.2 1.5
Kilometers

Figure 2: Bredon Hill SAC



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County Hall
Spetchley Road
Worcester
WR5 2NP

0 0.025 0.05 0.1 0.15 0.2 0.25
Kilometers

Figure 3: Lyppard Grange Ponds SAC

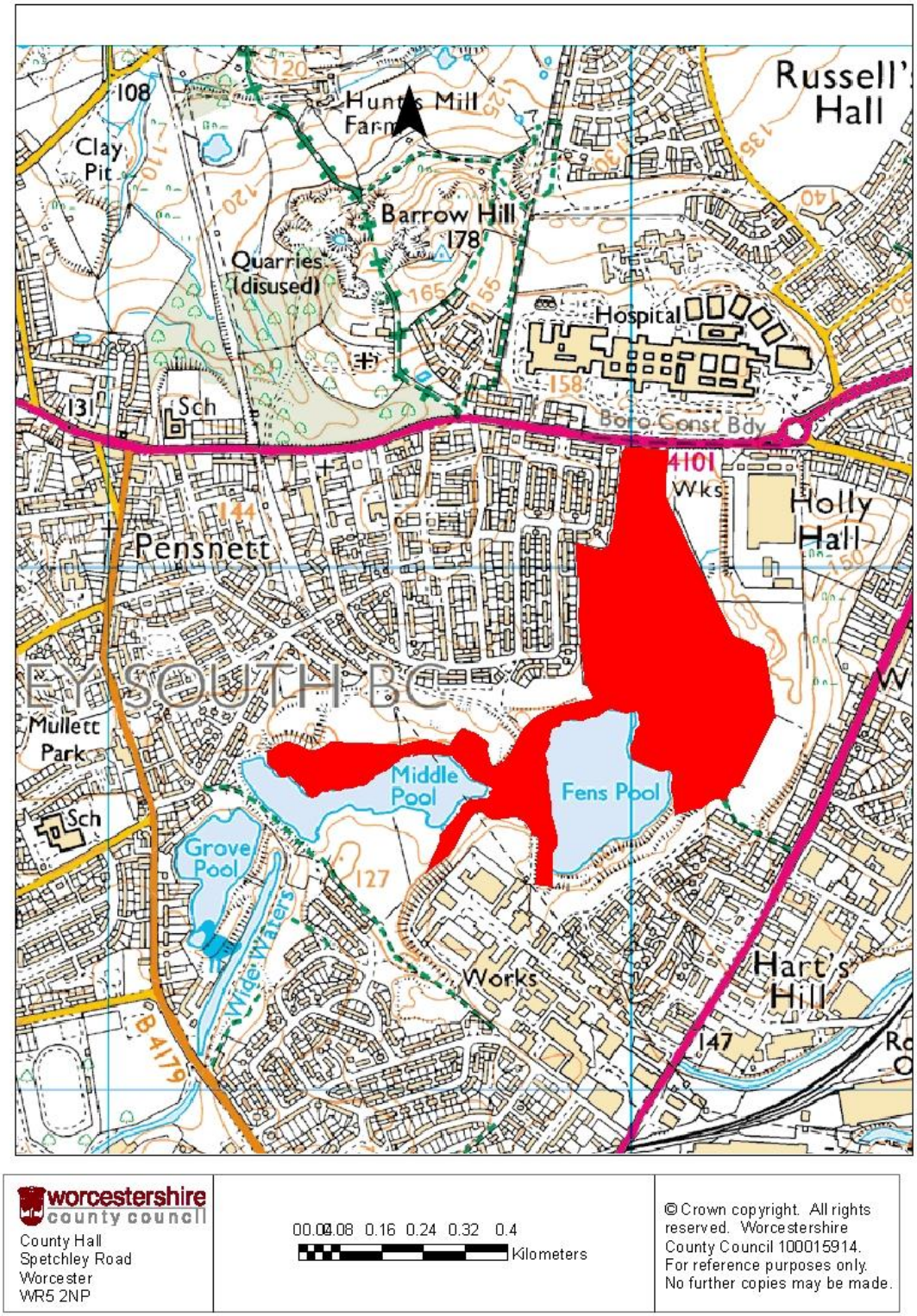
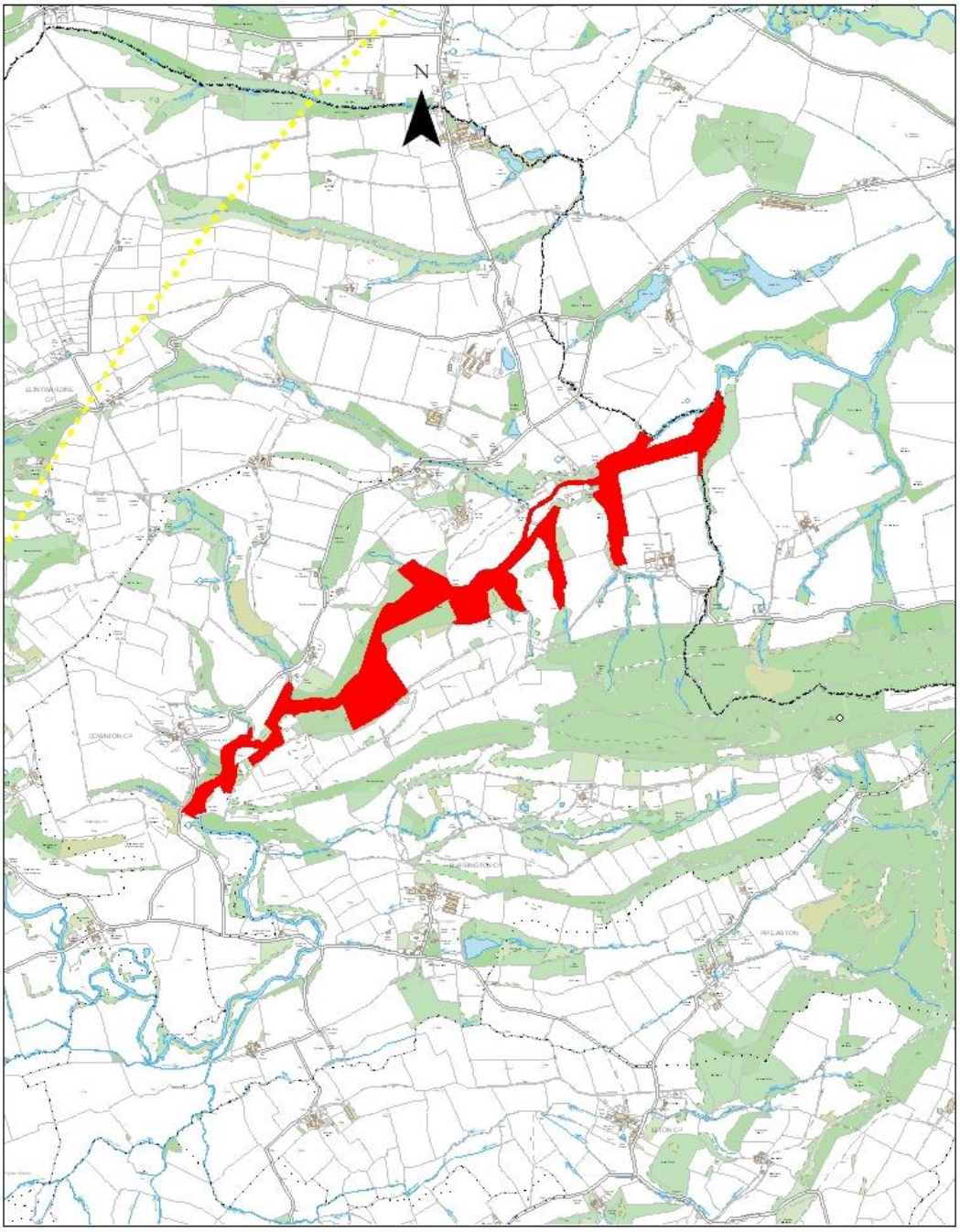


Figure 4: Fen Pools SAC



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Worcester
WR5 2NP

0 0.15 0.3 0.6 0.9 1.2 1.5
Kilometers

Figure 5: Downton Gorge SAC

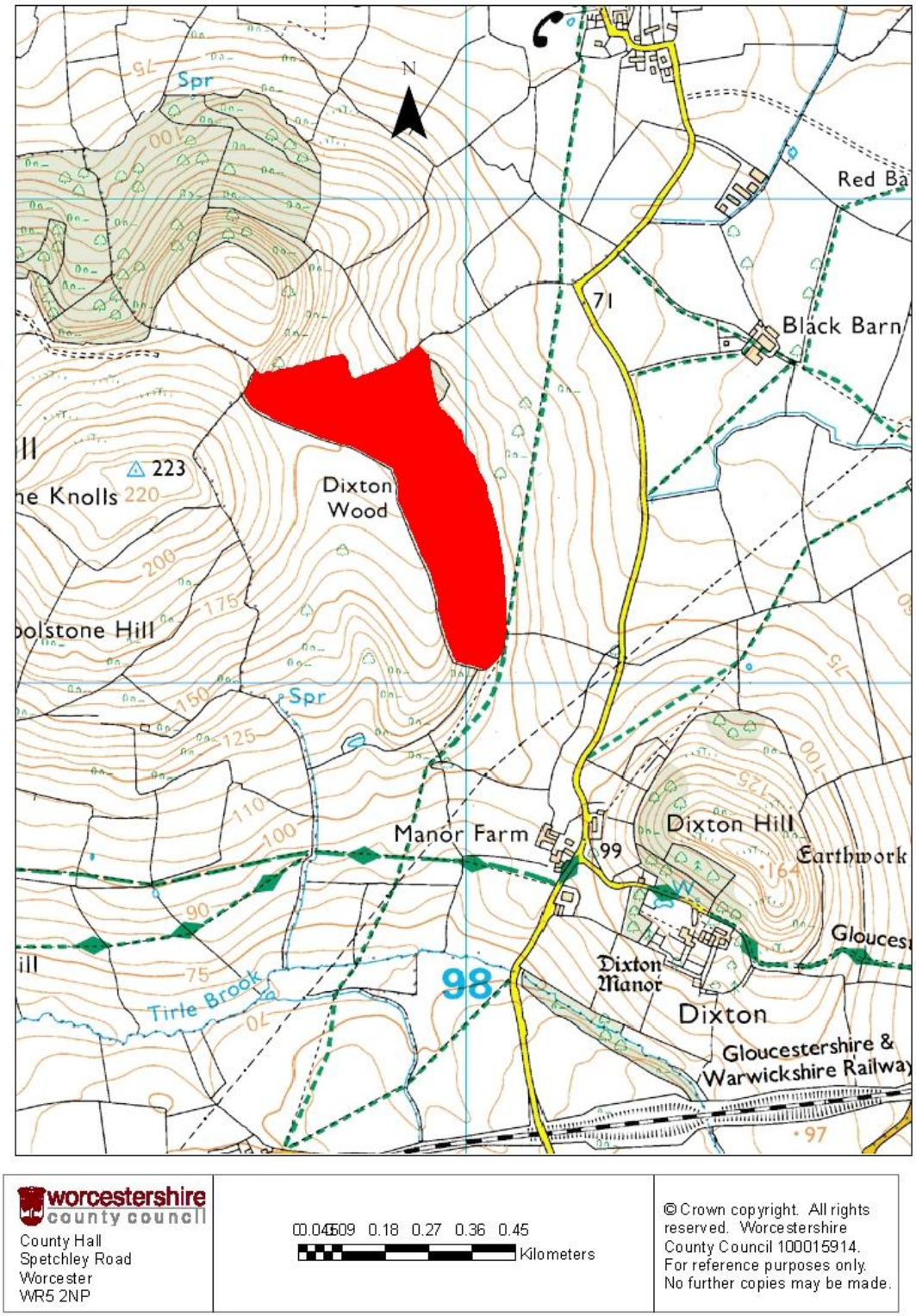


Figure 6: Dixton Woods SAC

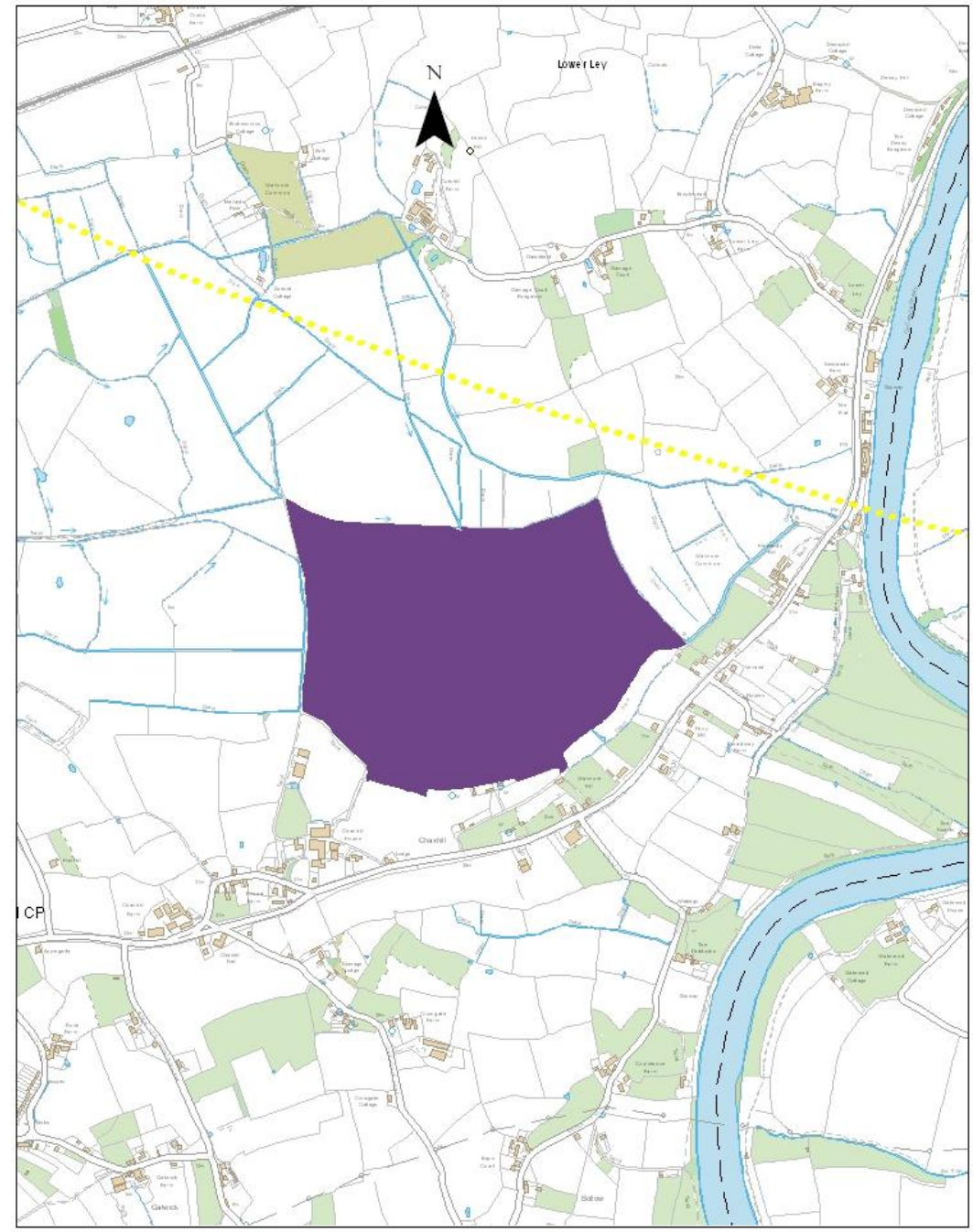


Figure 7: Walmore Common SPA

Figure 8: River Wye SAC

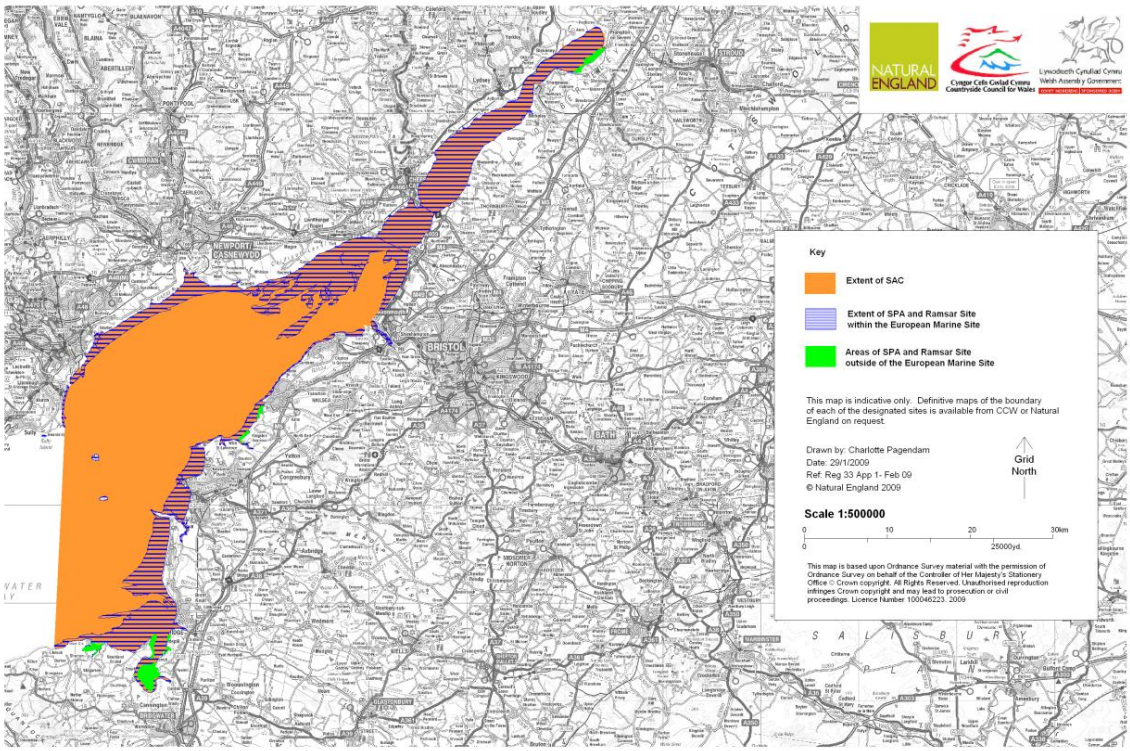


Figure 9: Severn Estuary SAC, SPA & RAMSAR.

Appendix 2. Showing Illustrative Mineral Resource Areas

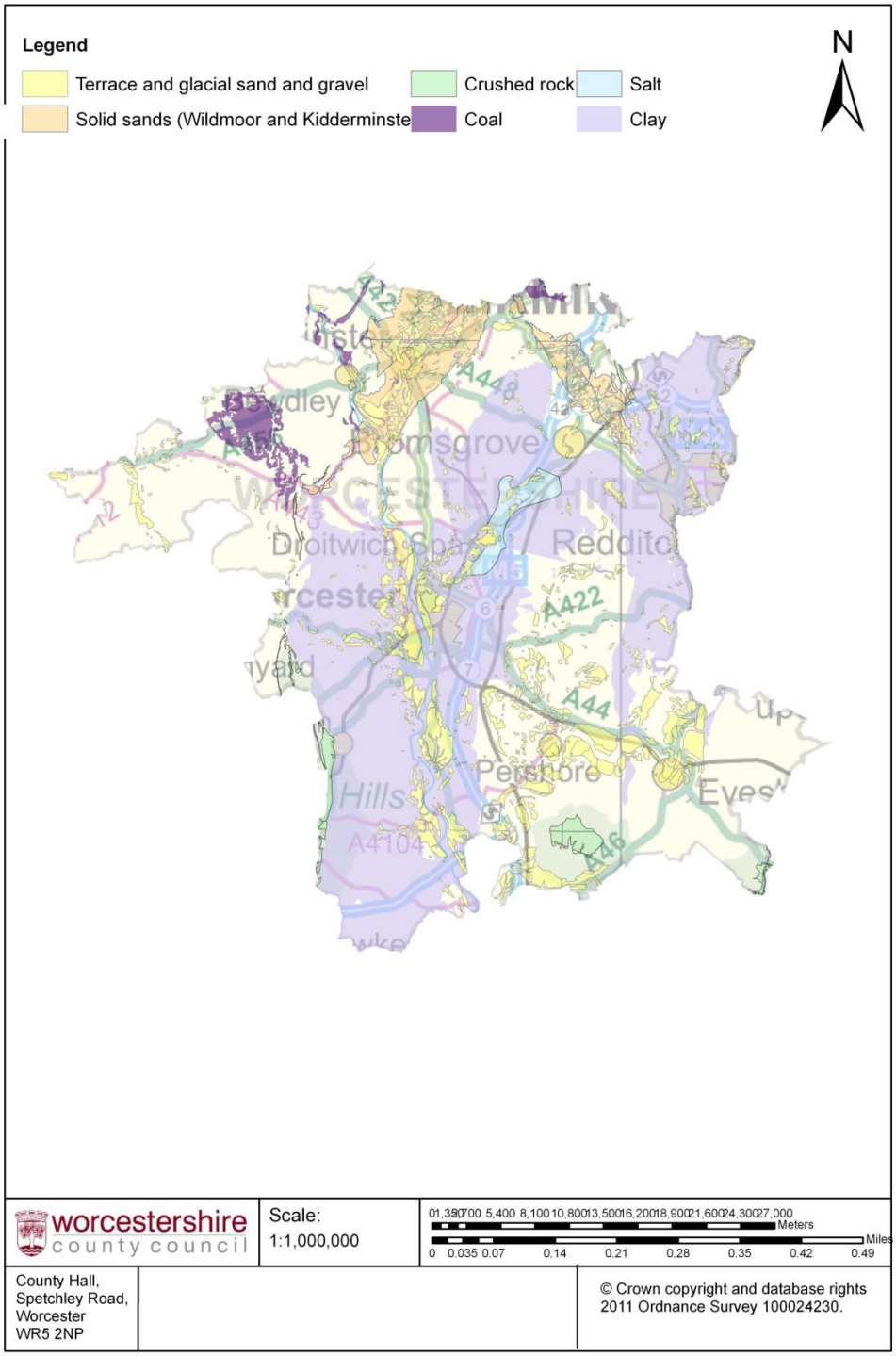


Figure 10: Overview of known County Mineral Resource Areas (details below)

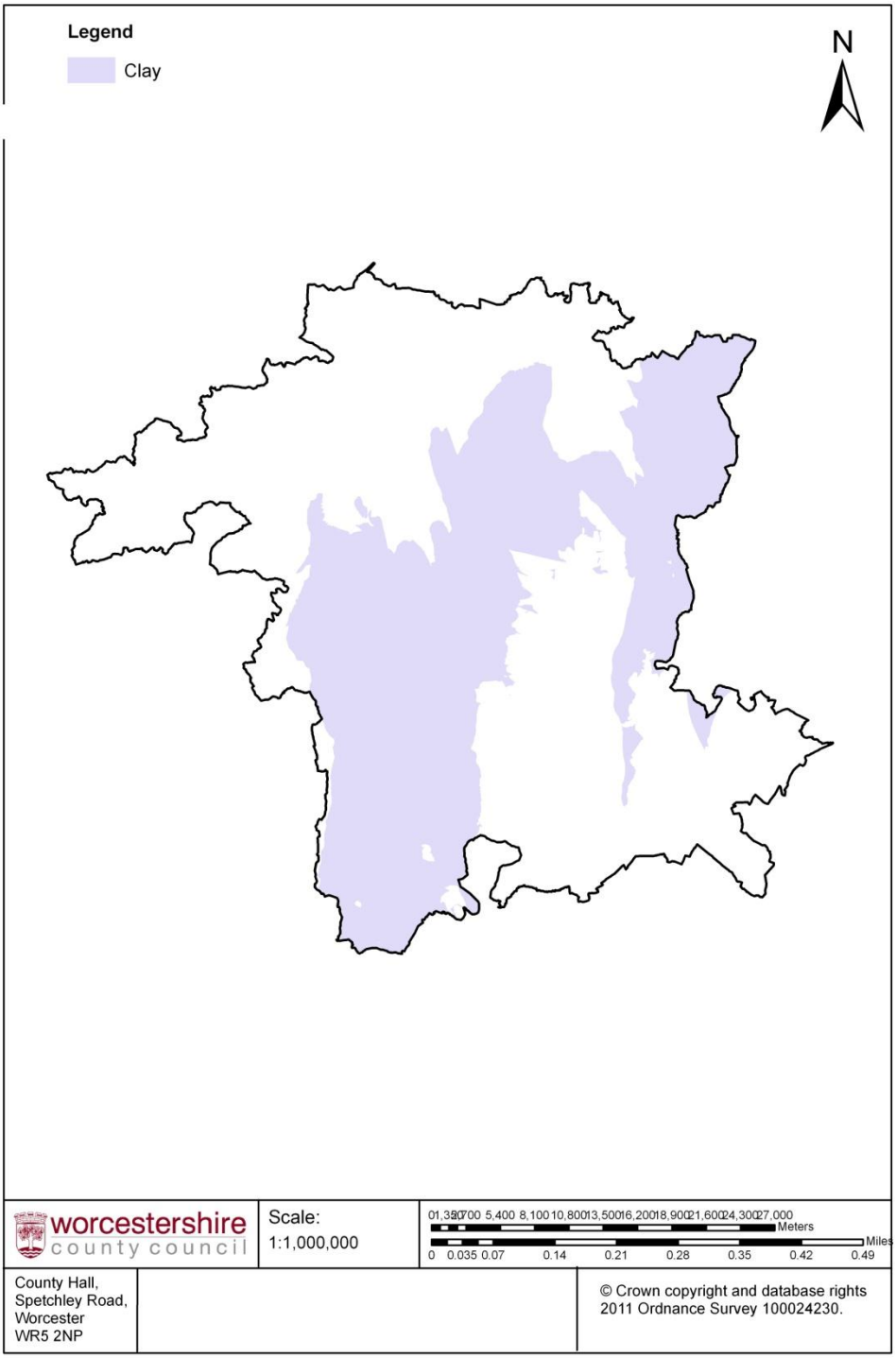


Figure 11: Showing County Clay Mineral Resource Area

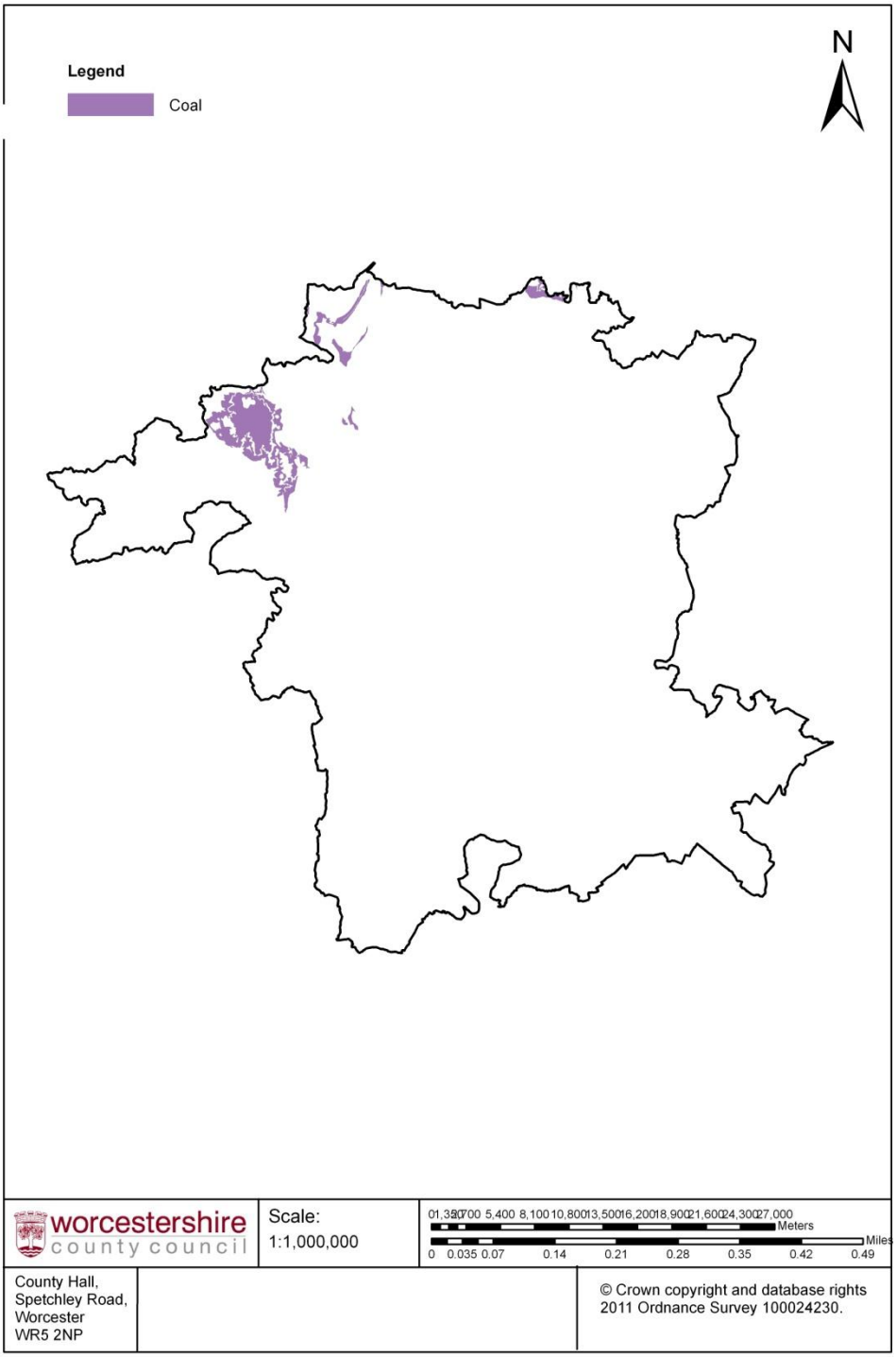


Figure 12: Showing County Coal Mineral Resource Area

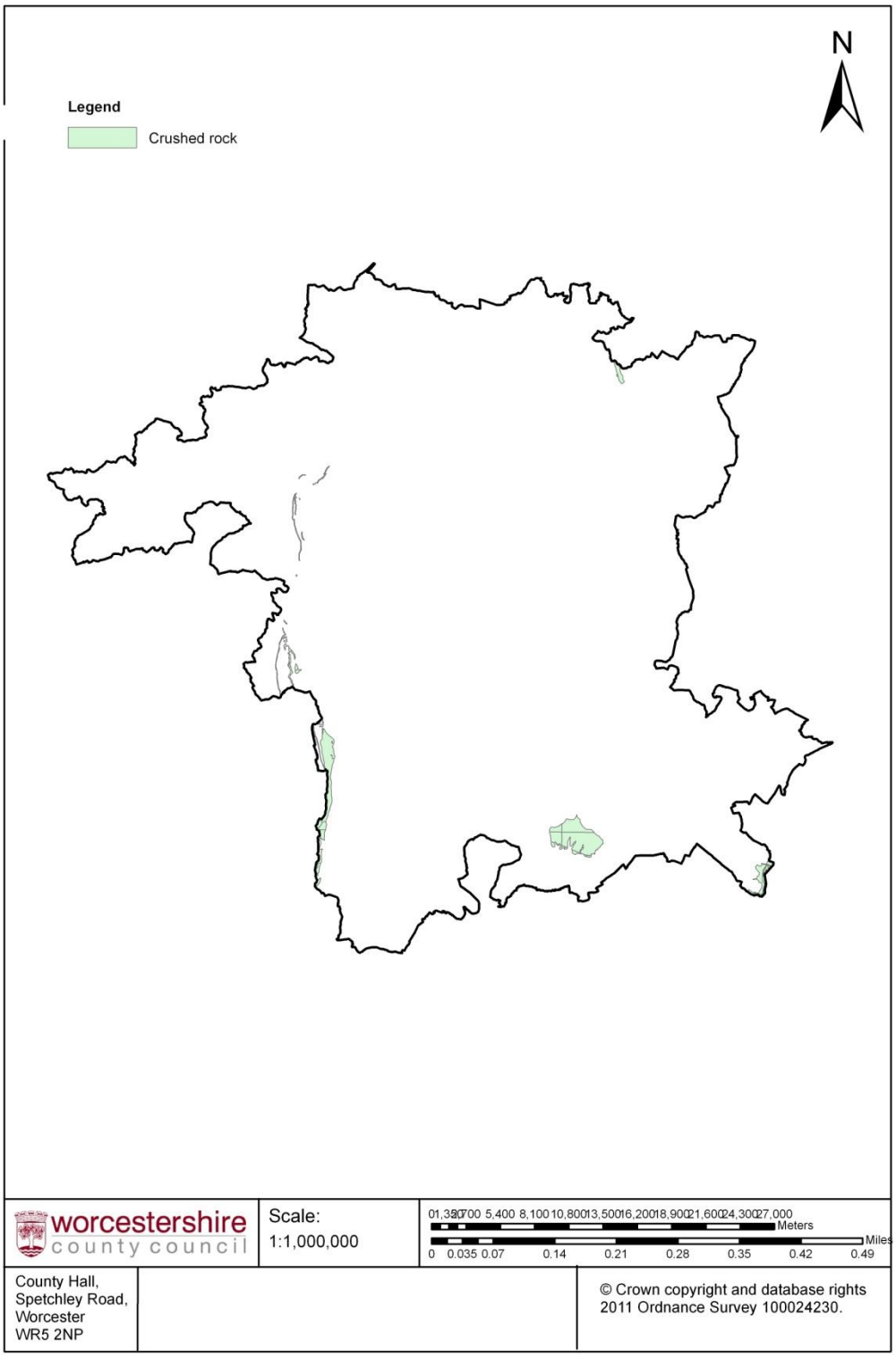


Figure 13: Showing County Crushed Rock Mineral Resource Area

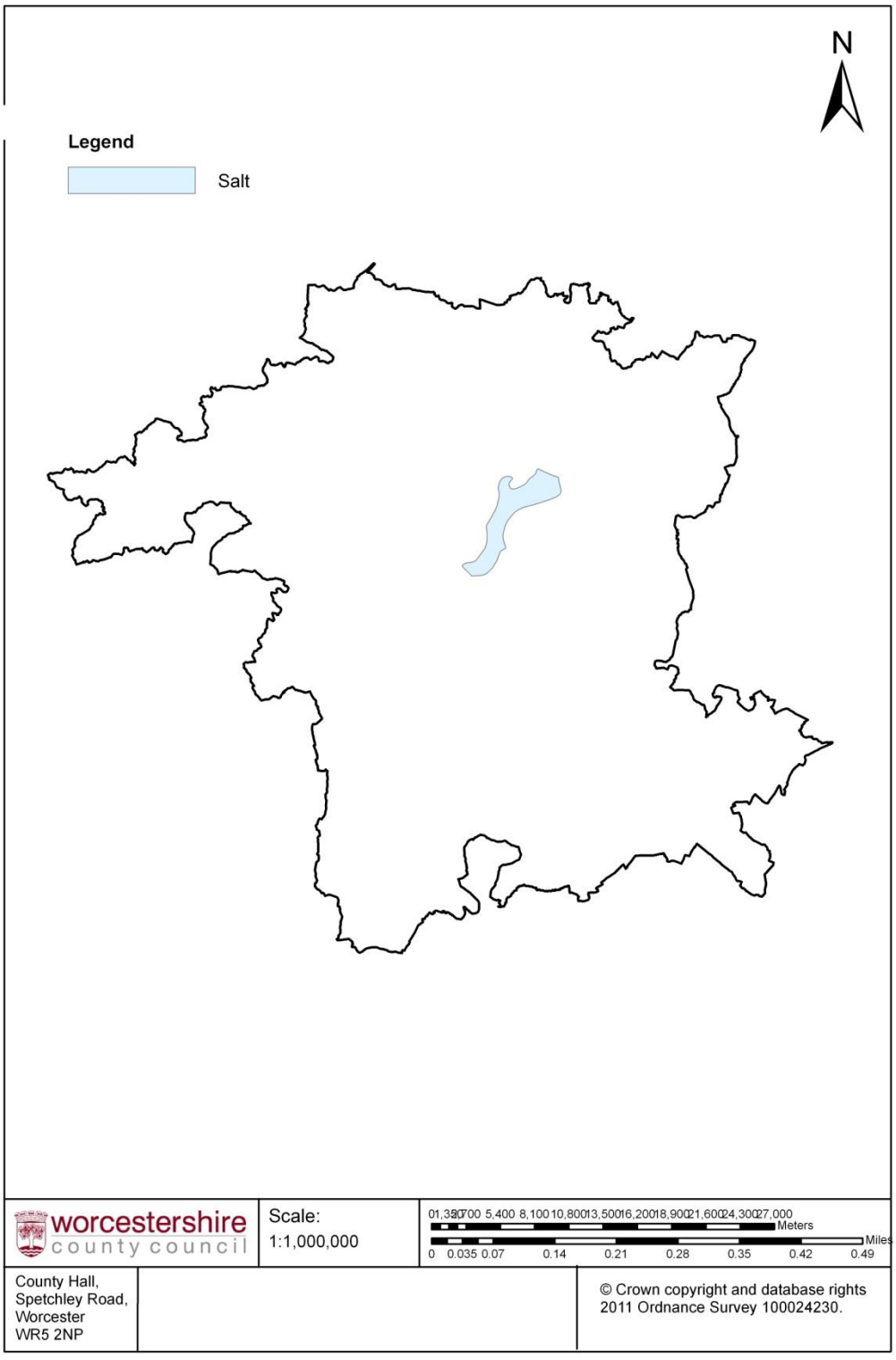


Figure 14: Showing County Salt Mineral Resource Area

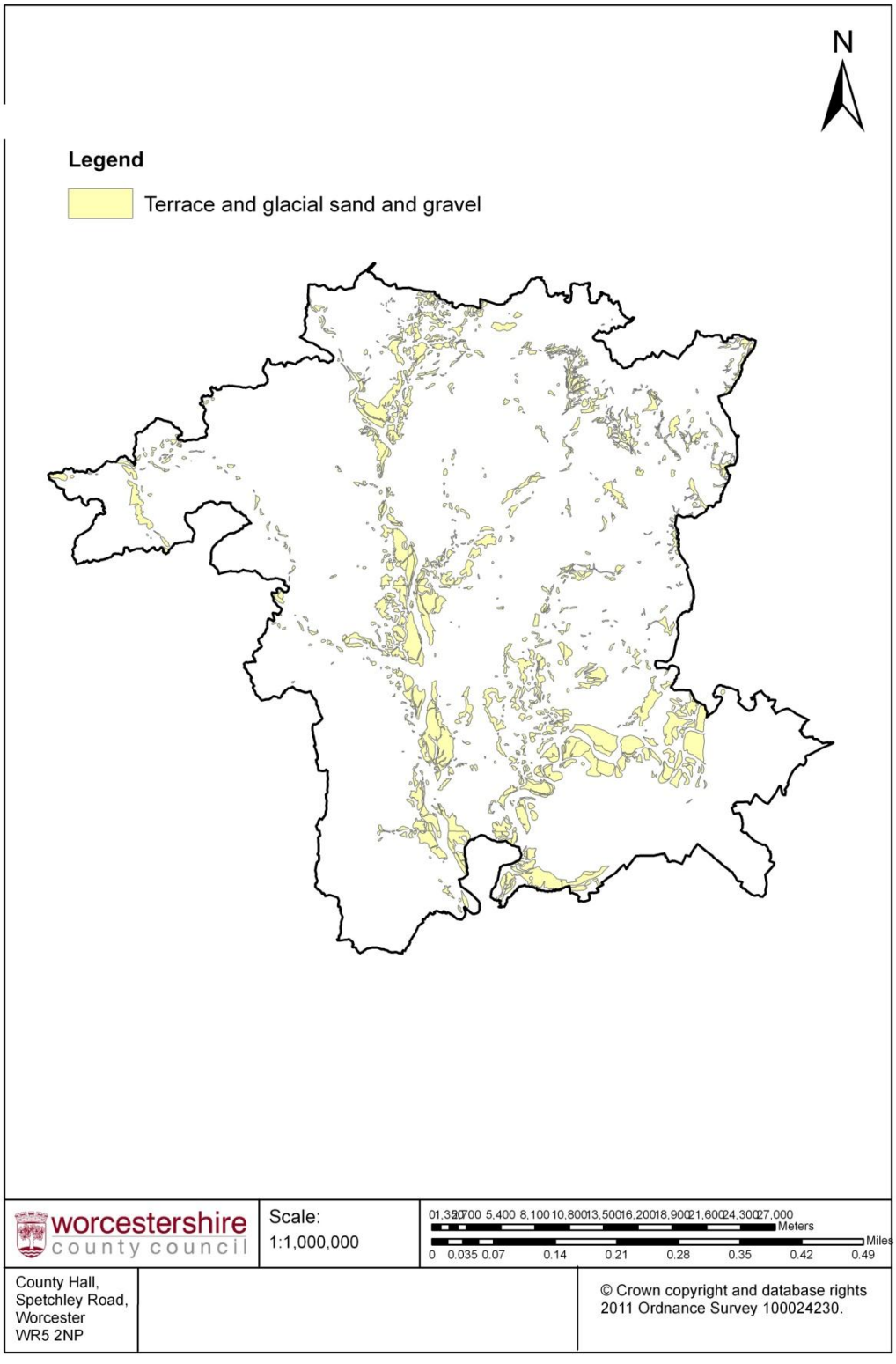


Figure 15: Showing Terrace and Glacial County Sand and Gravel Mineral Resource Area

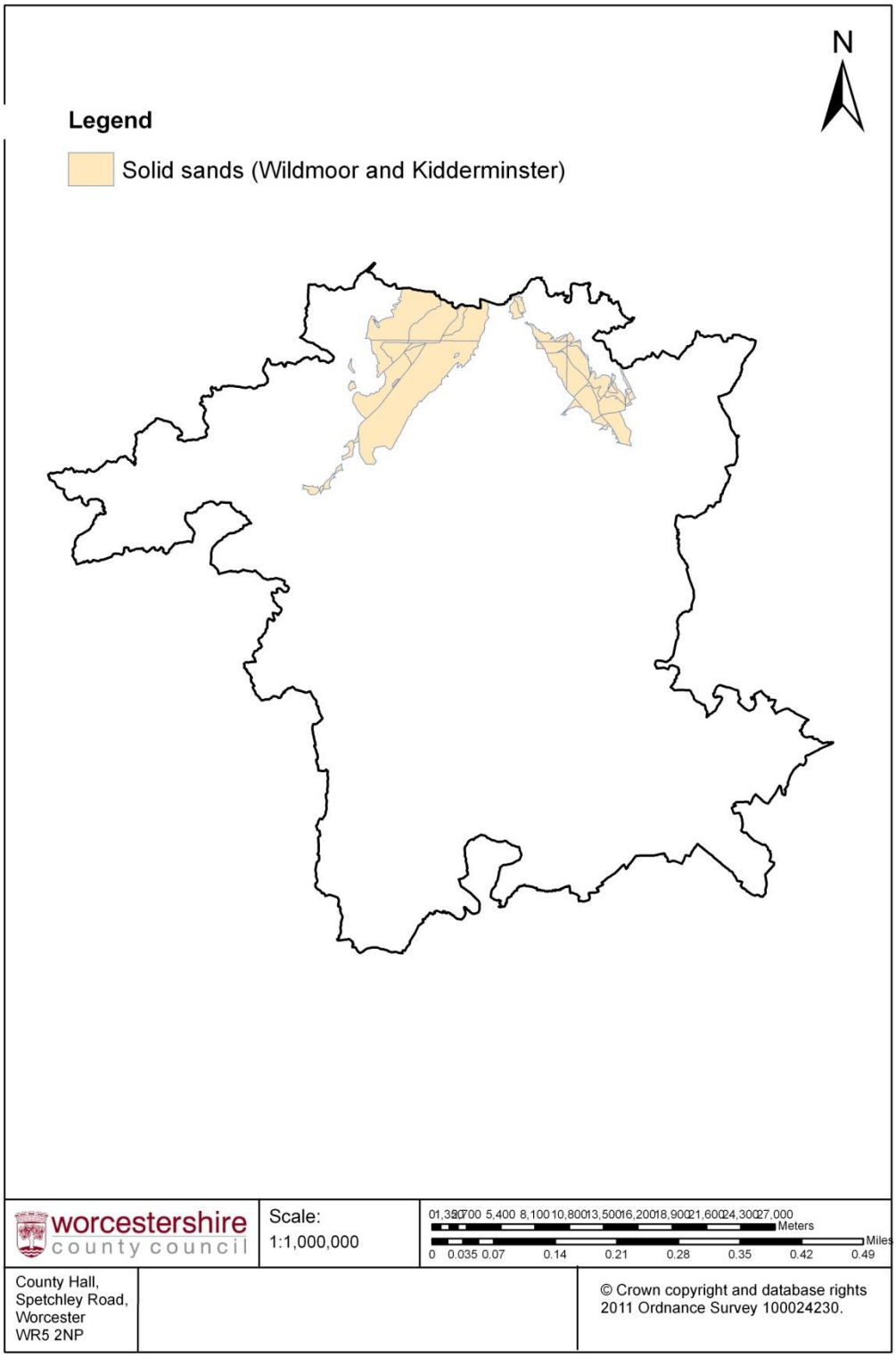


Figure 16: Showing County Sandstone Mineral Resource Area

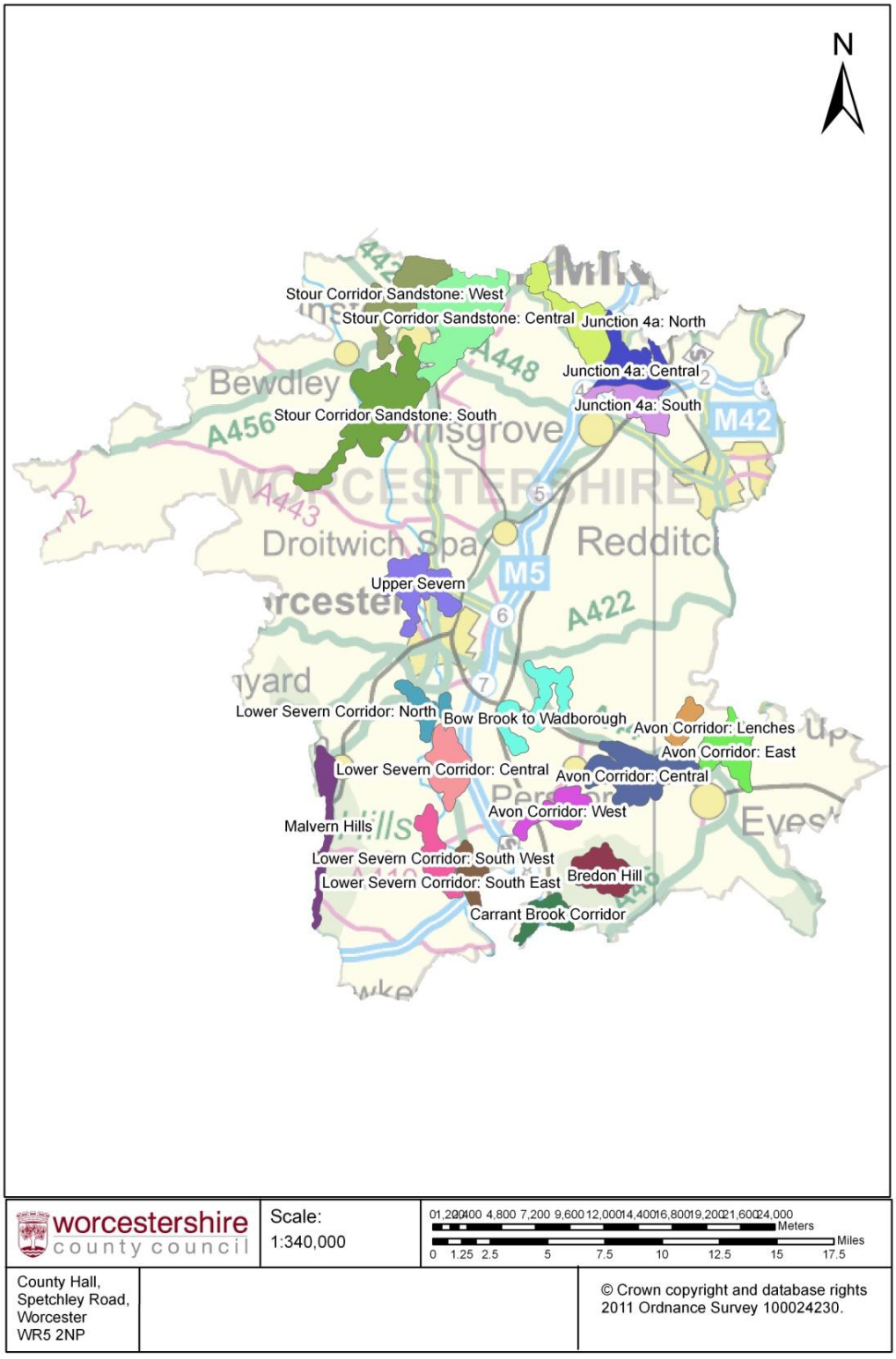


Figure 17: Showing an overview of the emerging Minerals Areas of Search (AoS) as of October 2013.

Appendix 3. Natura2000 sites with illustrative proximity buffers

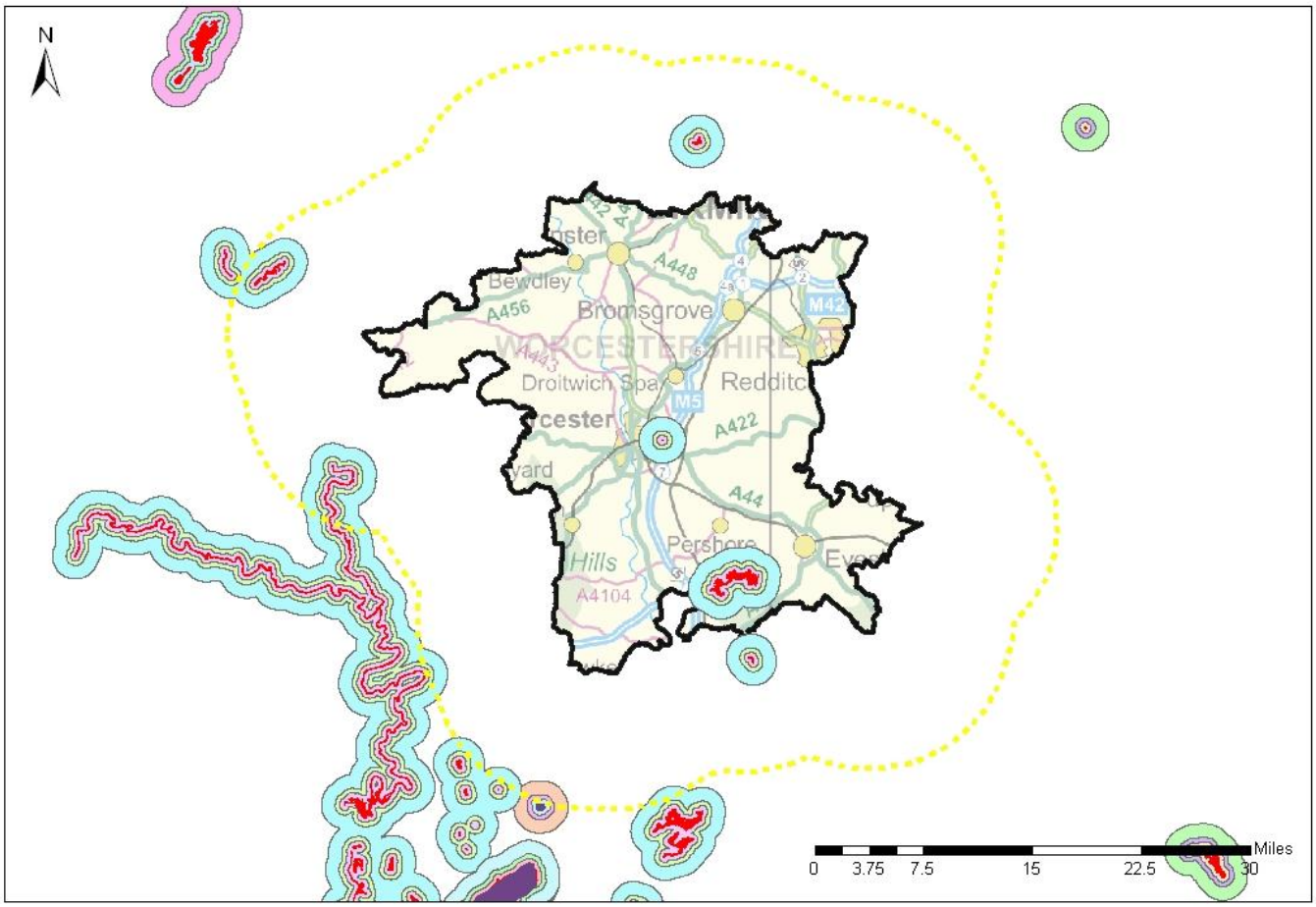
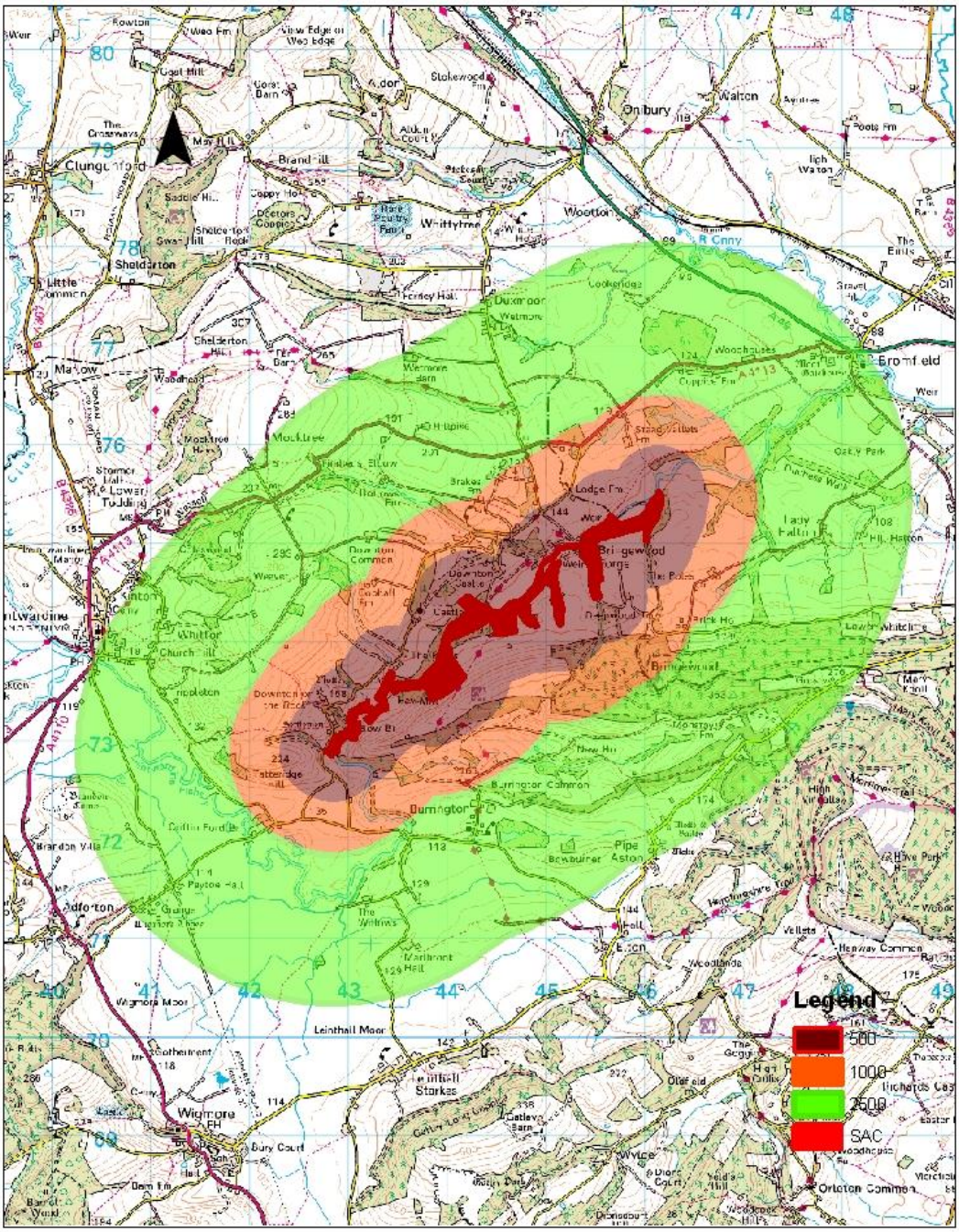


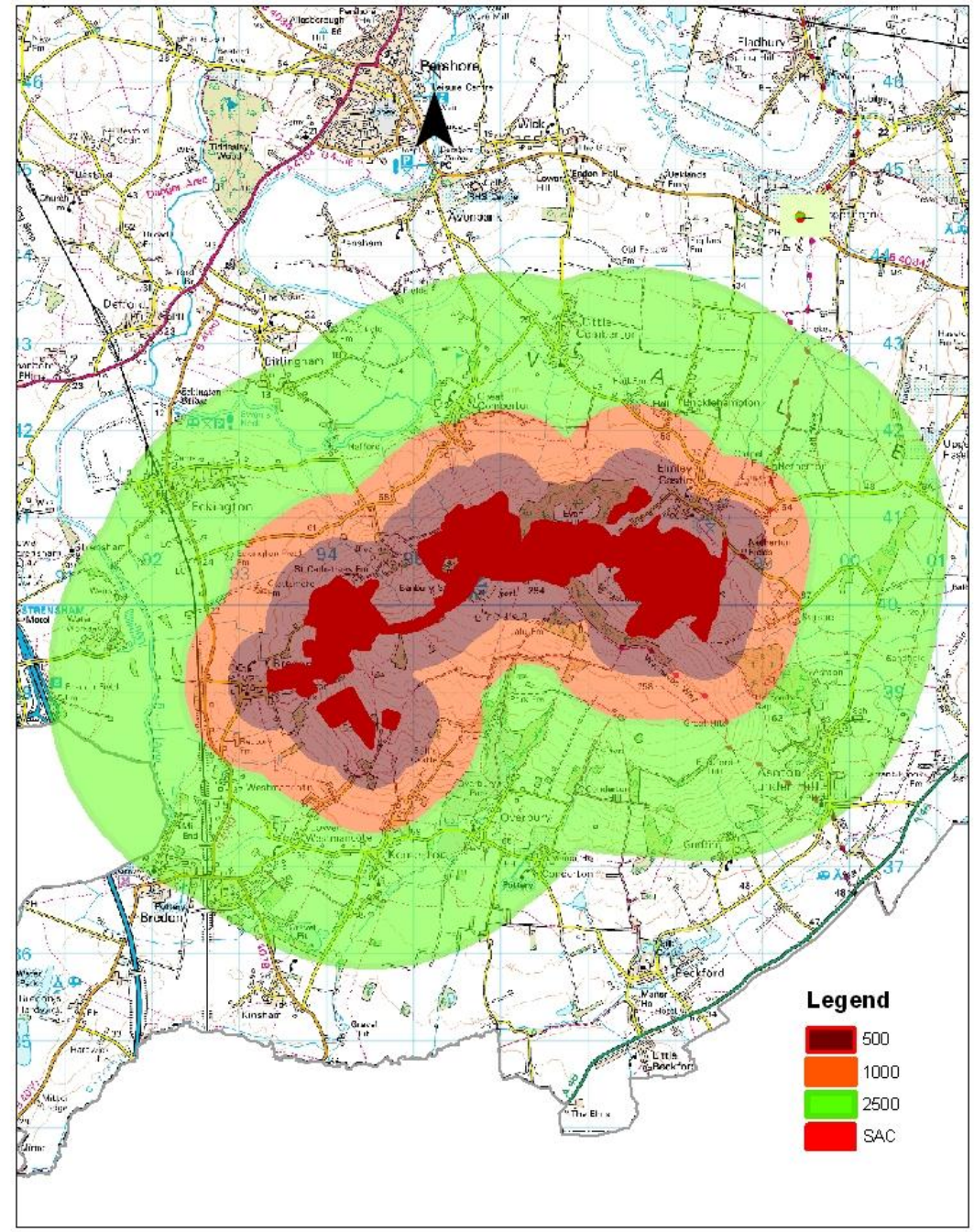
Figure 17: Showing Natura2000 site overview with 500, 1000 and 2500 meter proximity buffers highlighted.



worcestershire county council
County Hall
Spetchley Road
Worcester
WR5 2NP

0 0.25 0.5 1 1.5 2 2.5 Kilometers

Figure 18: Downton Gorge SAC – showing site boundaries and proximity buffers.



worcestershire county council
County Hall
Spetchley Road
Worcester
WR5 2NP

0 0.25 0.5 1 1.5 2 2.5
Kilometers

Figure 19: Bredon Hill SAC – showing site boundaries and proximity buffers.

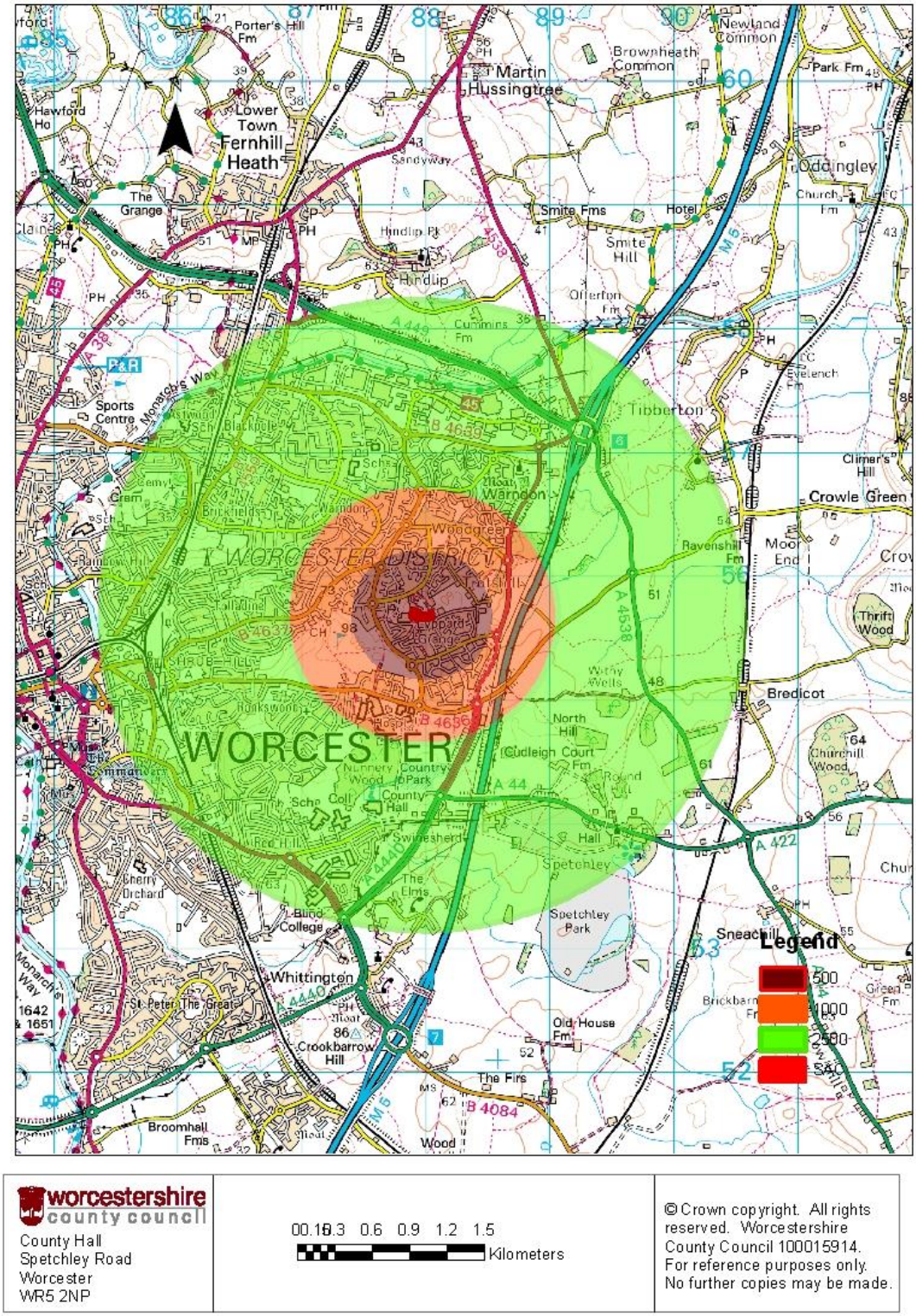


Figure 20: Lyppard Grange Ponds SAC – showing site boundaries and proximity buffers.

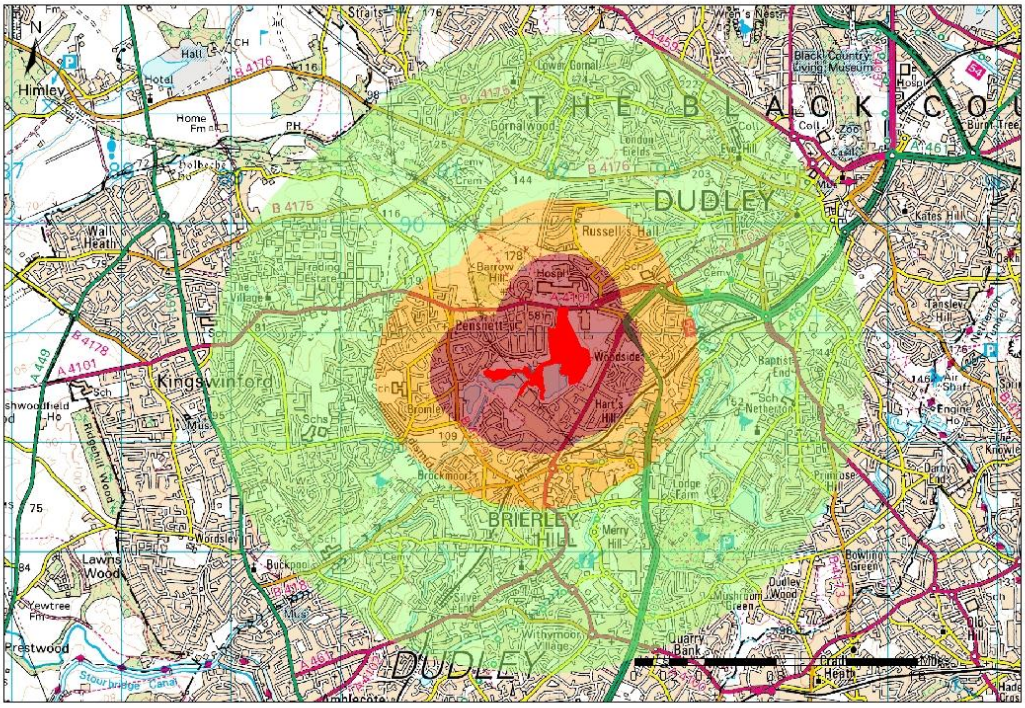


Figure 21: Fen Pools SAC – showing site boundaries and proximity buffers.

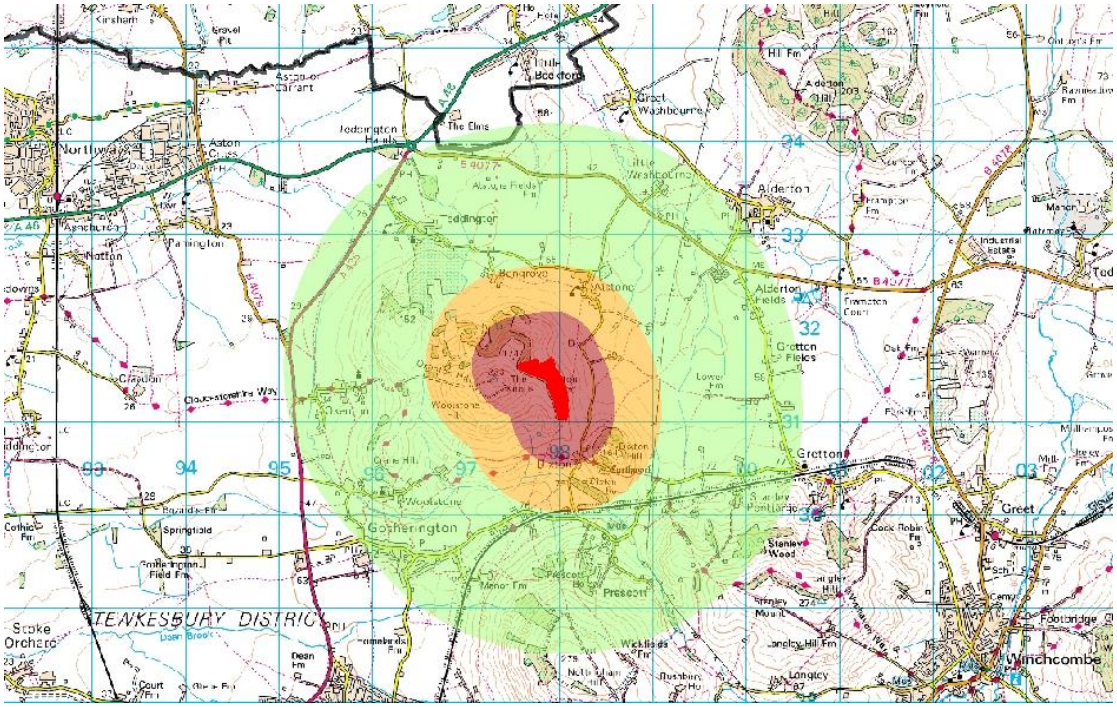


Figure 22: Dixton Woods SAC – showing site boundaries and proximity buffers.

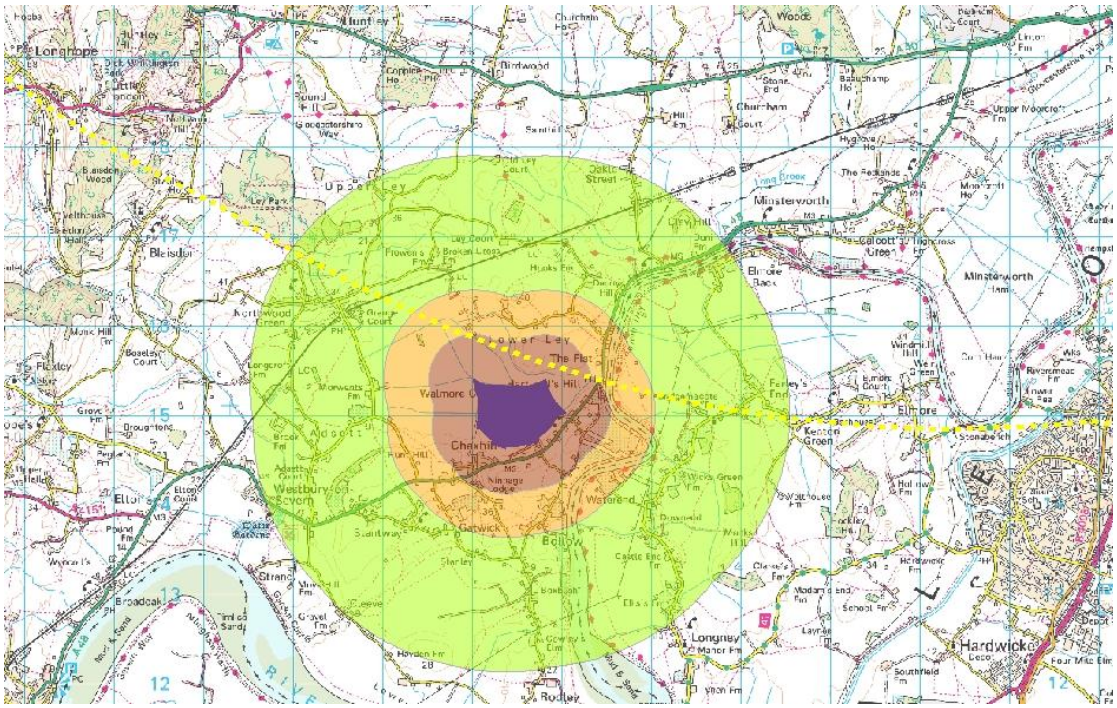


Figure 23: Walmore Common SPA – showing site boundaries and proximity buffers. The 15km Worcestershire county boundary buffer is highlighted in dotted yellow.

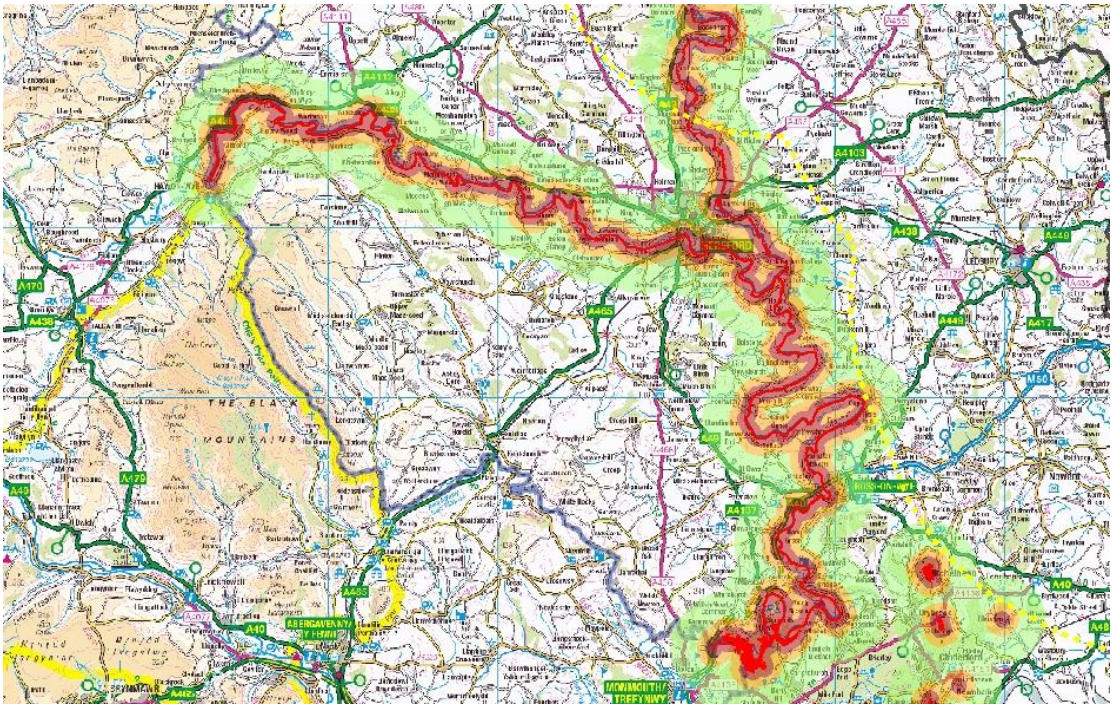


Figure 24: River Wye SAC – showing site boundaries and proximity buffers. 15km Worcestershire county border buffer (Western county border) is shown in dotted yellow, right of frame.

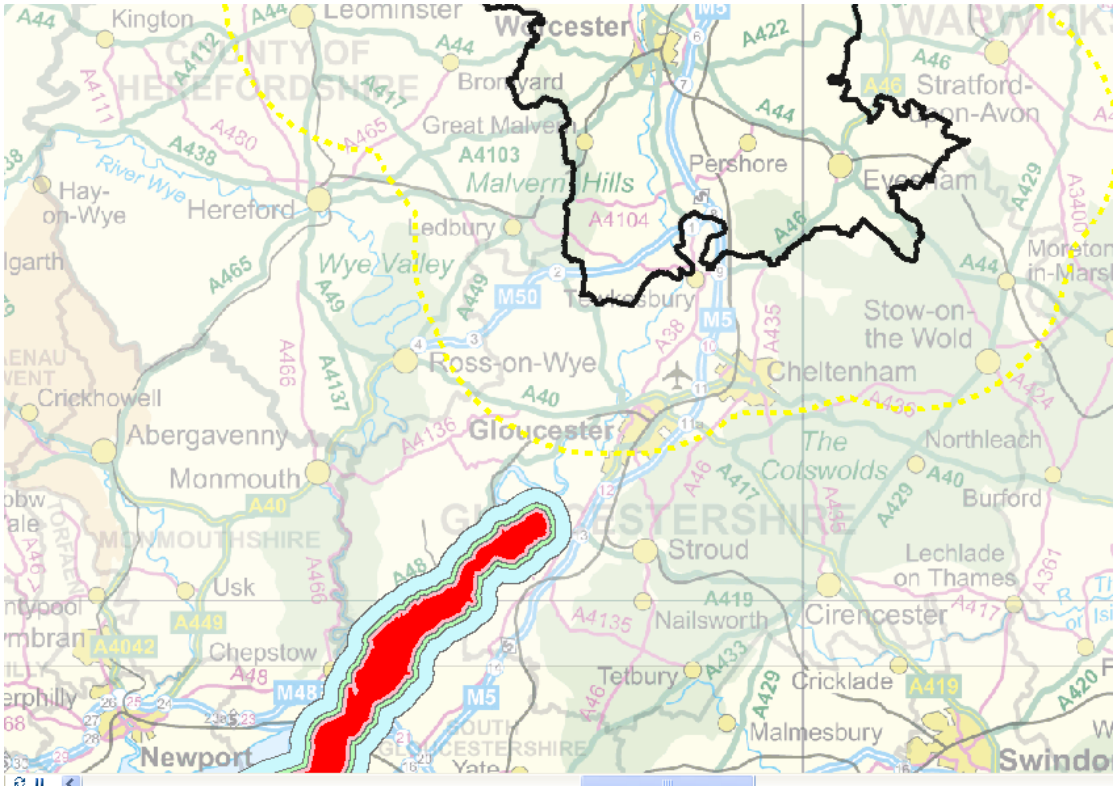


Figure 25: Plan showing upper reaches of the Severn Estuary SAC/SPA?RAMSAR and relationship with Worcestershire's county border. A 15km buffer around Worcestershire's county border is highlighted in yellow. Proximity buffers of 500, 1000 and 2500m around the Severn Estuary designated site boundary are highlighted.

Appendix 4. Showing Natura2000 sites within Worcestershire where identified Mineral Resource Areas occur within each site's proposed geographical proximity buffers.

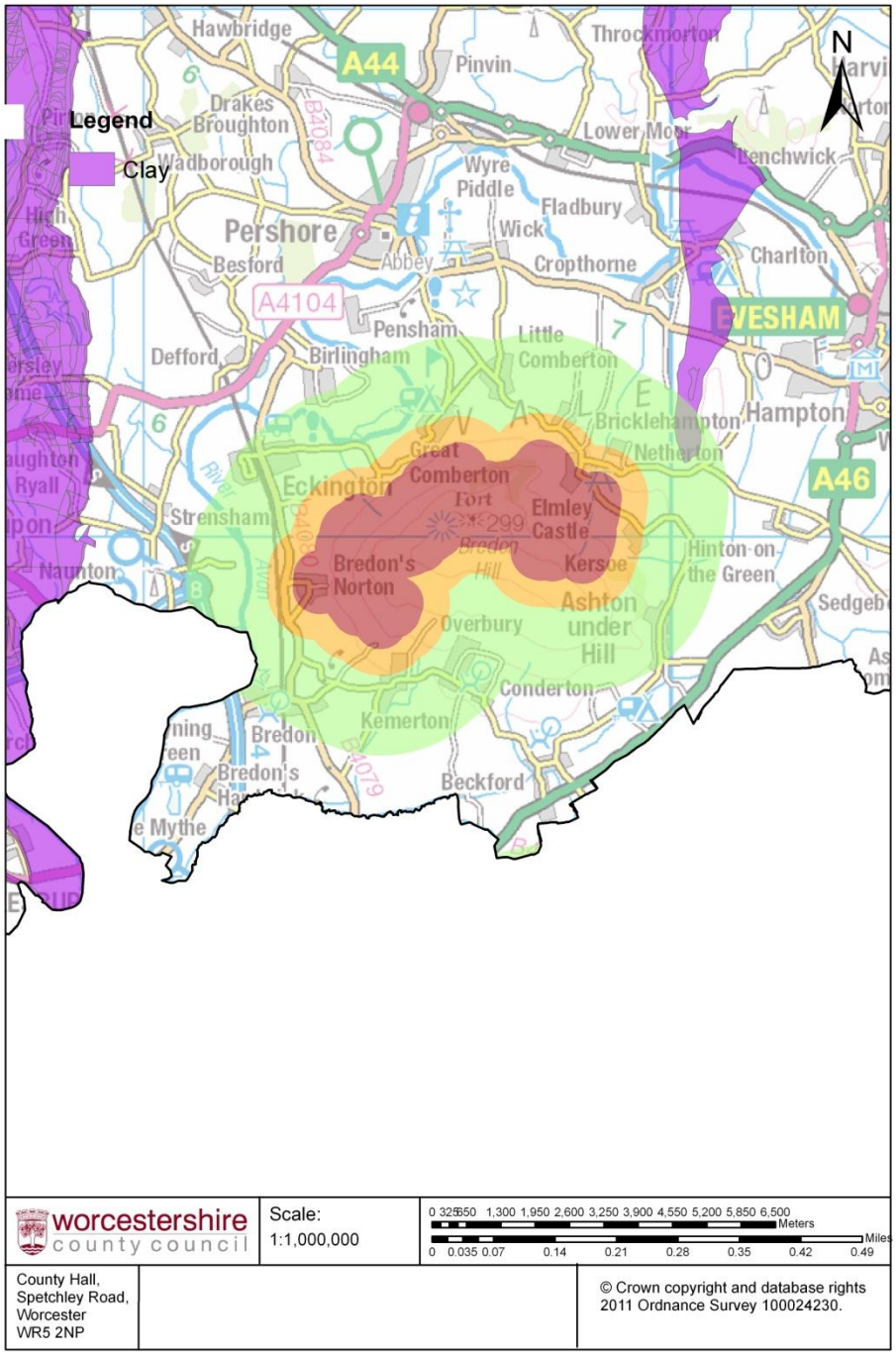


Figure 26: Showing Bredon Hill SAC with proximity buffers and location of known Clay Mineral resource Areas

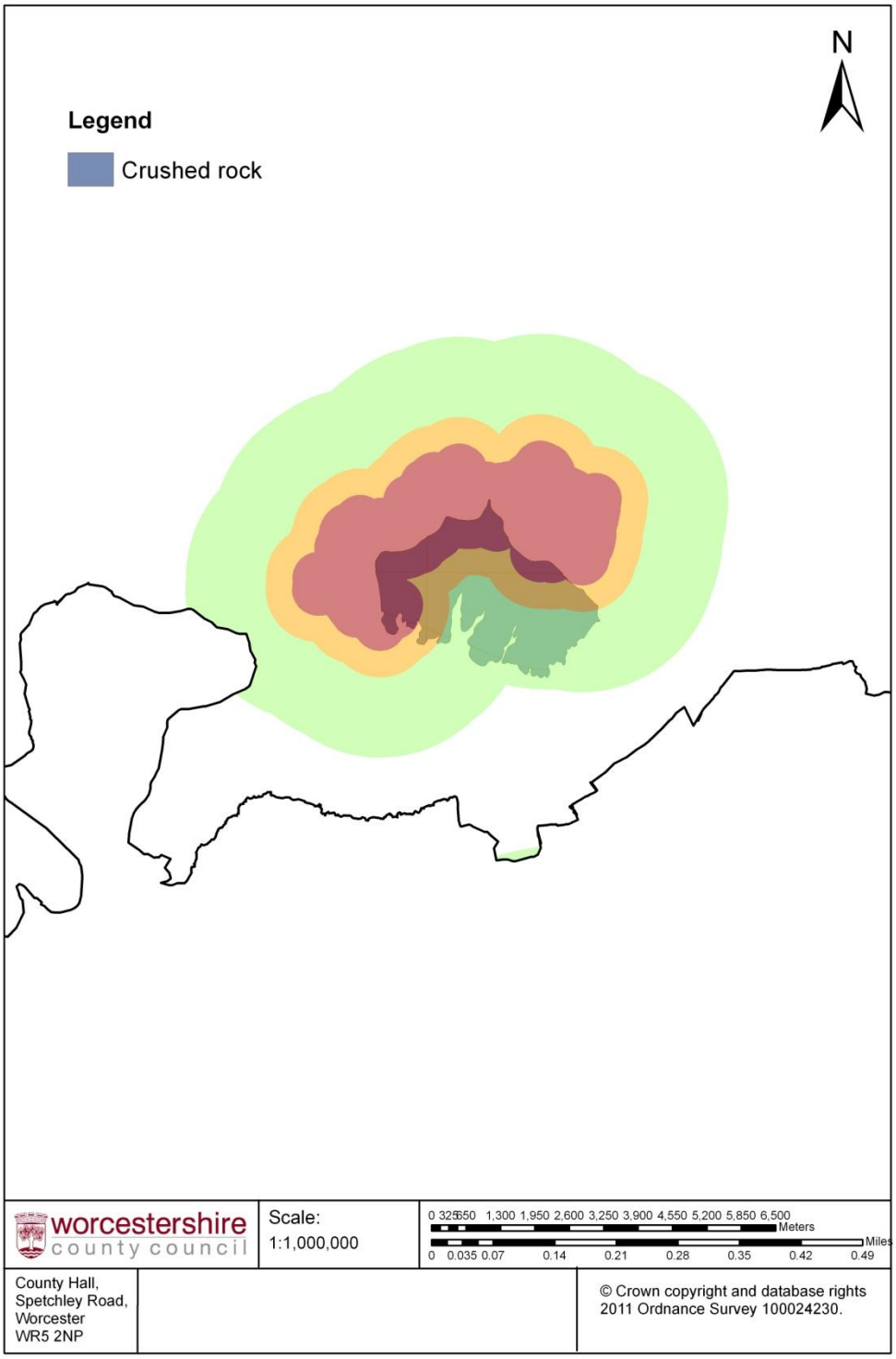


Figure 27: Showing Bredon Hill SAC with proximity buffers and known Crushed Rock Minerals Resource Area.

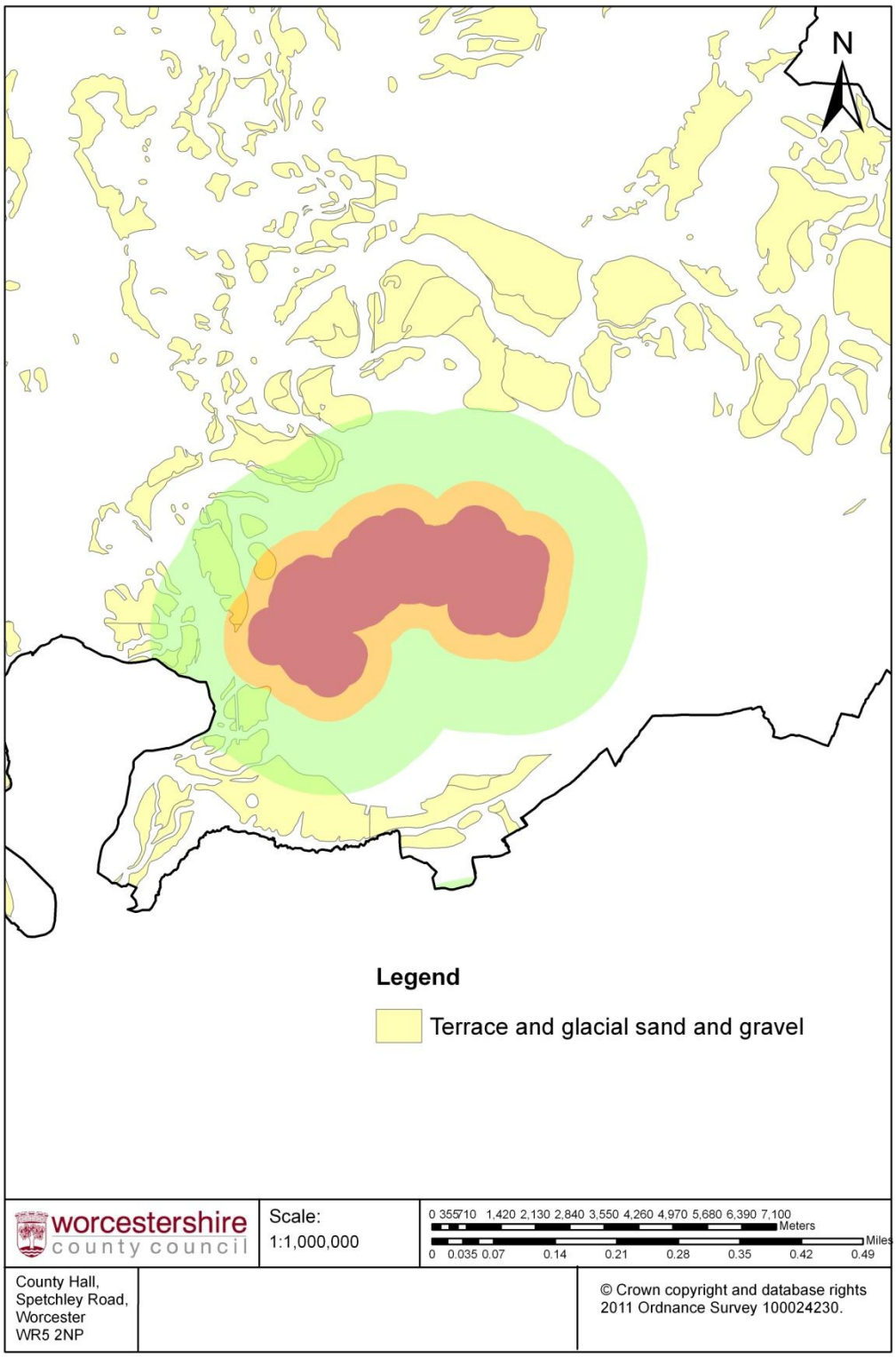


Figure 28: Showing Bredon Hill SAC with proximity buffers and known Sand and Gravel Minerals Resource Areas

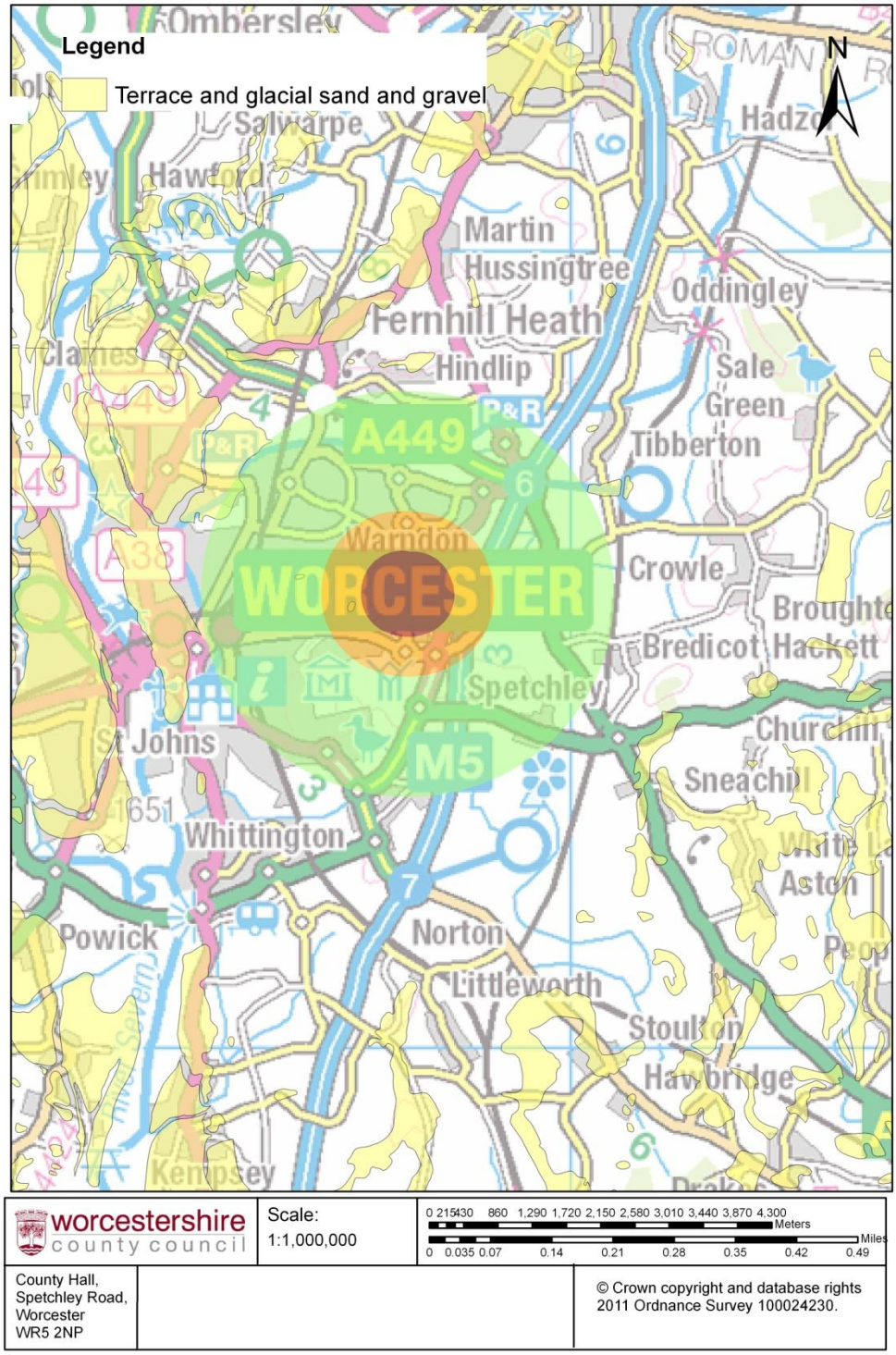


Figure 29: Showing Lyppard Grange Ponds SAC with proximity buffers and known Sand and Gravel Minerals Resource Areas.

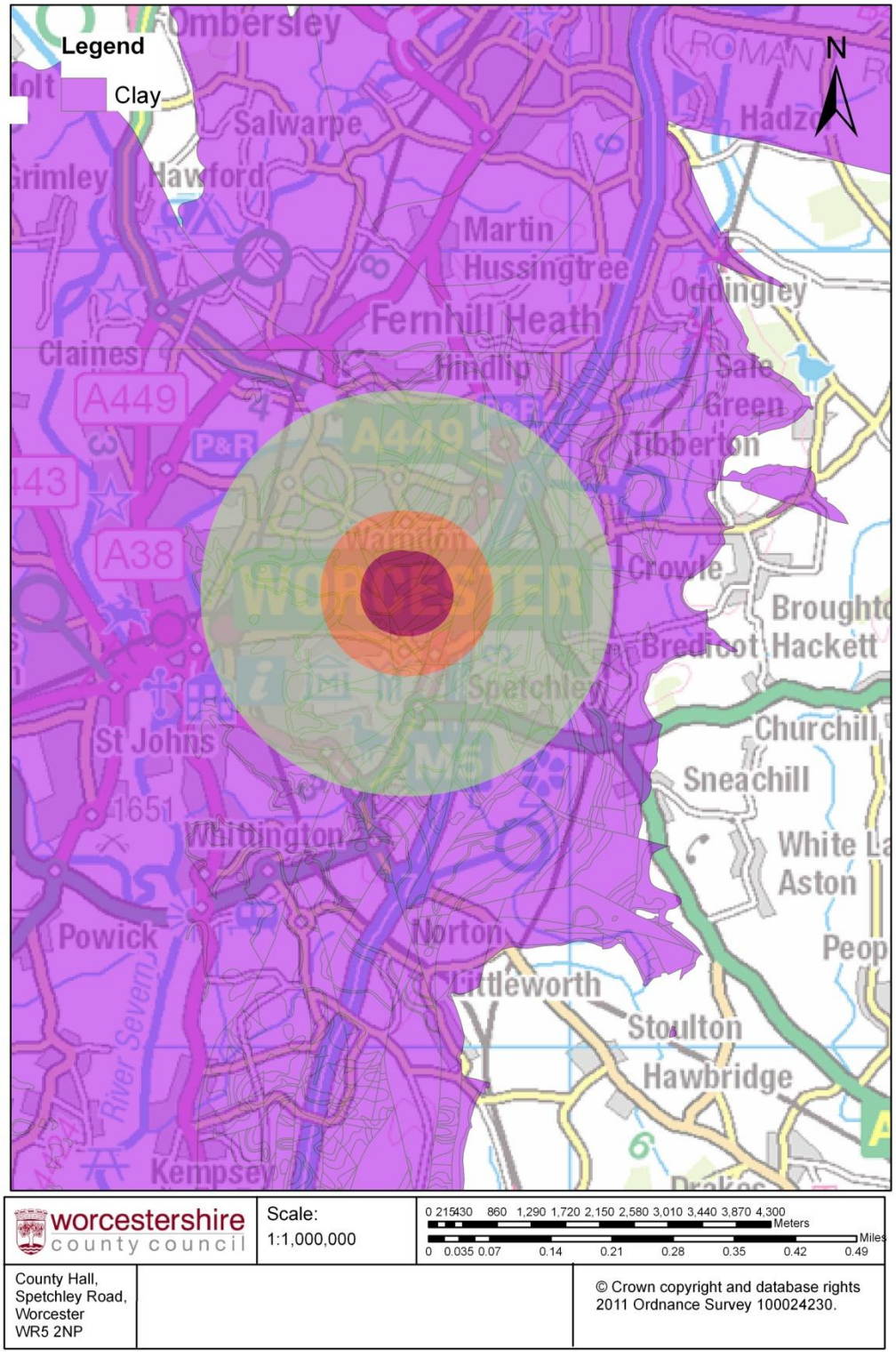


Figure 30: Showing Lyppard Grange Ponds SAC with proximity buffers and known Clay Minerals Resource Areas.