An Archaeological Resource Assessment for Leicestershire and Rutland's Aggregate Landscapes

Final Report (v2.4)

Prepared by Leicestershire County Council

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An Archaeological Resource Assessment for Leicestershire and Rutland's Aggregate Producing Landscapes

Final Report

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Acknowledgements

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Executive Summary

The following report presents the results of a detailed archaeological assessment of the active and potential aggregate producing landscapes of Leicestershire and Rutland. The project was conducted between October 2009 and March 2012 with funding from the Aggregates Levy Sustainability Fund, distributed by English Heritage on behalf of the Department of Environment, Food and Rural Affairs (Defra). It addressed directly Theme 1.1 of the 2009-10 ALSF funding priorities, which focused upon the identification and characterisation of the historic environment in key existing or potential areas of terrestrial extraction (http://www.english-heritage.org.uk/server/show/con Web Doc.4261). It has also contributed to English Heritage's SHAPE 2008 Sub-Programmes 11172.110 (Supporting Research Frameworks: national, regional, local, diachronic and thematic frameworks) and 32142.210 (Heritage at Risk: identifying threats [other than climate change] and developing responses; see English Heritage 2008).

From the national perspective, the project forms part of a package of ALSF-funded Aggregates Resource Assessments that together provide a valuable resource for assessing the archaeological potential of the aggregates-producing areas of the West and East Midlands. Resource Assessments have been completed for Lincolnshire (Groundwork Archaeology Ltd 2006), Warwickshire (Alexander 2008) and Derbyshire and the Peak District National Park (Brightman and Waddington 2011) and a further assessment is currently in preparation for Staffordshire (S. Dean: pers. comm.). We have liaised closely with colleagues working in neighbouring counties with the aim of achieving compatible end products, and have incorporated the landform element methodology developed in the Till-Tweed catchment (Passmore, Waddington and Houghton 2002; Passmore, Waddington and van der Schriek 2006; Passmore and Waddington 2009; Waddington and Passmore 2006), Derbyshire and the Peak District (Chatterton et al 2009; Brightman and Waddington 2011).

The research agenda and strategy proposed in this document draws heavily upon the *Research Agenda and Strategy for the Historic Environment of the East Midlands* (Knight et al. forthcoming) and from the Research Strategy developed by Trent Valley GeoArchaeology (http://www.tvg.org). The latter is a co-operative of stakeholders, including researchers, heritage managers and representatives of the quarry industry. It provides a mutually supportive framework for multidisciplinary research in the East Midlands, with a firm focus upon the aggregates-rich river terraces and alluvial floodplain of the Trent and its tributaries, and has supported a wide variety of research projects in Nottinghamshire and adjoining Counties. The most relevant of these in the present context is the recently published *Trent Valley Landscapes* (Knight and Howard 2004a), which together with the Quaternary Research Association's field guide to the Trent Valley and adjoining regions (White et al. eds. 2007) provides a springboard for our assessment of the archaeological resource of the superficial sands and gravels of the Trent catchment.

1 Introduction

1.1 Project Background

Aggregates play an essential role in our daily lives and make an important contribution towards social and economic progress through their many uses. Aggregates are essential for the provision of bulk and specialist materials for the construction and maintenance of road, rail and industrial infrastructure, the provision of raw materials and finished products in the building of homes, hospitals, schools and workplaces.

In 2002 the UK government introduced the Aggregates Levy Sustainability Fund (ALSF), initially as a two year pilot scheme. The aim of the scheme was to provide funds for a range of projects, which would help address the environmental impacts in areas affected by aggregate extraction. The popularity and success of the fund prompted its extension and the scheme was finally closed at the end of the financial year 2010-2011. The fund was distributed by English Heritage, together with Natural England, the Centre for Environment, Fisheries and Science and others, on behalf of the Department for Environment Food and Rural Affairs (DEFRA). Central to the English Heritage ALSF programme has been the primary objective of reducing the impact of aggregate extraction on the historic environment, both terrestrial and marine.

In December 2009, through the ALSF, English Heritage commissioned Leicestershire County Council to carry out 'An Archaeological Resource Assessment for Leicestershire and Rutland's Aggregate Landscapes'. This project was a desk-based assessment and synthesis of existing data held within the Leicestershire and Rutland Historic Environment Record (HER).

The project presented an opportunity to develop an informed strategic overview of both the extent and character of the known aggregate resources within the counties of Leicestershire and Rutland. Through the development of the knowledge base and by enhancing our understanding of the archaeological resource within aggregate areas, it is anticipated that future decision making priorities for the preservation and/or management of archaeological sites will be better informed.

This project identifies and examines the aggregate producing areas covered by the mineral planning authorities of Leicestershire County Council and Rutland County Council. Excluded from the scope of the project is the administrative area covered by the unitary authority of Leicester City Council.

This document represents the main technical report for the project and includes a description of the methodological approaches employed, an appraisal of the results of the study and an outline of the development management and mitigation strategies that have been devised and informed as a result of the information generated.

1.2 Aims and Objectives

The project focuses upon the core objective of the English Heritage administered ASLF Programme as presented on the ASLF Online pages within the Archaeology Data Service (ADS) website:

- http://archaeologydataservice.ac.uk/archives/view/alsf/;

This primary objective attempts to reduce the detrimental impact on the historic environment of aggregate extraction. Taking this core objective as a starting point the project contains a number of key **aims** outlined below:

1. to improve the knowledge base as it relates to Leicestershire and Rutland's archaeological resource within areas either affected by or having the potential to be affected by the production of mineral aggregates (to be achieved by meeting objectives 1, 5, 6 and 7),

2. to facilitate the development of an informed and proactive management strategy that addresses the known and potential archaeological resource within the identified aggregate areas (to be achieved by meeting objectives 1, 2, 3, 5, 6, 7 and 8),

3. to develop and enhance resources and datasets which will provide a useful input into any future reviews of Minerals Development Frameworks (MDFs), reviews of existing minerals permissions and assessment of new application sites for minerals permissions (to be achieved by meeting objectives 1, 2, 3, 6, 7 and 8),

4. address the effects of old mineral planning permissions (to be achieved by meeting objectives 4),

5. provide both public and professional audiences with access to the knowledge base produced through past work in advance of aggregate production (to be achieved by meeting objectives 5 and 9).

In order for these aims to be met the following key **objectives** were identified:

1. definition of the aggregate producing areas of Leicestershire and Rutland through the use of British Geological Survey (BGS) and minerals planning authority (MPA) data, to produce detailed mapping and written descriptions of these deposits,

2. definition of areas of past, present and future aggregate mineral extraction within Leicestershire and Rutland using BGS, MPA, and HER data,

3. definition of a series of aggregate areas and sub areas which will be derived from MPA and BGS information. These will be based on the potential for mineral extraction and geological indicators,

4. the identification of any outstanding ROMP's (Review of Old Minerals Permissions) for the project areas and the likely effect upon the historic environment of commencing or continuing extraction within the permitted area. Unfortunately, due to time constraints, with the exception of a collation of existing and outstanding ROMPs, this objective remains outstanding. The collated data set forms part of the project archive.

5. a review of aggregates related archaeological projects to assess level and adequacy of publication/dissemination. This data will be compiled to standards and using the database developed by ARCUS and currently administered by Wessex Archaeology Sheffield for English Heritage,

6. to prepare an assessment of the archaeological resource within the aggregate producing areas of Leicestershire and Rutland based upon the HER and archive data,

7. to develop a draft research agenda and strategy for the archaeological resource of Leicestershire and Rutland's aggregate producing areas,

8. an assessment of current methodologies associated with the evaluation, excavation and mitigation of the archaeological resource within the aggregate producing areas of Leicestershire and Rutland and to develop and adopt a mitigation strategy to improve those methodologies in collaboration with on-going projects in Derbyshire and Nottinghamshire,

9. to increase the awareness of the public, industry and other stakeholders to the archaeology and historic landscapes within the aggregate producing areas by the dissemination of project results through the relevant authority websites and ADS. The published material will include both executive summaries and the full report.

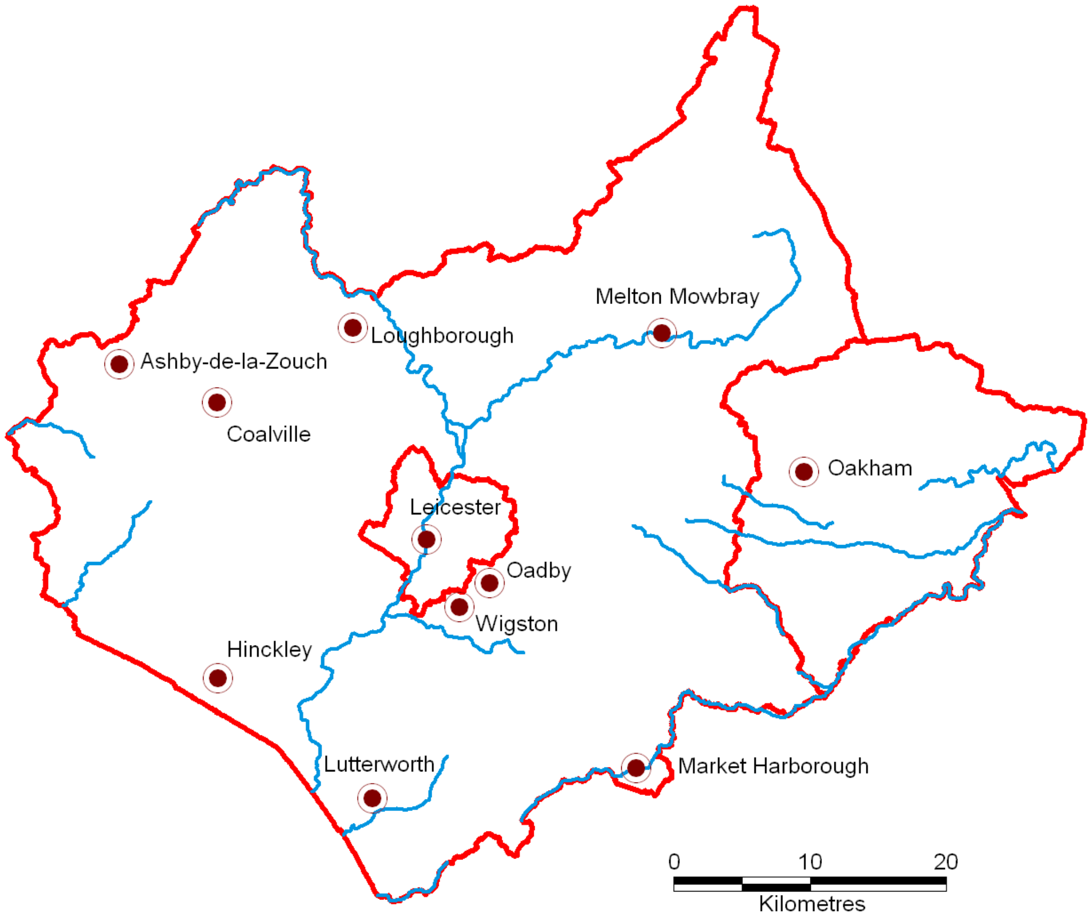
1.3 The Local and Regional Context

1.3.1 Definition of the Project Area

The project focuses upon the aggregate producing areas of the county of Leicestershire (Districts and Boroughs of Blaby, Charnwood, Harborough, Hinckley & Bosworth, Melton, North West Leicestershire, Oadby & Wigston) and the unitary authority of Rutland County. For the purposes of this document the area under consideration will either be referred to as the project area or Leicestershire and Rutland.

1.3.2 The Local Setting

The project area is landlocked, covering some 2,533 km^2 with Leicestershire accounting for 2,083 km^2 and Rutland 450 km^2 and may be considered to be a quintessential slice of the English Midlands. This is a predominantly rural area with agriculture traditionally playing an important role in the local economy. The importance of agriculture is reflected, at least in part, through a landscape



Leicestershire County Council

Legend

Figure 1 Project Area and Principal Settlements

dominated by enclosure and a settlement pattern that can be characterised as consisting predominantly of nucleated villages and market towns.

The project area is home to 679,300 people (Office of National Statistics, 2009) most of whom live in the towns and urban areas. The largest towns within the project area are Loughborough (57,560 persons), Hinckley (38,620 persons), Coalville (32, 030 persons), Melton Mowbray (25,890) and Wigston (25,610 persons). None of the remaining urban areas exceed 25,000 (Leicestershire County Council, 2006).

Inevitably the cumulative effect of years of aggregate extraction across Leicestershire and Rutland has, in some areas, impacted significantly upon the landscape. Leicestershire, in particular, has a very rich mineral resource and has represents one of the top aggregate minerals producing areas in the country, with a total output of *c*. 20 million tonnes or megatonnes (Mt) per annum and an allocation for the period 2001-2016 of *c.* 283Mt (Leicestershire County Council, 2006a). The bulk of this allocation is represented by crushed igneous rock; however, a significant proportion also comes from the production of limestone aggregate and sand and gravel extraction.

Whilst the important role aggregates play in contributing to the economy of Leicestershire and Rutland is apparent, it is essential to recognise that they represent a finite resource only available in a limited number of locations. Mineral exploitation is unlike other forms of development in that it can only take place where the mineral occurs and it is inevitable that there will be occasions when the consequences of this exploitation will have effects that are considered negative. For the historic environment the two obvious impacts of aggregate operations warranting consideration are the direct effect of extraction and the impact upon the setting of individual heritage assets and the wider historic landscape.
The processes of aggregate extraction are unavoidably destructive and, in addition to the impact on below ground archaeological remains, will typically result in the loss of landscape features, both natural and man-made. Heritage assets are similar to aggregates in the sense they too represent a finite resource and require appropriate management. MPAs are required to "consider carefully mineral proposals within or likely to affect regional and local sites of biodiversity, geodiversity, landscape, historical and cultural heritage" (Department for Communities and Local Government, 2006).

The aggregate resource across Leicestershire and Rutland is particularly rich and at its most basic level can be split into two main categories:

- *superficial* (quaternary) deposits of fluvially and glacially derived sand and gravel. Fluvial sands and gravels essentially represent material deposited by rivers, but, within the project area, also include the nationally important Bytham River deposits. The Bytham is a fossilised palaeosystem the course of which can be traced from the south-west of the county around Hinckley, passing under Leicester and along the Wreake Valley, exiting Leicestershire to the east of Melton. The glacially derived deposits lie primarily to the south and west of Leicester, e.g. Husbands Bosworth and Cadeby;

- *solid* (hard) rocks, such as the granites on the flanks of Charnwood Forest and to the south-west of Leicester, are an extensively exploited resource, providing approximately one third of the national requirement for igneous crushed rock. In addition isolated inliers of carboniferous limestone occur close to Leicestershire's boundary with Derbyshire, whilst Jurassic limestone extends over the whole of eastern Rutland, as well as part of north-east Leicestershire. These limestone deposits also represent an important mineral resource providing material which, although not as strong as some other lithologies, may be used as building stone or crushed and used as road ballast. The Jurrassic limestones of Rutland, quarried at Ketton, are chiefly used in cement production.

1.3.3 The Regional Setting

The project area lies within the East Midlands, the latter comprising the counties of Derbyshire, Leicestershire, Lincolnshire, Northamptonshire and Nottinghamshire together with the unitary authorities of Derby, Leicester, Nottingham and Rutland. Leicestershire and Rutland shares administrative boundaries with all of the East Midland counties, as well as with Staffordshire and Warwickshire (in the West Midlands). The City of Leicester unitary authority is located at the centre of the project area. It is important to recognise that, although beyond the immediate scope of this project, the influence exerted by Leicester over the project area is considerable. The city is a large conurbation (73km^2) with a population of about 292,600 people (Office for National Statistics 2009), it presents a significant local and regional market for mineral resources and creates a recreational and amenity use demand upon the surrounding urban and rural landscapes. Many of the towns and villages surrounding Leicester also act as dormitory settlements for people working in the city.

The East Midlands is a region that can be characterised by its wide diversity of landscapes that have been noted for their agricultural productivity, recreational value, geodiversity, biodiversity and heritage assets. Moving through the region witnesses a transition from the open sea, coastal salt marshes and low lying drained fenland farmlands of Lincolnshire in the east, to the upland moorlands of the Peak District in the west. In between the variation of landscape types is equally diverse and includes chalk and limestone hills, ancient woodlands, rolling farmland interspersed with villages, lowland heaths as well as areas noted for their rich mining heritage (LDA Design, 2010).

Home to about 4.4 million people (Office for National Statistics, 2009), the region has a settlement structure dominated and centred on the three major cities of Derby, Leicester and Nottingham and, in addition, Lincoln and Northampton continue to grow and extend their influence as important regional centres.

The population of the region is growing at a faster rate than the national average; a fact that can be attributed, in part, to migration into the East Midlands. This in turn places pressure both on the region's housing stock (Government Office for the East Midlands, 2009) and upon its transport network, with the East Midlands experiencing the highest rate of traffic growth of any of the English regions. The latter manifests itself chiefly by increasing congestion of existing north-south roads and railways, while poor east-west links underline the on-going need for investment in the communications network.

The pressures outlined above contribute to a continuing demand upon the aggregate resources of the project area and the wider East Midlands region, a situation which will continue to require appropriate long term management.

1.3.4 Landform and Drainage

As Hoskins (1970) has commented, a passing impression of Leicestershire and Rutland may give the impression of a landscape, *"...flat, pretty well covered with red-brick towns and villages, with somewhere in the unseen background a lot of fox-hunting going on" (*Leicestershire County Council, 2001, 3.01). However, a range of contrasting landscapes, themselves the product of human interaction with the natural environment, can be seen right across the project area. There include a patchwork of interconnecting elements including gently rolling countryside, relatively small rivers (Chater, Gwash, Jordan, Sence, Soar Welland and Eye/Wreake), tilled farmland and market towns. Elevation across the project area is relatively moderate and lies, for the most part, between 60 and 180 metres above sea level. The lowest point within the project area is found near the confluence of the Soar and Trent below Kegworth (27m); Bardon Hill (278m) in Charnwood Forest is the highest.

The project area can be divided roughly east/west by the broad floodplain of the River Soar, of which the only major tributary is the River Wreake. The Soar itself flows northwards to join the River Trent and this forms a short section of Leicestershire's northern border with Derbyshire. Much of Leicestershire drains into the Trent either through the Soar or the Mease.

Charnwood Forest is to the west of the River Soar; here Precambrian rocks form an isolated and distinctive area of high relief. There are many fast flowing streams in the area running off the high ground north and east into the Soar and south-west into the Sence. From Charnwood Forest westwards to Leicestershire's county boundary and beyond there is a band of moderately high land. The general character for much of the rest of western Leicestershire is a landscape of gently rolling landforms exhibiting little in terms of major contrasts in relief.

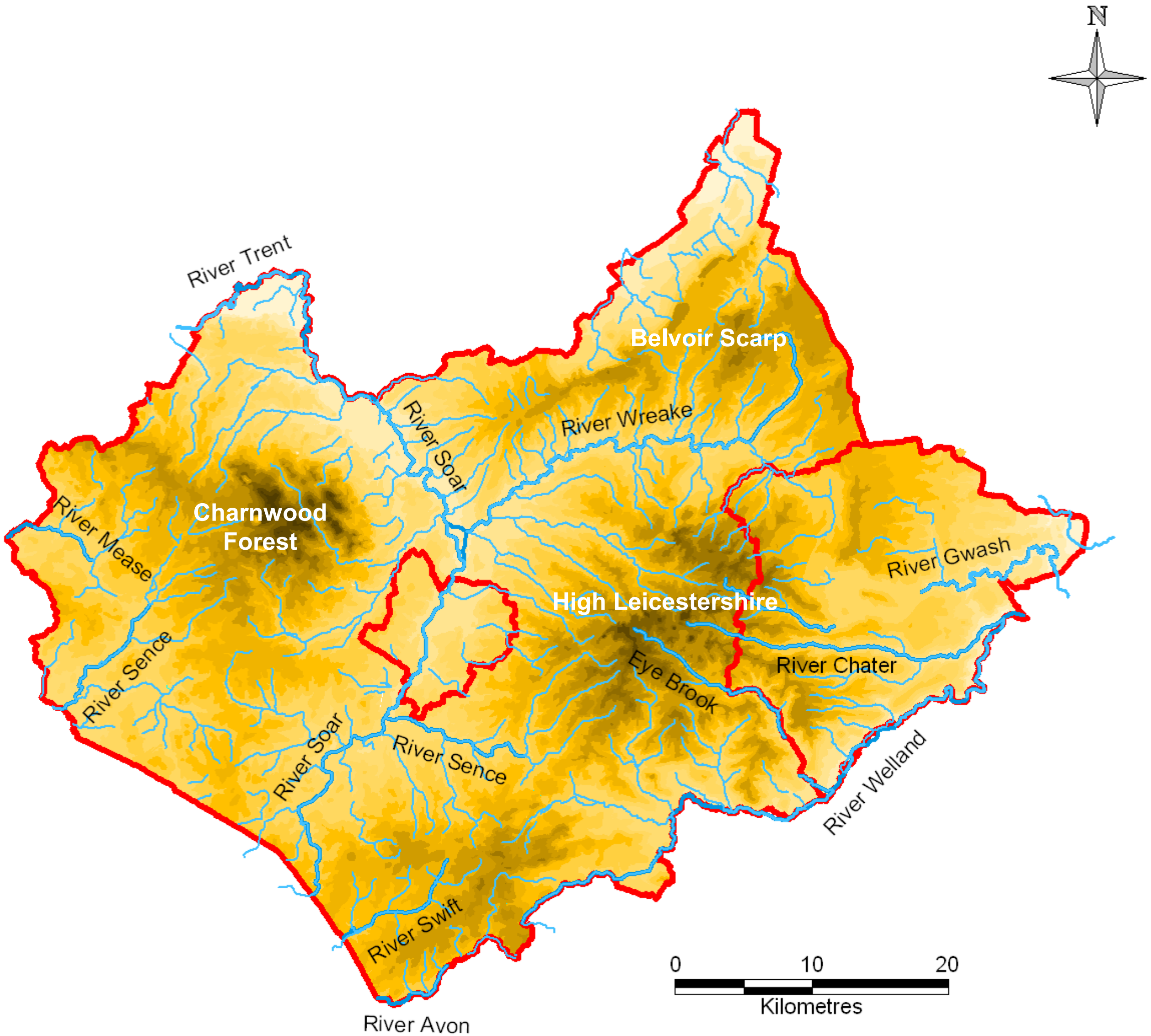


Figure 2 Landform and Drainage

That part of the project area lying to the east of the River Soar and south of the River Wreake is known as High Leicestershire. The landscape here has been greatly influenced by the erosion of Jurassic Lias Clays which have contributed to the formation of a high dissected plateau with numerous small stream valleys with clay floors and marlstone slopes. These small streams flow either to the north or west into the Wreake or Soar, or south and east into the River Welland and eastern River Sence.

To the east of the High Leicestershire plateau is the Vale of Catmose, a broad shallow valley which drains into the Wreake in the north and the Welland in the south. Continuing eastwards beyond the Vale of Catmose lies another plateau which rises steeply from the Vale at its northern end. The southern part of the plateau has been cut by rivers running into the Welland to form a gently rolling landscape containing within it a number of shallow but occasionally steep-sided valleys separated by broad ridges.

Moderately high land extends in a band running roughly from Market Harborough in the east to Lutterworth in the west. Here the land drains into the Rivers Avon and Swift.

The north-eastern part of the project area, essentially land north of the River Wreake, consists of undulating uplands. These are abruptly terminated by the Belvoir Scarp, a marlstone escarpment which falls dramatically to the flat claylands of the Vale of Belvoir to the north-west.

1.3.5 Leicester, Leicestershire and Rutland Landscape and Woodland Strategy

In 2001 Leicestershire County Council published the *Leicester, Leicestershire and Rutland Landscape and Woodland Strategy*. This strategy included a landscape character appraisal of the project area the purpose of which was to provide an assessment of landscape character, condition and vunerability. Following the survey eighteen character areas were defined (see Figure 3) and are refered to within this document.

1.3.6 Soils

A reasonably broad mix of soil types are represented generally reflecting drainage patterns and underlying parent materials. On the western side of Leicestershire the soils deriving from the rock of Charnwood Forest are often thin, stony and acidic. Further west the soils of the Coal Measures are generally sandy and of poor quality. Soils elsewhere in the western parts of Leicestershire are predominantly neutral clay loams (Leicestershire County Council, 2001).

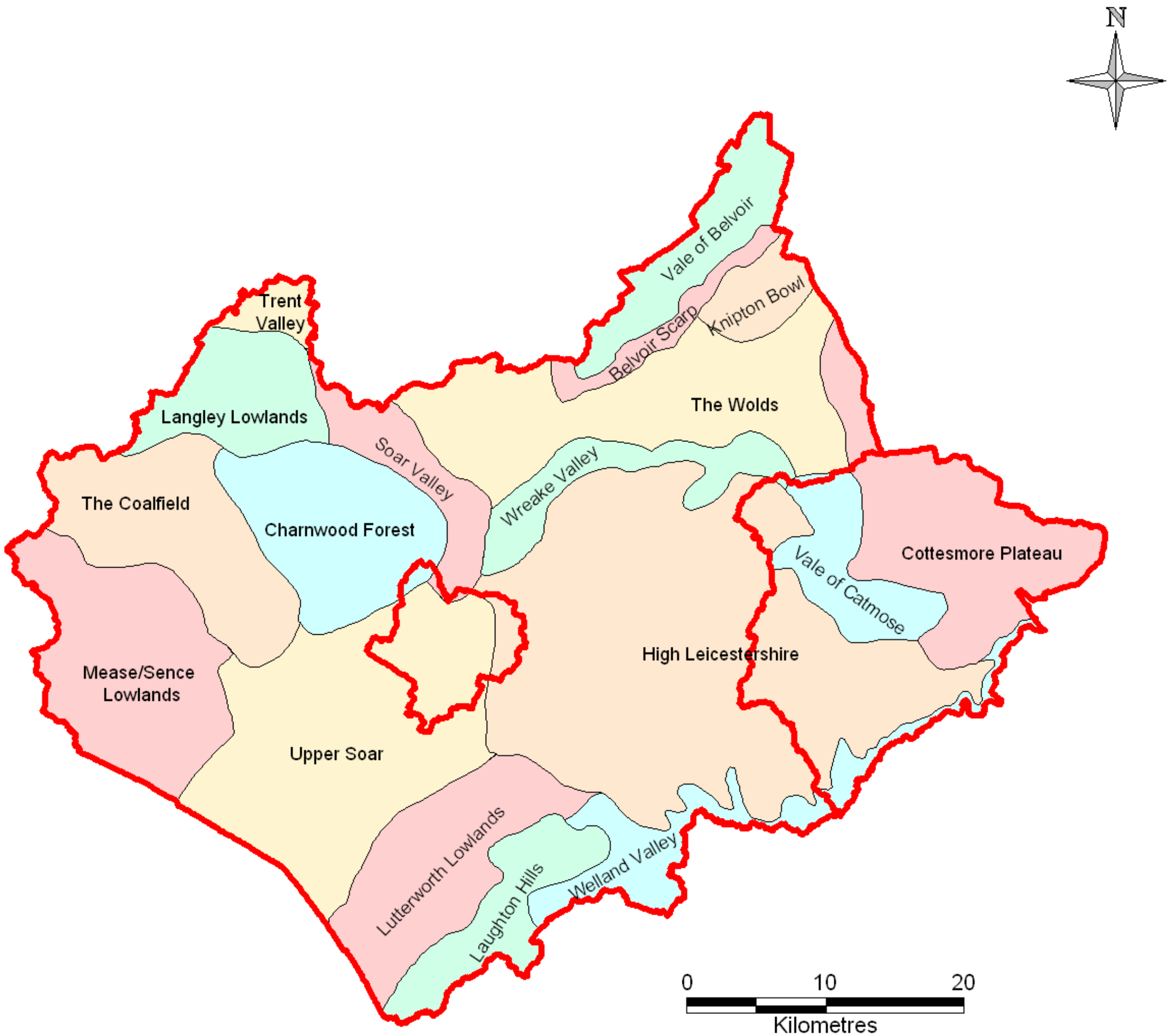


Figure 3 Leicestershire and Rutland Landscape Character Areas

In the eastern parts of Leicestershire and in Rutland clay soils also predominate, however, here they are more variable in character than those found on the western side of the project area. Where Lias Clays form the underlying geology they give rise to clay soils that are difficult to work and which have traditionally been kept under pasture. Arable usage tends to be located on the limestones and ironstones which produce soils that are lighter and loamy in character. The most easily worked soils, on the Marlstone, tend to have a calcareous and loamy or marl make-up (Leicestershire County Council, 2001).

Leicestershire County Council doesn't hold digital soil mapping; however a simplified soils dataset derived from the National Soil Resources Institute's 1:250,000 National Soil Map (NATMAP Vector) can be viewed on the internet at:

- http://www.landis.org.uk/services/soilscapes.cfm

The information was accessed and incorporated into project data set.

2 Minerals Planning in Leicestershire and Rutland

In Leicestershire and Rutland planning policy relating to mineral extraction is framed by legislation and guidance that has been formed at national, regional and local levels. The most important documents include Mineral Policy Statement 1 (MPS1: Planning & Minerals), which provides the national planning policy framework for minerals planning, whilst at a local level, both authorities have prepared their Minerals Core Strategy and Development Control Policies documents, part of the Minerals Development Plan Document. For Leicestershire and Rutland these were respectively adopted in 2009 and 2010. The separate planning structure for minerals planning, detached from other aspects of development management, has arisen due to the set of circumstances and characteristics unique to this form of development. The extraction of minerals is limited to those areas where they occur naturally and whilst their working of these resources can take place over a prolonged period this should not be viewed as permanent. It is intended that this document, utilising an overview of the extent of the known aggregate deposits in Leicestershire and Rutland, will provide a strategic appraisal of the Heritage Assets contained within those areas.

2.1 The National Context

2.1.1 Planning and Mineral Extraction

The basis for the current planning system was introduced in England and Wales with the passing of The Town and Country Planning Act 1947. The Act established a requirement for local authorities to complete a local plan, setting out detailed policies and specific proposals for the development and use of land within a planning district. The Act also established in law the principle that land use would be controlled and that prior to most development planning permission would be required.

Following the 1947 Act the planning system continued to evolve with many subsequent amendments being made, which were eventually consolidated within a new Town and Country Planning Act in 1971, itself considerably amended by the 1981 Town and Country Planning (Minerals) Act, which established the rele of County Councils as the Mineral Planning Authority (MPA) for their areas. This was followed by the 1990 Town and Country Planning Act, which established the requirement that each MPA had a duty to prepare a Minerals Local Plan.

Other relevant primary legislation includes the Planning and Compensation Act (1991) and the Environmental Act (1995). The 1991 Act required holders of mining permissions granted between July 1943 and July 1948 to apply to the relevant MPA for registration of any permissions they wanted to maintain. The 1995 act also addressed old mineral permissions looking specifically at those granted during the 1950's, 60's and 70's. MPAs were required to compile lists of 'dormant' and 'active' quarries and review all mineral permissions on a regular basis.

The Government's national land use planning policy and guidance, which is underpinned by the 1990, 1991, and 1995 Acts, is set out within a series of Mineral Planning Guidance Notes (MPGs) or their replacement, Minerals Policy Statements (MPSs) and Planning Policy Guidance Notes (PPGs) or their replacement Planning Policy Statements (PPSs). MPGs and MPSs have been designed to complement, but do not replace or overrule, other national planning policies and need to be read in conjunction with other relevant statements of national planning policy (DCLG 2006, para 2). These documents must be taken into account in the preparation of local development documents.

MPS 1 is the overarching planning policy document for all minerals in England. It provides advice and guidance to planning authorities and the minerals industry. The document is designed to ensure that the need by society and the economy for minerals is managed in an integrated way and measured against its impact on the environment and communities.

Paragraph 14 of MPS1 asks that MPAs 'consider carefully mineral proposals within or likely to affect *regional and local sites of biodiversity, geodiversity, landscape, historical and cultural heritage'* and also that they 'adopt a presumption in favour of the preservation of listed buildings, nationally important archaeological remains (including scheduled monuments) *in situ* and their settings, if mineral proposals would cause damage or have significant impact on them, unless there are overriding reasons of national importance for the development to proceed'.

The Government's overarching planning policies on the delivery of sustainable development through the planning system are sets out in Planning Policy Statement 1: Delivering Sustainable Development (PPS1). The key statement on the historic environment within this document is paragraph 17. This states that:

'The Government is committed to protecting and enhancing the quality of the natural and historic environment, in both rural and urban areas. Planning policies should seek to protect and enhance the quality, character and amenity value of the countryside and urban areas as a whole. A high level of protection should be given to most valued townscapes and landscapes, wildlife habitats and natural resources. Those with national and international designations should receive the highest level of protection'.

2.1.2 Heritage Legislation and Policy

The statutory basis for the protection of archaeological sites and their designation as scheduled monuments, is provided for under legislation set out in the *Ancient Monuments and Archaeological Areas Act 1979* (HMSO 1979). The historic built environment: buildings, structures and areas of special architectural or historic interest, are afforded specific protection under the provisions of the *Listed Building and Conservation Areas Act 1990*. While the publication in 1990 of Planning Policy Guidance Note 16, Archaeology and Planning (and latter PPG15: Planning and the Historic Environment, 1994), recognised that the wider historic environment, emplified by often undesignated archaeological remains, constituted a 'material consideration' in the planning process. As such the provision for the protection, conservation and investigation of the great majority of archaeological sites is facilitated through the planning process.

The two guidance notes (PPG15 and 16) have recently been superseded by a single unified planning policy statement, Planning Policy Statement 5: Planning for the Historic Environment (PPS5) (CLG 2010), which has further reinforced provision for the historic environment. Numerous other Acts and guidance documents contain provisions relating to the historic environment.

PPS5 sets out the Government's planning policies on the conservation of the Historic Environment. The policy document is supported by a Practice Guide the purpose of which is to assist local authorities, owners, applicants and other interested parties in its implementation and interpretation.

The intention and approach of PPS5 is to provide a strong policy basis reinforced by a holistic approach to the historic environment. This is made explicit within PPS5 and there are a number of policies which have a particular relevance for mineral extraction.

Policy HE2 sets out the need for local authorities to ensure that they have publicly documented evidence about the historic environment and heritage assets in their area and that local planning authorities should either maintain or have access to a Historic Environment Record.

Policy HE3 requires that local development frameworks should set out a positive and proactive strategy for the conservation and enjoyment of the historic environment. The supporting Practice Guide suggests:

'This may mean, for example, that particular land use or design policies are applied to certain areas, sites or categories of asset so as to manage threats to conservation, encourage the optimum viable use and proactively exploit the value of the heritage assets.' (English Heritage 2010, 14, Para. 33).

Requirements for pre-determination evaluation are outlined in Policies HE6 and HE8. HE6.1 states that the local planning authority should:

'…require an applicant to provide a description of the significance of the heritage assets affected and the contribution of their setting to that significance.'

HE6.2 goes on to say that:

'This information together with an assessment of the impact of the proposal should be out in the application…'.

Following on, HE6.3 states that:

'Local planning authorities should not validate applications where the extent of the impact of the proposal on the significance of any heritage assets affected cannot adequately be understood from the application and supporting documents.'

HE8 requires that the effect of an application on the significance of a non-designated heritage asset or its setting should be viewed as a material consideration when determining an application. In addition the requirements for recording and understanding any assets that are to be lost apply to these assets just as they do to designated assets.

The weight that should be afforded to the preservation *in situ* of heritage assets is set out in HE7, HE8 and particularly HE9.1 which requires that:

'There should be presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of conservation should be.'

The minerals planning process is administered by the local Minerals Planning Authorities (MPA). Within the study area the relevant authorities are Leicestershire County Council and Rutland County Council (the latter a unitary district council). In the context of undesignated heritage assets The Historic & Natural Environment Team (HNET), Leicestershire County Council provides archaeological advice to both MPAs. English Heritage, as the advisors to the Secretary of State, provide statuary advice on the designated historic environment (Scheduled Monuments and Grade I and II* listed buildings). In the context of listed buildings and Conservation Areas, both authorities also retain in-house conservation and historic buildings advisors.

2.2 The Regional Context

The East Midlands Regional Plan (RSS8), published by the Government Office for the East Midlands in March 2009 provides a broad development strategy for the East Midlands and also represents the spatial element of the Integrated Regional Strategy (IRS). Policy 1 of the document sets out a number of Regional Core Objectives for the East Midlands including the requirement that all strategies, plans and programmes having a spatial impact should seek to protect and enhance the environment through the:
'Protection, enhancement, sensitive use and management of the Region's natural cultural and historic assets, giving particular attention to designated sites of international importance.'

and also:

'Recognition of the limits to the capacity of the environment to accept further development without irreversible damage.'

Policy 26 deals specifically with the Region's natural and cultural heritage emphasising a requirement that sustainable development needs to ensure the protection, appropriate management and enhancement of the Region's natural and cultural heritage and establishes the principle that:

'Damage to natural and historic assets or their settings should be avoided wherever and as far as possible, recognising that such assets are usually irreplaceable.'

Policy 27 lays out the Region's priorities for the historic environment the policy makes explicit the need for local authorities to:

- identify and assess the significance of specific historic assets and their settings;
- use characterisation to understand their contribution to the landscape or townscape in areas of change

Policy 37 sets out regional priorities for minerals and makes the requirement that local development frameworks should:

- identify and identify sufficient environmentally acceptable sources to maintain an appropriate supply of aggregate and other minerals of regional or national significance;
- indicate areas within which sites needed for land-won, minerals should be safeguarded from development that would sterilise future exploitation, including those required to maintain historic buildings or new construction that reflects local character.

The abolition of Government Offices for the Regions was announced in October 2010; however the East Midlands Regional Plan currently remains in force. It is anticipated that the of the primary legislation which sets the basis for Regional Strategies will be removed when the Localism Bill is granted Royal Assent later in 2011.

2.3 The Local Context

2.3.1 Leicestershire

A Minerals Development Framework is being prepared for the administrative area of Leicestershire. The Development Framework will comprise a portfolio of development plan documents. So far, the Core Strategy and Development Control Policies Development Plan Documents (DPDs) have been adopted.

The Core Strategy sets out the key principles to guide the future winning and working of minerals in the County and includes a spatial vision, spatial strategy, strategic objectives, core policies and a monitoring framework.

Key objectives of the Core Strategy include that it should "protect people and local communities, and the natural and built environment from minerals development" and also that it should:

'…ensure land is reclaimed at the earliest opportunity and that high quality restoration and aftercare takes place to an appropriate after-use that enhances and complements the natural and historic environment and that is in keeping with the local area, adding to local distinctiveness and biodiversity.'

Core Strategy Policy 17 sets out the strategy for environmental protection. The key aim of this is to protect and enhance the natural and built environment of Leicestershire by ensuring that there are no unacceptable adverse impacts from minerals development on, amongst other things, historic and cultural features of acknowledged importance.

The Development Control Policies set out the criteria against which planning applications for minerals development will be considered.

Policy MDC3 deals with Sites of National Historic Importance. It states that planning permission will not be granted for minerals development that would have significant adverse effects on sites of national historic importance or on their character, appearance or setting, including:

(i) Scheduled Ancient Monuments and other nationally important archaeological sites;
(ii) historic parks and gardens, battlefields and historic landscapes;
(iii) listed buildings.

Unless there are overriding reasons of national importance for development in that location and that those reasons clearly outweigh the likely impacts of development upon the historic environment, planning permission will be refused.

Policy MDC5 addresses the countryside and states:

'Planning permission will not be granted for minerals development that will adversely affect the general appearance and character of the landscape and the countryside, unless it can be demonstrated that there is an overriding need for the development.'

Archaeology is directly addressed in Policy MDC7; this states that where important archaeological remains are likely to be affected by minerals development planning permission will not be granted unless it has:

'…been the subject of a preliminary archaeological assessment to determine the nature and significance of any archaeological remains;'

and also that:

'…adequate provision for the preservation *in situ*, excavation or recording of any interest is made in accordance with the level of importance of the finds.'

2.3.2 Rutland

In Rutland the Minerals Core Strategy and Development Control Policies Development Plan Document (DPD) was adopted by Rutland County Council in October 2010. This document replaces the Leicestershire Minerals Local Plan Review which was adopted by Leicestershire County Council in 1995, prior to Rutland becoming a unitary authority in 1997. The DPD sets out the council's vision, objectives, spatial strategy, policies and development control policies to guide minerals development in Rutland up to 2026 and forms part of the Local Development Framework for Rutland.

MDC Policy 1 – Impacts of mineral development states that

'Mineral development will only be permitted where it can be demonstrated that there is a need, and that the impact on communities and the environment can be controlled within acceptable levels. In determining planning applications for development the following issues will be considered:

(iii) impacts on the appearance, quality and character of the landscape and any features that contribute to its distinctiveness;

(v) impacts on historic landscapes, area, sites or structures of architectural and historic interest and their settings and sites of existing or potential archaeological interest or their settings.'

In addition MDC Policy 3 – Sites with National Designations states that:

'Minerals development, which is likely to prejudice the purpose of the following designated sites and their settings, will not be permitted unless the reasons for development outweigh the likely adverse impact, taking into account the requirements of relevant legislation and guidance.

Scheduled Ancient Monuments and other nationally important archaeology; Listed Buildings, and Registered Historic Parks and Gardens. In all cases, applications will be subject to the most rigorous examination.'

Undesignated heritage assets of regional and local significance including conservation areas are considered in Policy MDC5 – Historic Heritage

'Minerals development will only be permitted if it can be demonstrated that there will not be an unacceptable impact on areas, sites and features of archaeological, historical, and architectural importance, and their settings and that appropriate measures will be implemented to protect these assets.'

2.3.3 Local Authority Core Strategies

In Leicestershire the only local authorities to have an adopted Core Strategy are Oadby & Wigston and Hinckley & Bosworth Borough Councils. Core Strategy

Policy 15 of the Oadby & Wigston Core Strategy addresses Landscape and Character and states:

'…all development proposals will be considered against the need to protect and enhance the distinctive landscape and historic character of the Borough. They should reflect the prevailing quality, character and features such as settlement pattern, views, biodiversity and local distinctiveness.'

The policy goes on further to state:

'The Borough Council will take into account any potential impacts on the character and quality of the landscape, particularly where this relates to nationally designated areas or features of landscape and cultural significance.'

Similarly the Hinckley & Bosworth Core Strategy sets out the overarching strategy and core policies to guide the future development of the borough up to 2026. The value of the borough's landscapes, wildlife and heritage are recognised within the core strategy which explicitly reconises the need to:

'…safeguard valuable assets such as conservation areas, listed buildings, sites of archaeological and cultural interest, geology and landscape character.'

Core Strategies for the other local planning authorities in Leicestershire are currently at varying stages with drafts either yet to be published or still going through a consultation phase. A timetable for the publication of the various core strategies is set out in Table 1.

2.4 Minerals Planning and the Aggregate Resource Assessment

Table 1 Progress of Core Strategies in Leicestershire and Rutland

Local Authority	**Pre-Submission Consultation**	**Submission to Secretary of State**	**Adoption**	**LDF Website**
Blaby	Oct-Nov 2011	Dec 2011	Oct 2012	http://www.blaby.gov.uk/ccm/navigation/planning-and-building/planning/consultation/
Charnwood	Nov-Dec 2011	Feb 2011	N/A	http://www.charnwood.gov.uk/pages/charnwood2026
Harborough	Nov-Dec 2010	April 2011	Nov 2011	http://www.harborough.gov.uk/site/scripts/documents.php?categoryID=856
Hinckley & Bosworth	Completed	Completed	Dec 2009	http://www.hinckley-bosworth.gov.uk/info/856/local_development_framework
Melton	June-July 2011	Oct 2011	April 2012	http://www.melton.gov.uk/environment_and_planning/planning/planning_policy/local_development_framework.aspx
North-West Leicestershire	Dec 2011	May 2012	Dec 2012	http://www.nwleics.gov.uk/pages/local_development_framework
Oadby & Wigston	Completed	Jan 2010	Sept 2010	http://www.oadby-wigston.gov.uk/Home/Planning/Forward%20Plans/Local%20Development/LDF_LDF_Home.aspx

3 Methodology

To achieve the main aims and objectives of the project a range of methodologies were employed to secure the information necessary to facilitate the assessment. These methodologies are outlined within this section.

The survey area for the Resource Assessment covered those parts of the project area where surface aggregate producing deposits and areas of current, previous or potential hard rock extraction, have been recorded on the 1:50,000 BGS digital geology maps. These comprise both superficial sand and gravel and bedrock deposits.

3.1 Defining the Aggregate Resource

3.1.1 Identification of Past, Present & Future Aggregate Extraction Areas

The location of all aggregate minerals extraction planning permissions since 1948 was collated from information derived from the Leicestershire and Rutland MPAs, the Leicestershire HER and relevant data available through the BGS website derived from the Mines and Quarries Database – BritPits:

- http://www.bgs.ac.uk/discoverymetadata/13480276.html

These quarries are identified in Table 13 and Table 14. The likely locations of future extraction sites was determined using relevant MPA data and through reference to published LDF documentation and the indicative Minerals Safeguarding Areas. This process addressed the requirements of objective 2 (section 1.2). Possible locations for future aggregate extraction are listed in Table 17 Geology of Allocated Sites and Alternative Sand and Gravel Sites.

3.1.2 Definition of the Aggregates Resources

To meet **objective** 1 (section 1.2) the aggregate resource was defined using information provided by both the Leicestershire and Rutland Minerals Planning Authorities (MPAs), as well as data available from the BGS.

3.1.3 Definition of Aggregate Areas

The process of defining the Aggregate Character Areas (ACAs), required to meet **objective** 3 (Section 1.2), involved drawing together MPA and BGS data within a Geographical Information System (GIS) environment, in this case MapInfo. This required all the known areas of past and current aggregate extraction to be plotted against BGS mapping for the project area to facilitate the production of Table

13,Table 14 and Table 17, which list allocated and alternative sand and gravel sites. By identifying areas of past, current and possible future aggregate extraction and viewing these against the bedrock and superficial mapping it was possible to produce lists of the known exploited aggregate minerals present across the project area, these are presented in Tables 15Table 15, Table 16 and Table 18. This process enabled the identification of the aggregate resource.

All currently exploited and potentially exploitable aggregate resources within the project identified inTables 15, Table 16 and Table 18 were then selected from the BGS mapping. This enabled the creation of a series of GIS layers for the defined aggregate resource. A 200 metre buffer was included to extend the area encompassed within each of these layers, the purpose of which was to accommodate that proportion of the aggregate resource which has not been mapped either because the full extent has not been recognised or because it has been masked by overlying superficial deposits. The larger areas of settlement were then excluded from the GIS layers since these are areas unlikely to be considered for aggregate extraction. The settlement areas were defined using the 'Urban' layer from the Ordnance Survey's "Strategi" dataset. This is a digital vector representation of the OS 1:250,000 scale mapping which identifies the larger settlement areas.

The approach outlined above, using a combination of BGS, MPA and OS information, defined the full extent of the aggregate resource for the project area. From this aggregate resource four Aggregate Character Areas (ACAs) were identified: Charnwood and Upper Soar Igneous Rocks, Leicestershire and Rutland Limestone, Fluvial Sands & Gravels and Glaciofluvial Sands and Gravels (Figure 6). The ACAs represent the main areas of consideration for this project, however these have, where appropriate, been further divided into a series of sub areas based upon a range of factors including geological indicators, topography and landscape character. So for instance in the case of Fluvial Sands and Gravels where the aggregate resource was clearly associated with a river valley the topography was used to define the sub area boundary (Figure 6).

3.2 Identification of the Archaeological Resource

3.2.1 Definition of the Archaeological Resource

The archaeological resource of the aggregate producing areas was defined using information principally derived from the Leicestershire and Rutland HER. Other key information sources included data recorded through the Portable Antiquities Scheme (PAS), the Leicestershire, Leicester & Rutland Historic Landscape Characterisation (HLC), a significant body of air photo interpretation work carried out across Leicestershire and Rutland for several National Mapping Programme (NMP) projects, and as a result of independent local investigations.

The HER is an actively maintained register of the known archaeological resource and of other heritage assets (e.g. SMs, LBs, RPG and Battlefields, etc.) within Leicestershire and Rutland. However, notwithstanding the wealth of information held by the record, users need to recognise that there is a inherent bias within the data, predicated substantially upon the subjective targeting of past investigations and the differential visibility of archaeological sites present within a range of landscape types (more or less conducive to the identification of sub-surface archaeological remains) across the project area. As such the HER will not provide us with a wholly accurate reflection of previous human activity, rather it forms a picture of the current state of knowledge.

3.2.2 The Leicestershire and Rutland Historic Environment Record

The core information that comprises the Historic Environment Record (HER) for Leicestershire and Rutland is held within a sophisticated database and maintained by the Historic and Natural Environment Team at Leicestershire County Council; a separate HER for Leicester City is maintained by Leicester City Council. The database, which is held within a software package known as HBSMR (Historic Buildings, Sites and Monuments Record), was developed by exeGesIS Spatial Data Management Ltd in partnership with English Heritage's National Monument Record (NMR) and the Association of Local Government Archaeological Officers (ALGAO). HBSMR is currently used by the majority of HERs/SMRs in England and has come to be regarded as the industry standard. This database which is linked to the County Council's corporately maintained GIS (currently MapInfo 8.5) is frequently used to produce mapped outputs which can display records of monuments, events, finds and Historic Landscape Character (HLC) and allows the user to build custom queries enabling detailed analysis of the data.

The HER also consists of a substantial body of 'grey' literature. This comprises largely developer funded reports generated from archaeological work carried out to meet the requirements of planning conditions. In addition, antiquarian studies, reports supplied by local archaeological and historical societies and individuals, maps and aerial photographs are also held, as are a large number of journals and books relating specifically to the county.

The Leicestershire and Rutland HER was established during the early 1980s and since that time has developed considerably both in terms of the technology it employs and in the scope of the information held within it. The HER is now maintained primarily as a facility to aid the development management process. The HER is routinely consulted during the determination of planning applications to help assess the likelihood of the presence, or absence, of archaeological remains and how they may be affected by any proposed development.

As a public record the HER is regularly consulted by a range of people, including archaeological contractors, local history societies, students and interested members of the public. These people all feed information back into the HER, which in turn contributes to more informed planning decisions.

3.2.3 Analysis of HER data

During the course of the archaeological resource assessment both Monument and Event records from the HER were queried with the resulting searches copied into the project database.

Data was initially extracted by period using the date ranges employed by the HER; these date ranges are set out in Table 1 below. When analysing the information a number of caveats need to be taken into account. First, a significant proportion of the records will span more that one period so that they will appear in two or three layers. This is most commonly the case with prehistoric records, where a site afforded a broad 'Later Prehistoric' date, will appear across a range of period time-slices from the Neolithic to the Iron Age. Second, many prehistoric sites, identified by aerial photography, have been attributed a 'default' Iron Age date. Whilst in many instances this is likely to prove correct, it follows that the Iron Age is over-represented, whilst other periods, notably the Bronze Age and Roman periods are underrepresented. Finally, for the data analysis linear features such as roads and canals were converted to points so that their location may not appear obvious during any visual appraisal of the information. Where important linear features do cross any of the sub area areas this will be discussed.

Following data extraction, to concord with the current regional research agenda, as well as aggregate assessments being conducted in adjacent counties, the HER data was restructured to reflect current chronological subdivisions, which recognise growing evidence for continuity between and transition within the traditional period divisions. In that context, the resource assessment amalgamates the Neolithic with the Early to Middle Bronze Age, and the Late Bronze Age with the subsequent Iron Age. This has the side effect of partly addressing the chronological bias in the cropmark data noted above.

In addition to splitting data up by period it was also possible to view the HER information separately for each of the ACAs and sub areas so that distribution patterns and densities could be recognised and compared across the project area.

Table 2 HER Period Definitions

Period	From	To
Palaeolithic	950,000 ya	9,701 BP
Mesolithic	9,700 BP	4,001 BC
Neolithic	4,000 BC	2,501 BC
Bronze Age	2,500 BC	801 BC
Iron Age	800 BC	AD42
Roman	AD43	410
Anglo-Saxon	411	1066
Medieval	1067	1539
Post-medieval	1540	1899
Modern	1900	2050
Unknown		

Table 3 HER data summary for Leicestershire and Rutland

Period	No of sites	% of total	% of actual HER Records
Palaeolithic	107	0.5	0.7
Mesolithic	392	1.7	2.5
Neolithic	1,059	4.7	6.9
Bronze Age	1,223	5.4	7.9
Iron Age	1,104	4.9	7.2
Roman	1,580	7.0	10.2
Anglo-Saxon	765	3.4	5.0
Medieval	3,786	16.9	24.5
Post-medieval	6,934	30.9	45.0
Modern	4,405	19.6	28.5
Unknown	1,097	4.9	7.1
TOTAL	22452	100	145.5

Total area 2,476km^2, Leicestershire 2083km^2. Rutland 393km^2

3.2.4 The Portable Antiquities Scheme

The Portable Antiquities Scheme (PAS) is a national programme currently funded by DCMS and administered by the British Museum which aims to record archaeological objects found by members of the public in England and Wales. The scheme, which began in 1997, has been running in Leicestershire and Rutland since August 2003. The primary, but not exclusive, focus of the scheme has targeted metal detectorists who regularly look for and find objects that are of archaeological interest. The scheme provides on opportunity for detectorists and other members of the public to have their finds identified by a dedicated professional and for the object's details to be entered on a national database. The development of this database provides an additional source of information covering the project area.

In common with the HER the information recorded on the PAS database has its own set of inherent biases with regard to the type and distribution of data typically being recorded. The most apparent bias being that the bulk of the material recorded is metalwork, predominantly found in rural locations. In addition PAS tends to record single find spots rather than sites and often reflects the activities of a relatively small number of particularly active individuals who may be focusing intensively on their own favoured areas. Despite these caveats, PAS data now provides a useful source of information which extends our knowledge of human activity across the project area and can be viewed as a useful addition to the information recorded on the HER.

The period definitions employed by the Portable Antiquities scheme are similar to those used by the HER and an appraisal of the material held within this database has produced the summary of results found below in Table 4. In a similar fashion to the HER, information recorded through PAS can be used to recognise distribution and density patterns both for each of the ACAs and the sub areas.

Table 4 PAS Data Summary for Leicestershire and Rutland

Period	No of Finds	% of total
Palaeolithic	9	0.1
Mesolithic	49	0.6
Neolithic	132	1.8
Bronze Age	86	1.1
Iron Age	224	3
Roman	3371	45
Anglo-Saxon	312	4.2
Medieval	2159	28.8
Post-medieval	1038	13.9
Modern	8	0.1
Unknown	106	1.4
TOTAL	7494	100

3.2.5 Historic Landscape Characterisation (HLC)

A Historic Landscape Characterisation (HLC) study has recently been completed for Leicestershire, Leicester and Rutland. The data set is now held within a module of the HBSMR database. The characterisation provides a comprehensive and high quality appraisal of the historic dimension of the landscape. The information created through the HLC process was drawn from a wide range of sources; these were also consulted for the Aggregates Resource Assessment although for this the purpose was not specifically to determine the Historic Landscape Character. HLC focuses, primarily, on describing the current historic character of the landscape and, where available information permits, a description of the previous character has also been made.

HLC is underpinned by a number of simple guiding principles. First, it concerns the mapping of the historic dimension of existing urban and rural landscapes; it is a comprehensive and not selective study and looks at areas rather than individual sites. The study takes a holistic approach, recording both the commonplace and the locally distinctive. By studying the time-depth of the landscape HLC is able to express the dynamic nature of both urban and rural environments (Clark, J, Darlington, J, & Fairclough, G, 2004).

By integrating HLC information into an analysis of the ACAs and the sub areas it becomes possible to develop a more informed understanding of how they sit within a broader landscape context. It is important to understand the landscape as a product of human interaction and influence and recognise landscape as archaeologically significant. In adopting this approach it follows that HLC provides a vital data set which should be used to inform planning decisions and as an aid for mitigating the impact of aggregate extraction upon the landscape. HLC will also have a useful role to play when it comes to restoration following extraction. Whilst it may not be realistic, or even desirable, to attempt to replicate the landscape looked prior to extraction any restoration needs to be sympathetic to the wider landscape character.

3.2.6 Landform Classification

The Landform Classification system, devised by David Passmore and Clive Waddington (Passmore and Waddington 2009, Ch. 2.3), provides an analytical framework within which geologically discrete units are correlated with specific archaeological and palaeoenvironmental associations. The technique has been applied to the study area, enabling the definition of discrete Landform Elements informed by discussion with project teams working on archaeological resource assessments for Derbyshire and Nottinghamshire (Table 5 Landform Elements in Leicestershire and Rutland). The primary purpose of the analysis has been to inform the identification of the larger Aggregate Character Areas (ACAs) and their constituent sub areas, whilst providing a structured archaeological appraisal of the constituent Landform Elements (Section 5 below). The rate and scale of change for each of these landform elements will have varied considerably since the last glaciation and, consequently, the potential preservation of archaeological and palaeoenvironmental remains will vary accordingly.

Table 5 Landform Elements in Leicestershire and Rutland

Geological Period	Landform Element
1. Bedrock geology (Carboniferous, Permian , Triassic and Jurassic) with discontinuous shallow drift cover	1a. Carboniferous Limestone (incl. interbedded mudstones, etc)
	1b. Dolomitic Limestone
	1c. Magnesian Limestone (incl. the Cadeby formation – dolomitic limestone)
	1d. Lava, basaltic lava, agglomerates, microgabbro
	1e. Sandstones (Sherwood, etc)
	1f. Millstone Grit
	1g. Shales, siltstones, mudstones
	1h. Conglomerates
	1i. Coal Measures
	1j. Jurassic Limestone
2. Superficial deposits (Pleistocene)	2a. Till (Mid- Pleistocene, Devensian)
	2b. Undifferentiated Deposits (incl. head, tufa, talus, slope deposits, alluvial fans)
	2c. Glaciofluvial sands and gravels (ice-contact deposits)
	2d. Glaciofluvial sands and gravels (river terraces)
	2e. Late glacial palaeochannel belts, kettle holes & enclosed basins
3. Superficial deposits (Holocene)	3a. Alluvial terraces and floodplain including modern floodplain development.
	3b. Lowland alluvial palaeochannel and floodbasin deposits and carrs (incl. organic-rich deposits)
	3c. Upland Holocene peat bogs
	3d. Alluvial fans and colluvial spreads.
	3e. Cover sands
4. Developed, made or disturbed ground (modern)	4a.Urban, plantation, infrastructure, etc

Using the classification system devised by Passmore and Waddington copies of the BGS Bedrock and Superficial geology GIS layers were made; within the associated tabular data additional fields were created to accommodate landform element codes and brief summaries of their archaeological associations. A new legend, defined by the landform codes, was then created and consulted when defining the ACAs and their sub areas. These GIS layers may be used independently of the ARA and have the potential to be used as a core dataset to aid future statistical analysis of HER, PAS or air photo information.

3.2.7 National Mapping Programme and Aerial Photography

Since the 1990s work has been carried out on English Heritage's National Mapping Programme (NMP). The programme, initially undertaken by the Royal Commission on the Historical Monuments of England (RCHME), aims to develop our understanding of past human settlement by providing primary information and synthesis for all archaeological sites and landscapes visible on aerial photographs or other airborne remote sensed data.

Most ALSF Aggregate Resource Assessments have included an NMP component; however, for the current project resources did not extend to carrying out full targeted mapping across the project area to NMP standards. However, it was felt that the project would benefit from a consolidation of the available mapped information into a single GIS dataset. This provided an opportunity to make a considered appraisal of the transcribed cropmark evidence across the project area. This process also allowed for a re-evaluation of the quality of the original mapping and to consider the need, if any, for a full or targeted survey to be carried out to full NMP standards at some point in the future.

Only a limited proportion of Leicestershire and Rutland has been directly targeted by the NMP (i.e. The National Forest), however, most of the surrounding counties have been surveyed. Consequently, there has been a significant degree of overlap with NMP survey being carried out along the Welland Valley, much of the Trent-Soar confluence and across a significant proportion of Leicestershire and Rutland's Jurassic limestone. Approximately of 35% (c. 900km^2) of the project area has currently been surveyed as part of the NMP process. However, prior to the ARA project little of this information had been incorporated into the Leicestershire and Rutland HER.

The relevant NMP data was acquired from the NMR to be incorporated into the project data set. For Lincolnshire, Nottinghamshire and the National Forest this information was supplied digitally in the form of a series of .TIFF files, each one representing the area covered by a 5km x 5km 1:10,000 scale OS quarter sheet. So that this information could viewed against other digitally held data sets the TIFFs were georeferenced and registered for use in MapInfo. The TIFFS were then used as the basis for the development of a cropmark layer which was saved as a .TAB file. The creation of this layer involved the tracing of the raster TIFFS so that they could be stored in a vector format and features mapped by NMP could be associated with the relevant HER entry or, where necessary a new HER record created.

The Northamptonshire National Mapping Project data was readily available as a GIS layer and was downloaded through the ADS website at:

- http://ads.ahds.ac.uk/catalogue/projArch/NMP/nnmp_eh_2003/downloads.cfm?type=gis.

From this layer the information relating to Leicestershire and Rutland was cut out, copied and incorporated into the layer containing information from the Lincolnshire, Nottinghamshire and National Forest Projects to form a single GIS Air Photo layer.

Across both Leicestershire and Rutland there has been a good tradition of archaeological air reconnaissance much of which being carried out from the 1950s to 80s by James Pickering. This work has resulted in the identification of a large number of cropmark sites many of which have been transcribed onto a series of paper plots currently held within the HER. Many of these transcriptions were published in *Past Worlds in a Landscape: Archaeological Crop Marks in Leicestershire* (Pickering, J. and Hartley, R. F. 1985). The problem with many of the original and indeed published transcriptions, however, was that they could not be readily spatially located. To overcome this problem many of the original paper plots were scanned and georeferenced in MapInfo in order that these to could be digitised and added to the newly created air photo GIS layer.

One limitation to the air photo evidence recognised early on in the process was that the much of the non NMP material only mapped cropmarks and did not include any earthwork plots, consequently, the air photo layer was exclusively restricted to cropmark evidence.

The bringing together of the mapped archaeological air photo information has resulted in a single cropmark MapInfo layer known as APCropmark. This layer includes, within its tabular data, a record of the underlying bedrock and superficial geology as well as any HER reference that can be reliably associated with the mapped features.

3.2.8 LiDAR Data

Light Detection and Ranging (LiDAR) is an airborne laser mapping technique that can be used to build up accurate, high resolution models of the ground surface and the features upon it. The technique has successfully been used to identify very slight earthwork remains. To aid its work in managing flood risk a significant of LiDAR survey has been carried out by the Environment Agency (EA) Geomatics Group. The information gained from LiDAR survey has the potential to provide detail of valley bottom physiography/geomorphology, as well as detail of archaeological sites. It was intended that LiDAR data for the aggregate producing areas would be sought from EA, subject to availability, and its potential assessed as a supplement to existing available air photo coverage. Efforts were made to obtain LiDAR data from EA however this was unavailable during the period that the project was running.

Limited LiDAR analysis was available principally as a result of work carried out to examine aspects of the archaeology on the route of a proposed widening scheme along the M1 motorway between junctions 21 and 30 (Kincey, M. and Challis, K. 2007). Within the project area this represents a corridor approximately 2 kilometres wide and about 34 kilometres long stretching form the south-western side of Leicester to county's border with Derbyshire on the River Trent just south of Long Eaton. Whilst this represents a relatively small area it does cut across both hard rock and sand and gravel ARA sub areas and consequently provides a sample of the range of evidence this form of survey may reasonably be expected to reveal were the technique to be more widely applied.

3.2.9 Backlog Projects

A study of archaeological investigations undertaken as a result of aggregate extraction was carried out as a component of the project meeting objective 5 (section 1.2). The aim of this was to assess whether there were any 'aggregate-related' archaeological investigations which have not had their results adequately disseminated. This component of the project comprised a literature check, specifically reviewing data held by the Leicestershire and Rutland HER and published data from the annual review of fieldwork in the Transactions of the Leicestershire Archaeological and Historical Society. Guidance and a task specific database was developed by ARCUS (ARCUS, 2007), later to become part of Wessex Archaeology. Once all relevant information for Leicestershire and Rutland had been entered into the database a copy was then returned to Wessex Archaeology for incorporation into English Heritage's National database.

As part of the appraisal, a small number of new monuments and rather larger quantity of new event records were identified for inclusion on the HER; these have been incorporated into the record as part of the on-going maintenance programme.

3.3 Data Synthesis

3.3.1 Archaeological Resource Assessment

The known archaeological resource was summarised by Aggregate Character Area and sub area, the latter forming part of the project archive, along with an analysis of information held by the HER; this included chronology, type, asset density and distribution together with a description of the historic landscape character. Other ARAs including those for Gloucestershire (Mullin, D. 2008), Warwickshire (Alexander, M. 2008) and Worcestershire (Jackson, R & Dalwood, H. 2007) were also taken into consideration.

3.3.2 Mitigation Strategy

The work outlined above contributed to the development of a mitigation strategy comprising a defined suite of techniques applicable to specific archaeological potentials and targeting particular ACAs and selected sub areas (Sections 6 and 10 below). The development of a defined mitigation strategy addresses **objective** 8 (section 1.2). Included within this strategy is an assessment examining how the archaeological resource within the project area may be most effectively managed helping to fulfil **project aim** 2 (section 1.2). Included here is some consideration of current strategies and policies. The intention of this component was to inform proposals for the development of new strategies which could be applied to both mineral and other planning applications. The development of mitigation strategies draws upon those outlined by Waddington and Passmore (2006) in *Planning for the Future,* also from *Mineral Extraction and Archaeology: A Practice Guide* prepared by the Minerals and Historic Environment Forum (2008), and was further developed following consultation with ARA project team members for both Derbyshire and Nottinghamshire. This has enabled, to some degree at least, a consistency of approach across much of the East Midlands.

3.3.3 Creation of a Project GIS

A project GIS was developed using MapInfo; the purpose of this was to facilitate the identification of the Aggregate Character Areas. This facilitated **aim** 1 (section 1.1) to be fulfilled and enabled detailed spatial analysis of a range of data sets to be carried out helping to meet **objectives** 1, 2 and 3 (section 1.1). The base data for the GIS was derived from a number of sources which included the following layers.

- Superficial Geology
- Bedrock Geology
- Artificial Ground
- Minerals Safeguard Areas
- Relief and Drainage
- Floodplain
- Modern and Historic OS Mapping
- Historic Environment Record Layers
- Past, Current and Potential Aggregate Extraction Areas
- Historic Landscape Characterisation Data
- National Mapping Programme Data
- 2000 and 2006 GIS Aerial Photography Layers

A number of GIS layers were also created during the course of the project and included separate MapInfo.TAB files for each of the newly defined ACAs and their sub areas as well as a series of layers containing subsets of HER information. The GIS datasets will be deposited with the ADS following the conclusion of the project.

4 Aggregate Resource Assessment

4.1 The Geology of Leicestershire and Rutland

Leicestershire and Rutland have an incredibly rich and diverse geological heritage with most of the geological ages represented within the British Isles present within the project area. This rich geodiversity has had a profound influence over the ecological, cultural and economic diversity of the two counties. The impact of geology upon the topography of an area can be considerable and the soils derive many of their characteristics from the underlying rocks which, in turn will have a direct influence over the ecological profile of an area. (Ambrose, K. 2001). Similarly the industrial and cultural character evident within the landscape has been profoundly influence by topography and ecology derived from the underlying geology.

Within Leicestershire and Rutland the many different rock types date from a range of geological epochs and many form prominent landscape features. However, a substantial proportion of the bedrock geology lies below unconsolidated sediments, such as boulder clays and glacial sand and gravel deposits. Along the Trent and Soar valley and, to a lesser extent along the Welland and Wreake, there are many superficial deposits of sands and gravels which are recognised as having a significant archaeological potential. The working of these deposits has itself also had a significant effect upon the present day landscape.

The oldest rocks found within the project area are in Charnwood Forest, to the north-west of Leicester, and have been exposed largely as a consequence of a gentle tilting of Leicestershire and Rutland's rock formations to the east. These rocks, which are volcanic in origin, represent one of very few exposures in England of 'basement' rocks dating to the Precambrian (Carney, J.N. 2010). Folded by subsequent earth movements and subject to the processes of erosion these are rocks which, millions of years ago, formed part of a mountain range the lower slopes of which are still covered by Triassic–age Mercia Mudstone and Quaternary deposits. Charnwood's rocks, which are considered to be of international importance, contain fossils of some of the oldest known multicellular organisms, including *Charnia Masoni*, a soft coral–like creature and the first Precambrian fossil to be identified, as well as soft bodied jellyfish-like and worm-like organisms.

West of Charnwood Leicestershire's geology consists of layers of younger Carboniferous and Triassic rocks including sandstones and limestone. Carboniferous Limestone forms the most recent component of the Carboniferous rock succession in England and, unlike Derbyshire to the north, is not well represented in Leicestershire appearing only as a series of inliers. The reason for this can probably be attributed to the fact that Charnwood's Pre-Cambrian rocks formed a series of islands in the shallow tropical sea covering much of the land that is now England and Wales. This had the effect of reducing the extent over

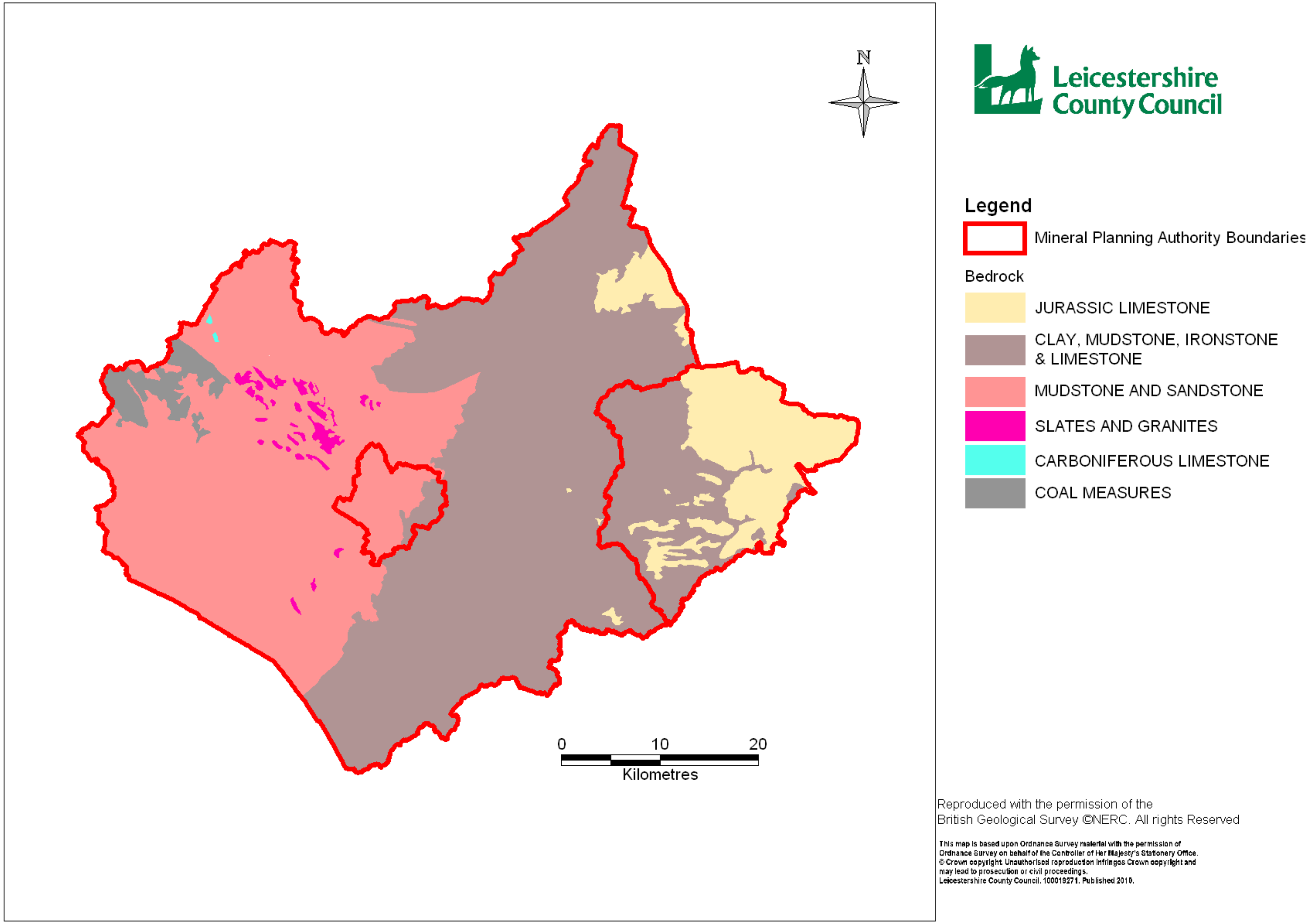


Figure 4 Bedrock Geology in Leicestershire and Rutland

which limestone was deposited. Also laid down during the Carboniferous are overlying sandstones and shales of the Millstone Grit, outcropping in the very north-east of Leicestershire and extensive Upper Carboniferous Coal Measures in the west around Ashby-de-la-Zouch. The Coal Measures are made up mudstones, sandstones as well as coal seams which represent the fossilised remains of forests that grew on deltas extending into the shallow sea.

Underlying most of the western half of Leicestershire are red mud stones and sandstones of the Mercia Mudstone Group deposited during the Triassic Period when what is now Britain formed part of the supercontinent known as Pangaea and was at a latitude equivalent that of the Saharan desert today. These mudstones were most probably formed from wind-blown dust settling in shallow salt-lakes and on dried out mudflats. These mudstones can be up to 300m thick and give rise to a moderately undulating landscape.

East of the River Soar the rocks are more recent comprising Jurassic clays, ironstones and limestones. Here the thick clay formations alternate with thinner layers of ironstones and harder bands of limestones which typically stand out as small ridges. These rocks were deposited as layers of mud and sand in the warm tropical shallow seas covering most of central England at this time. A resistant capping of Marlstone Rock above the clays, typifies the higher parts of eastern Leicestershire and Rutland, including the Belvoir Scarp, Laughton Hills, higher ground between Caldecott and Uppingham and around Oakham.

In the eastern half of Rutland and on the Leicestershire/Lincolnshire border are limestones and clays of Middle Jurassic age which were laid down in a very shallow sea and sometimes under estuarine conditions.

The most recent superficial, or drift, deposits which overlie the bedrock geology of much of the project area comprise Alluvium, Glacial Sands and Gravel, River Terrace Deposits and Till. These are deposit laid during the Quaternary, a period covering the last two million years up to the present day. Often referred to as The Ice-Age this is a period which has witnessed dramatic changes in the global environment and is typically subdivided into two epochs, the Pleistocene (up to about 11,500 years ago) and the Holocene (about 11,500 years ago to the present day). During this period there has been a series of widespread glaciations separated by more temperate climatic conditions (interglacials) which have been instrumental in forming the landscape we now live in.

Across the project area it is the deposits of clay, sand and gravel which provide much of the evidence for this mix of glacial and warmer conditions. Till, or boulder clay represent the most extensive deposits, formed in and beneath successive glaciers and ice-sheets, they occur across much of Leicestershire and Rutland.

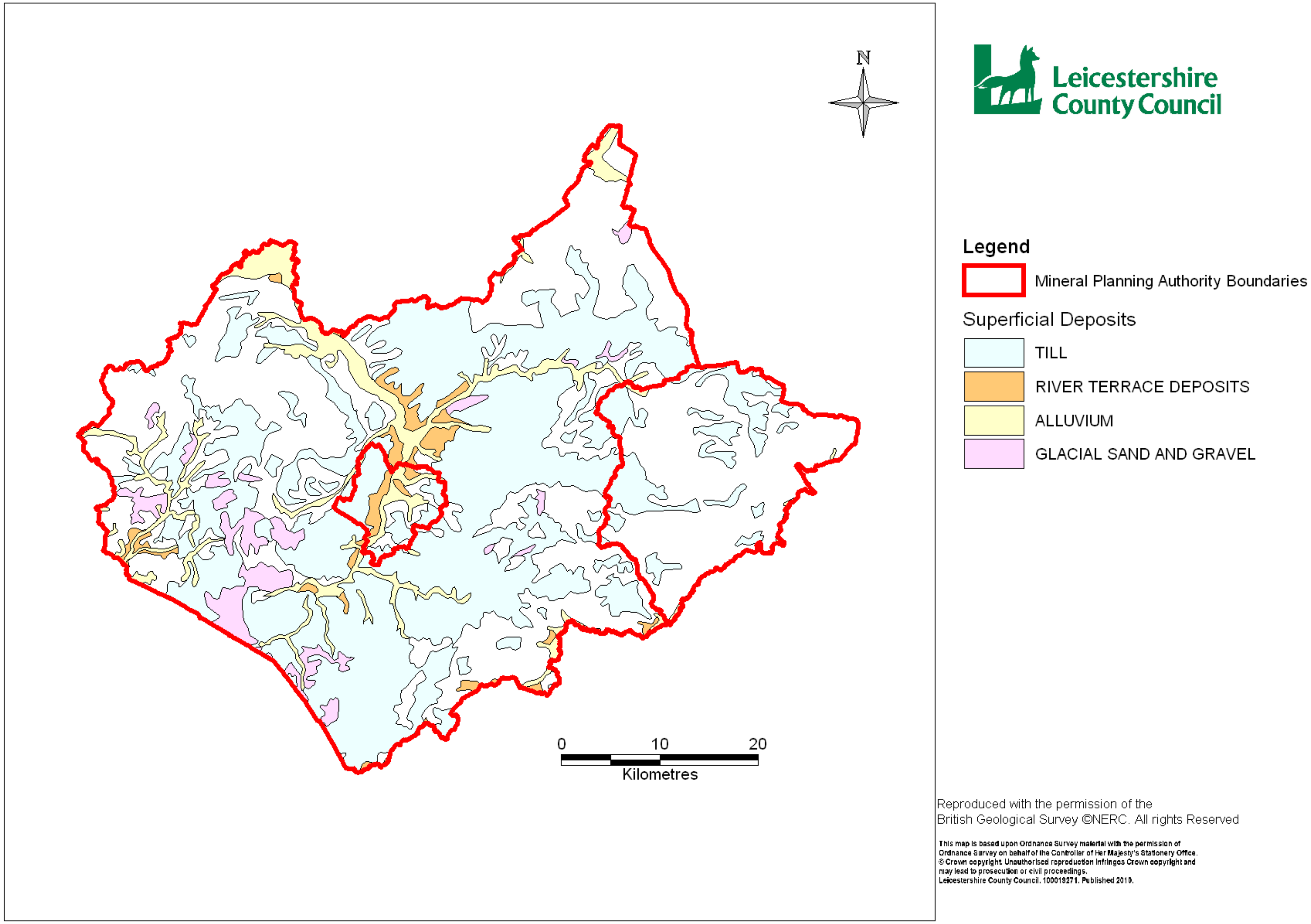


Figure 5 Superficial Deposits in Leicestershire and Rutland

The sands and gravels found along the valley of the Soar, its tributaries, the Welland and Trent, were deposited by more extensive river systems than are present today following the melting of the last ice sheet about 12,000 years ago. Of particular importance are the quartz and quartzite-rich sands and gravels deposited by the Bytham River; a major river draining much of the Midlands, during the Cromerian stage. It is these deposits which are regarded as having a potentially crucial role in providing evidence of early human occupation in the British Isles.

Around 478,000 years ago temperatures were falling and ice sheets began to spread from the north. This period of glaciation, which we refer to as the Anglian, lasted approximately 50,000 years during which time the ice appears to have blocked the course of the Bytham resulting in the formation of a large lake known as Lake Harrison. Several layers of clay up to 40m thick in places were laid down, along with sands and gravels, which now form part of the project area's aggregate resource.

4.2 Summary of Aggregate Extraction in Leicestershire and Rutland

The following assessment provides a brief overview of operational (active) and former (worked out) quarries as well as the site allocations identified in the Leicestershire Minerals Development Framework, Preferred Options Document (up to 2021). This assessment draws from the Minerals Development Framework and the Minerals Development Framework Issues and Options Consultation. An important information source from which the assessment is drawn is the Minerals UK website hosted by the British Geological Survey (BGS):

- http://www.bgs.ac.uk/mineralsuk/

This site includes Minerals Online, a web Geographical Information System (GIS), which provides access to minerals-related data and information. The data available through the GIS are intended to be used as a decision support system and as an aid for land-use planning at a local and a regional scale.

The Minerals Online mapping includes all known mineral planning permissions in Leicestershire and Rutland and information from the BritPits database. The latter holds information on both active and ceased mineral workings, their geographic location, operator, Mineral Planning Authority (MPA), site geology, mineral commodities produced and their subsequent end-uses. Much of this information has been generated by the Leicestershire and Rutland MPAs to which this project had direct access. Another core dataset was the Leicestershire and Rutland Historic Environment Record.

Through a combination of these and other relevant data sources, it is possible to develop mapping and analysis which will summarise the results of previous archaeological interventions carried out as a response to quarrying.

Quarry Name	Status	Commodity	Operator Name	Grid ref.
Bardon Hill	Active	Igneous & Metamorphic Rock	Bardon Aggregates - Midlands	SK45701320
Breedon Hill	Active	Limestone	Ennstone Johnston Ltd	SK40652305
Brooksby	Active	Sand & Gravel	Lafarge Aggregates Ltd	SK67401525
Cadeby	Inactive	Sand & Gravel	Tarmac Limited - Midlands	SK43450228
Cadeby	Active	Sand & Gravel	Tarmac Limited - Midlands	SK44330230
Charnwood	Inactive	Igneous & Metamorphic Rock	Midland Quarry Products Ltd	SK48541791
Cliffe Hill	Active	Igneous & Metamorphic Rock	Midland Quarry Products Ltd	SK45661087
Cloud Hill	Active	Limestone	Ennstone Johnston Ltd	SK41302140
Croft	Active	Igneous & Metamorphic Rock	Bardon Aggregates - Midlands	SK51209630
Freshfield Works	Inactive	Sand & Gravel	Tarmac Limited - Midlands	SK43210253
Groby	Inactive	Igneous & Metamorphic Rock	Midland Quarry Products Ltd	SK52680822
Husbands Bosworth	Active	Sand & Gravel	Lafarge Aggregates Ltd	SP63808240
Lockington	Active	Sand & Gravel	Lafarge Aggregates Ltd	SK47482967
Mountsorrel	Active	Igneous & Metamorphic Rock	Lafarge Aggregates Ltd	SK56201500
Naneby Hall Farm	Inactive	Sand & Gravel	A Braithwaite & Co Ltd	SK43380281
Old Cliffe Hill	Active	Igneous & Metamorphic Rock	Midland Quarry Products Ltd	SK47341079
Sapcote	Dormant	Igneous & Metamorphic Rock	Unknown Operator	SP49759340
Shawell	Active	Sand & Gravel	Lafarge Aggregates Ltd	SP54008120
Slip Inn	Inactive	Sand & Gravel	CEMEX UK Materials Ltd	SP53608905
Syston	Yet to Begin	Sand & Gravel	Lafarge Aggregates Ltd	SK61941268
Whitwick	Dormant	Igneous & Metamorphic Rock	Midland Quarry Products Ltd	SK44901588
Granitethorpe	Dormant, Ceased	Igneous & Metamorphic Rock	Unknown Operator	SP49509371
Syston (R)	Dormant, Ceased	Sand & Gravel	Lafarge Aggregates Ltd	SK61431205
Clipsham (R)	Active	Limestone	Bullimores Sand & Gravel Ltd	SK97651523
Greetham (R)	Active	Limestone	M. Dickerson Ltd	SK93191466
Hooby Lane, Stretton (R)	Active	Limestone	Goldholme Group	SK93581636
Woolfox (R)	Active	Limestone	Bullimores Sand & Gravel Ltd	SK95021353
Thistleton (R)	Yet to Begin	Limestone	Thisleton Quarries Ltd	SK89561766

Table 6 Operating Aggregate Sites in Leicestershire and Rutland (R)

The BGS resource mapping includes all known permissions granted since 1948 and Interim Development Order (IDO) permissions. As a consequence, whilst known archaeological sites, finds and interventions prior to this date have been considered no attempt has been made to map or quantify any aggregate extraction pre-dating 1948. It is recognised that a good knowledge of the pattern, distribution and nature of quarries prior to 1948 can provide an invaluable tool for enhancing our understanding the potential extent of aggregate resources and the level of impact quarrying might have upon potential archaeological remains.

Table 6 (above) provides details of all operating aggregate operating sites in Leicestershire and their current status, while Table 7 lists sites either abandoned, restored or in use for waste disposal.

Site Name	Status	Commodity	Grid ref.
Acresford Quarry	Restored	Sand & Gravel	SK30361343
Barrow Hill Quarry	Abandoned	Igneous & Metamorphic Rock	SP48789716
Beedles Pit	Restored	Sand & Gravel	SK62401252
Broughton Astley	Waste Disposal	Sand & Gravel	SP53509170
Calver Hill Quarry	Restored	Igneous & Metamorphic Rock	SP49639359
Cavendish Bridge Quarry	Waste Disposal	Sand & Gravel	SK45772948
Clint Hill (	Abandoned	Igneous & Metamorphic Rock	SK48979497
Enderby Warren Quarry	Waste Disposal Ceased	Igneous & Metamorphic Rock	SK53850005
Flesh Hovel Lane	Restored	Sand & Gravel	SK56271796
Frisby	Restored	Sand & Gravel	SK69161850
Narborough Road	Restored	Sand & Gravel	SP55509845
Ryecroft Road	Restored	Sand & Gravel	SK46042912
Sandfield Quarry	Restored	Sand & Gravel	SK56571230
Sawley Marina	Restored	Sand & Gravel	SK47223077

Table 7 Aggregate Sites in the Project Area no Longer Operating

4.3 The Aggregate Resource

The United Kingdom is rich in a wide range of industrial mineral resources. The extraction of these resources supports a range of important and diverse sectors and contributes significantly to the national economy. The project area covers a part of the country that is particularly rich in mineral resources. These resources are conventionally grouped into categories associated with their main uses. These are (aggregate minerals) crushed rock, sand and gravel, other construction minerals (brickclay, fireclay, gypsum and building stone) and energy minerals (coal and oil/gas). It is the aggregate minerals that form the focus of this study.

In Leicestershire and Rutland there are three principal types of industrially extracted mineral aggregate. These are sand and gravel, limestone (both Jurassic and Carboniferous) and igneous rocks.

4.3.1 Sand and Gravel

The sub-alluvial and river terrace deposits of Quaternary age represent the most important source of sand and gravel in Leicestershire, due to their consistent grading, uniformity and lower percentage of fines. These deposits mark an abandoned valley floor of a recent or existing river and are often arranged in a series of well defined steps or terraces. Across the study area deposits occur, most notably, in the valleys of the Rivers Trent, Soar and Wreake where historically extraction has taken place and continues today. These fluvial deposits also include the nationally important Pre-Anglian Bytham River.

Also important as a source of sand and gravels are the glaciofluvial deposits. These are formed from glacial melt waters, which escaped from the ice margins and occur in a complex series of isolated pockets in areas chiefly to the south and west of Leicester. These deposits typically occur in sheet or delta-like formations above boulder clays, or irregular deposits within the clay series. As a result of their irregularity and inconsistent quality, these deposits are worked less intensively than the sub-alluvial and river terrace sands and gravels. Extensive boulder clay and other drift deposits cover much of the central and eastern parts of Leicestershire and consequently the precise extent of this resource remains unknown.

In the north-west of Leicestershire around Measham and Castle Donnington there are deposits of solid sand and gravel in the form of Triassic Bunter Pebble Beds. There has been some historic working of these resources during periods when it has been economically. Some small-scale working has taken place in the past in the Vale of Belvoir of blown sand deposits resulting from aeolian reworking of river and glacial deposits and bare Triassic bedrock.

Extraction of sands and gravels for the project area have been fairly consistent between 1997 and 2008 averaging 1.3Mt or 1.97% of annual sales in England (see Table 8).

Table 8 Sand and Gravel Sales

Year	England (Mt)	Leicestershire (Mt)	Leicestershire as a % of England Sales
1997	63.01	1.67	2.65
1998	61.24	1.03	1.68
1999	62.95	0.91	1.45
2000	63.20	1.26	1.99
2001	62.68	1.40	2.23
2002	71.32	1.53	2.15
2003	69.38	1.49	2.15
2004	74.48	1.42	1.91
2005	70.84	1.36	1.92
2006	69.04	1.27	1.84
2007	67.14	1.33	1.98
2008	61.67	1.09	1.77

Source: EMRAWP Surveys & Aggregates Minerals Survey 2001/Business Monitor PA 1007

4.3.2 Limestone

Across Leicestershire and Rutland both Carboniferous and Jurassic limestones are commercially exploited.

Carboniferous limestones occur at the surface in several small isolated inliers in north-west Leicestershire close to the Leicestershire/Derbyshire border. These form locally prominent hills, their limits defined by the surrounding Triassic mudstone and marl deposits, which increase rapidly beyond the outcrops, thus determining the workable extent. Currently two of these limestone inliers are being worked within Leicestershire, at Breedon Hill and Cloud Hill.

The Carboniferous limestone outcrops at these quarries have been worked since the late 19th century. It is probable that most of this stone would have been used for local building purposes and in lime burning for agricultural uses.

The geology of the eastern half of Leicestershire and all of Rutland is dominated by rocks dating from the Jurassic (205-142 Ma) period. The Lincolnshire Limestones have been extensively quarried for building stone, including the production of roofing slates.

In Rutland there are four Limestone quarries: Clipsham, Ketton, Stretton and Woolfox. The stone quarried from Ketton, the largest limestone operation in Rutland, is used solely in connection with cement manufacture. Average limestone aggregate sales for the period 1997 to 2008 were 1.56Mt representing 2.53% of material extracted in England over that period (see Table 9 below).

Table 9 Limestone Aggregate Sales

Year	England (Mt)	Leicestershire and Rutland (Mt)	Leicestershire and Rutland as % of England Sales
1997	79.34	1.20	1.51
1998	79.78	1.57	1.97
1999	75.82	1.57	2.07
2000	74.85	1.43	1.91
2001	64.79	1.75	2.70
2002	59.24	1.66	2.80
2003	55.62	1.60	2.88
2004	58.85	1.62	2.75
2005	54.62	1.58	2.89
2006	54.92	1.70	3.10
2007	54.19	1.56	2.88
2008	48.38	1.43	2.96

Source: EMRAWP Surveys & Aggregates Minerals Survey 2001/Business Monitor PA 1007

4.3.3 Igneous Rock

Leicestershire's oldest rocks are found around the centre of Charnwood Forest and date from the Precambrian (>684 million years ago (Ma)) and Cambrian (515-570 Ma) periods. Whilst most of these rocks have no economic value Precambrian lavas do occur in exposed masses around High Sharpley and Peddlar Tor and are worked around Bardon Hill.

Later folding and uplifting movement of this stratum was accompanied by the injection of masses of fluid magma which exploited fractures around the flanks of Charnwood Forest and to the south-west of Leicester. These intrusions include economically important granodiorites and diorites which have been extensively worked. The intrusions at Charnwood Forest comprise two main groups: the southern group around Markfield, Bradgate and Groby, which are green and pink in colour; and the grey, northern group, which extends towards Shepshed. To the south-west of Leicester, isolated intrusions of granodiorite occur at a number of locations where working has taken place in the past. These sites include Enderby, Earl Shilton, Huncote, Stoney Stanton and Sapcote.

The hard rock of western Leicestershire has been exploited as a construction material for many centuries although it was not until the beginning of major road construction that large scale commercial quarrying began. By the end of the 19th century all the present major igneous rock quarries with, the exception of Buddon Wood, Mountsorrel, were in operation.

During the 1990s several of the companies involved in aggregates extraction in Leicestershire underwent a process of merger and rationalisation resulting in fewer operating units concentrated at four main sites: Bardon, Cliffe Hill, Croft and

Mountsorrel. Extraction at Charnwood Quarry has now ceased, whilst at Whitwick and Groby quarries are currently inactive, although coating and concrete plants have been maintained and permission has been granted for the re-opening of Groby and Lawn Wood Quarries.

Although there are now fewer quarries they have grown substantially in size and with the aid of rail links have become a nationally important source of crushed rock aggregate, making Leicestershire the largest producing county. Between 1997 and 2008 average annual sales of igneous rocks in the project area was 13.98Mt which equates to 67.09% of sales in England (see Table 10 below).

Table 10 Igneous Rock Sales

Year	England (Mt)	Leicestershire (Mt)	Leicestershire as % of England Sales
1997	20.34	13.94	68.53
1998	17.23	13.83	80.26
1999	20.80	13.61	65.41
2000	20.44	13.70	67.02
2001	21.80	14.36	65.85
2002	21.89	14.26	65.14
2003	21.88	14.07	64.30
2004	20.17	13.02	64.55
2005	20.58	13.91	67.59
2006	22.08	14.52	65.76
2007	21.87	14.62	66.85
2008	21.06	13.45	63.87

Source: EMRAWP Surveys & Aggregates Minerals Survey 2001/Business Monitor PA 1007

4.3.4 The Potential for Future Aggregate Extraction in Leicestershire and Rutland

Sand and Gravel

The most important sources of sand and gravel within the project area are the sub-alluvial and river terrace deposits, which are found in the valleys of the Rivers Trent, Soar and Wreake and the glaciofluvial deposits, which occur in a more complex series of isolated glacial deposits in areas to the south and west of Leicester. Two of the five currently active sites involve the working of alluvial and river terrace deposits, while the remainder work glacial deposits.

Within the Leicestershire Minerals Development Framework (Leicestershire County Council 2009) it has been noted that there would be a shortfall of sand and gravel reserves amounting to 6Mt over the period to 2021 (see Table 11). This equates to 4.8 years supply in terms of the annual apportionment figure. The calculation is based on meeting the approved sub-regional aggregate apportionment of 20 million tonnes of sand and gravel between 2001 and 2016, together with an additional 5 years based on the average annual apportionment figure. The calculation takes account of the level of permitted reserves (i.e. that part of the aggregate resource that has planning permission for extraction) as at 1st January 2001 together with reserves subsequently permitted up to 31st December 2007.

Table 11 Calculation of Sand and Gravel Provision

Regional Requirement 2001 - 2016	**165Mt** Source: ODPM June 2003
a) Leicestershire Requirement (2001 – 2016)	**20Mt** Source: RSS8
b) Annual Requirement (over 16 year period)	**1.25Mt** (a) divided by 16
c) Provision for additional 5-year period (2016 -2021)	**80.5Mt** (b) x 5
d) TOTAL REQUIREMENT (a+c)	**26.25Mt**
e) Permitted Reserves* @ 1/1/2001 (revised)* **Additional Reserves Released****	**11.02Mt** **9.251Mt** **TOTAL= 20.265**
2001 - 2021 Reserve Position (e-d): 20.25 = - 5.96Mt	
SHORTFALL OF 6 MILLION TONNES	

* Reserve data gathered for AM2001 revised following subsequent information provided from the minerals industry relating to Huncote Quarry
** Additional reserves permitted up to 31/12/07 in respect of sites at Brooksby (3,140,000 tonnes), Fosse Way, Syston (190,000 tonnes), Quorn (340,000 tonnes), Husbands Bosworth (270,000 tonnes), Ashby Parva (756,000 tonnes), Cadeby (945,000 tonnes) and Shawell (3,600,000 tonnes).

There are currently six active sites in Leicestershire at Brooksby, Cadeby, Husbands Bosworth, Lockington, Shawell and Slip Inn Quarry. There is one further permitted site, Syston (Fosse Way), which had not yet commenced extraction.

Sand and gravel operations within Leicestershire tend to serve local markets, largely within the County, although some travel to neighbouring counties and regions from sites located close to the County boundary. All material is transported by road. All of the existing operations are located in close proximity to those parts of the local road network which have the capacity to handle the heavy lorry traffic the industry generates. They are also well located to supply development within the proposed urban growth extensions, in particular those at Coalville, Earl Shilton and Barwell, Loughborough, Lubbesthorpe, Melton Mowbray and north-east Leicester.

The existing operational sites have production capacity capable of producing the required sub-regional apportionment production of 1.25Mt per annum. Existing sites, however, will not be able to meet the County's future requirements without the benefit of extensions to their currently permitted operations. The aggregates industry has identified potential extensions to these operations and it is anticipated that more than sufficient sand and gravel reserves could be released through such extensions to meet requirements over the MDF period. It is therefore considered that all of Leicestershire's sand and gravel needs in the immediate future could be met without releasing any additional land for the establishment of new sand and gravel operations.

Provision will be made in the Site Allocations Document for the release of additional sand and gravel reserves. The document will include specific proposals and policies for the release of sites, including specific requirements related to each site and the provision of appropriate safeguards and reclamation and after-use details. The identification of additional sand and gravel reserves will aim to reflect an optimum use of extensions to existing operations, where acceptable, in accordance with the LMDF strategy and reflecting a sustainable use of mineral resources.

Crushed Rock

The principal sources of igneous crushed rock within Leicestershire are located within a relatively small area around the flanks of Charnwood Forest and to the south-west of Leicester, whilst carboniferous limestone is extracted in north-west Leicestershire close to the border with Derbyshire. In Leicestershire quarrying is now concentrated at four main sites: Bardon, Cliffe Hill, Croft and Mountsorrel, whilst in Rutland the existing operational sites are located at Woolfox, Greetham, Clipsham and Stretton, together with Thistleton Quarry which is yet to begin operatio, these represent sufficient reserves to provide a 10 year landbank as specified in MPS1.

Rocks suitable for road construction and building purposes are generally absent across much of the south of England, the reserves in Leicestershire represent the nearest significant resource to the major markets in the South-East. The importance of this resource is reflected in the approved sub-regional aggregate apportionment which requires Leicestershire (with Rutland) to provide 262.5 million tonnes of crushed rock between 2001 and 2016.

It is calculated that there would be more than sufficient crushed rock reserves to meet requirements over the period to 2021 (see Table 12). The calculation is based on meeting the approved sub-regional aggregate apportionment between 2001 and 2016, together with an additional 5 years based on the average annual apportionment figure. The County's requirement has been adjusted to exclude the expected contribution from sites within Rutland, around 2% of the total requirement based on historic sales figures. The calculation takes account of the level of permitted reserves as at 1st January 2001 (adjusted for subsequent reassessments of reserves at certain quarries) together with reserves subsequently permitted up to 31st December 2007.

There are a variety of circumstances under which proposals to extend existing sites may nevertheless come forward during the MDF period. This may be for operational reasons in terms of efficient use and recovery of resources; as a means of addressing any unforeseen circumstances affecting the landbank provision or production capacity; to enable the industry to maintain or secure productivity growth and levels of employment or to justify investment in associated infrastructure, and also to reflect the different types of crushed rock aggregates produced/supplied. Such extensions to existing quarries may be appropriate in order to ensure continuity of supply, provided that the effects of the proposed development on the environment and residential amenity can be made acceptable.

Table 12 Calculation of Crushed Rock Provision

Regional Requirement 2001 - 2016	**523Mt** Source: ODPM June 2003
Leicestershire Requirement (2001 – 2016)	**257.25Mt** Source: RSS8
Annual Requirement (over 16 year period)	**16.1Mt** (a) divided by 16
Additional provision 2016 -2021	**80.5Mt** (b) x 5
d) TOTAL REQUIREMENT (a+c)	**337.75Mt**
e) Permitted Reserves* @ 1/1/2001 **Additional Reserves Released****	**467.854Mt** **17.000Mt** **TOTAL= 484.854**
2001 - 2021 Reserve Position (e-d):	**484.854 – 337.75** **= +147.104Mt**
SURPLUS OF 147 MILLION TONNES	

***** excludes reserves at dormant sites**;** figure derived from AM2001 survey, adjusted for subsequent reassessments of reserves at Cliffe Hill, Cloud Hill and Croft Quarries.
****** Additional reserves permitted at Breedon Quarry in 2006.

Quarries producing rock aggregates will generally require a longer security of reserves to justify capital investment in, for example, crushing equipment. This factor coupled with the geological limitations mean that it is not considered appropriate at the current time to contemplate any new greenfield sites for rock extraction, given the potential impact that such large scale development would involve, in Leicestershire and Rutland.

5 Defining the Aggregate Character Areas

5.1 The Aggregate Resource

Tables 13 to 18 (below) define, by quarry, the relevant exploited and potentially exploitable aggregate resource and provide their associated BGS codes. Table 13 and Table 14 list the quarries of Leicestershire and Rutland and aggregates present. Table 15 and Table 16 condense this information into two lists defining the exploited bedrock and superficial aggregate geological descriptions. Table 17 lists allocated and alternative sand and gravel sites with Table 18 providing a list of alternative and allocated sand and gravel descriptions.

Table 13 Exploited Geology in Leicestershire

Quarry and Status	Description	BGS Code
Bardon Hill (A)	Bardon Breccia; Andesitic-Rock Bradgate Formation; Volcaniclastic-Siltstone Pedlar Dacite Breccia Beacon Hill Formation; Volcaniclastic-Siltstone	BDBR-ANDR CMBT-VCSLST PLD-DA CMBH-VCSLST
Breedon Hill (A)	Milldale Limestone Formation; Dolostone Cloud Hill Dolostone Formation; Mudmound Dolostone	MI-DOLO CLHD-DLMDM
Brooksby (A)	Glaciofluvial Deposits; Sand and Gravel	GFDMP-XSV
Charnwood	North Charnwood Diorite Blackbrook Reservoir Formation; Volcaniclastic Rocks	NCHD-DI BLK-VLSS
Cavendish Bridge	Hemington Member; Silt and Gravel Holme Pierrepont; Sand and Gravel	HETD-XZV HPSG-XSV
Cadeby (A)	Glaciofluvial Deposits; Sand and Gravel	GFDMP-XSV
Cliffe Hill (A)	South Charnwood Diorites	SCHD-DI
Cloud Hill (A)	Milldale Limestone Formation; Dolostone Milldale Limestone Formation; Limestone Cloud Hill Dolostone Formation Cloud Hill Dolostone Formation; Mudmound Dolostone	MI-DOLO MI-LMST CLHD-DOLO CLHD-DLMDM
Croft (A)	South Leicestershire Diorite; Quartz-Diorite	SLED-QDI
Enderby Warren	South Leicestershire Diorite Complex	SLED-DI
Husbands Bosworth (A)	Glaciofluvial Deposits; Sand and Gravel	GFDMP-XSV
Lockington (A)	Hemington Member; Silt and Gravel Holme Pierrepont; Sand and Gravel	HETD-XZV HPSG-XSV
Mountsorrel (A)	Mountsorrel Complex; Grandiorite Unnamed Dyke, Carboniferous; Basalt and Microgabbro	MSRL-GD UDKC-BAMG
Shawell (A)	Shawell Sand and Gravel; Sand and Gravel Glaciofluvial Deposits; Sand and Gravel Dunsmore Gravel	SLSG-XSV GFDMP-XSV DMG-XSV
Groby	South Charnwood Diorite Bradgate Formation; Volcaniclastic-Siltstone Mountsorrel Complex; Pegmatitic Granite and Aplitic Microgranite	SCHD-DI CMBT-VCSLST MSRL-GRPA
Sapcote	South Leicestershire Diorite Complex	SLED-DIOQ
Slip Inn (I)	Wolston Sand and Gravel	WOSG-XSV
Syston (Y)	Alluvium, Clay, Silt, Sand And Gravel Glaciofluvial Deposits ; Mid Pleistocene River Terrace Deposits (Undifferentiated)	ALV-XCZSV GFDMP-XSV RTDU-XSV
Whitwick (D)	Peldar Dacite Breccia; Vocaniclastic Grimley Andesite Swannymote Breccia Member; Vocaniclastic	PLD-VCBR GYA-AND SYB-VCBR
Granitethorpe (DC)	South Leicestershire Diorite Complex	SLED-DIOQ

(A=Active, C=Ceased, D=Dormant, I=Inactive, Y=Yet to Begin)

Table 14 Exploited Geology in Rutland

Active Quarry	Description	BGS Code
Big Pits (Clipsham)	Upper Lincolnshire Limestone; Limestone	ULL-LMST
Clipsham	Upper Lincolnshire Limestone; Limestone Rutland Formation; Argillaceous Rocks with Subordinate Sandstone and Limestone	ULL-LMST RLD-ARSL
Greetham	Lower Lincolnshire Limestone; Limestone Upper Lincolnshire Limestone; Limestone	LLL-LMST ULL-LMST
Ketton	Rutland Formation; Argillaceous Rocks with Subordinate Sandstone and Limestone Blisworth Limestone Formation; Limestone Upper Lincolnshire Limestone; Limestone	RLD-ARSL BWL-LMST ULL-LMST
Luffenham	Lower Lincolnshire Limestone Member	LLL-LMST
Thistleton	Lower Lincolnshire Limestone Member	LLL-LMST
Tixover	Lower Lincolnshire Limestone	LLL-LMST
Witham	Upper Lincolnshire Limestone; Limestone Lower Lincolnshire Limestone; Limestone Blisworth Limestone Formation; Limestone Rutland Formation; Argillaceous Rocks with Subordinate Sandstone and Limestone	ULL-LMST LLL-LMST BWL-LMST RLD-ARSL
Woolfox	Lower Lincolnshire Limestone; Limestone Upper Lincolnshire Limestone; Limestone	LLL-LMST ULL-LMST

Table 15 Actively Exploited Bedrock Geology

Description	BGS Code	Quarry
Bardon Breccia; Andesitic-Rock	BDBR-ANDR	Bardon Hill
Beacon Hill Formation; Volcaniclastic-Siltstone	CMBH-VCSLST	Bardon Hill
Blackbrook Reservoir Formation; Volcaniclastic Rocks	BLK-VLSS	Charnwood
Blisworth Limestone Formation; Limestone	BWL-LMST	Ketton, Witham
Bradgate Formation; Volcaniclastic-Siltstone	CMBT-VCSLST	Bardon Hill, Groby
Cloud Hill Dolostone Formation	CLHD-DOLO	Cloud Hill
Cloud Hill Dolostone Formation; Mudmound Dolostone	CLHD-DLMDM	Breedon Hill, Cloud Hill
Grimley Andesite	GYA-ANDE	Whitwick
Lower Lincolnshire Limestone Member; Limestone	LLL-LMST	Greetham, Luffenham, Thistleton, Tixover, Witham, Woolfox
Milldale Limestone Formation; Dolostone	MI-DOLO	Breedon Hill, Cloud Hill
Milldale Limestone Formation; Limestone	MI-LMST	Cloud Hill
Mountsorrel Complex; Grandiorite	MSRL-GD	Mountsorrel
Mountsorrel Complex; Pegmatitic Granite and Aplitic Microgranite	MSRL-GRPA	Groby
North Charnwood Diorite	NCHD-DI	Charnwood
Pedlar Dacite Breccia	PLD-DA	Bardon Hill
Peldar Dacite Breccia; Vocaniclastic	PLD-BREV	Whitwick
Polesworth Formation; Sandstone and Congloerate	PLWF-SCON	
Rutland Formation; Argillaceous Rocks with Subordinate Sandstone and Limestone	RLD-ARSL	Clipsham, Ketton, Witham
South Charnwood Diorites	SCHD-DI	Cliffe Hill, Groby
South Leicestershire Diorite; Quartz-Diorite	SLED-QDI	Croft
South Leicestershire Diorite Complex	SLED-DIOQ	Enderby Warren, Sapcote
Swannymote Breccia Member; Vocaniclastic	SYB-BREV	Whitwick
Unnamed Dyke, Carboniferous; Basalt and Microgabbro	UDKC-BAMG	Mountsorrel
Upper Lincolnshire Limestone Member; Limestone	ULL-LMST	Big Pits (Clipsham), Clipsham, Greetham, Ketton, Witham, Woolfox

Table 16 Actively Exploited Superficial Geology

Description	BGS Code	Quarry
Alluvium; Clay, Silt, Sand and Gravel	ALV-XCZSV	Syston
Dunsmore Gravel	DMG-XSV	Shawell
Glaciofluvial Deposits; Sand and Gravel	GFDMP-XSV	Brooksby, Cadeby, Husbands Bosworth, Shawell, Syston
Hemington Member; Silt and Gravel	HETD-XZV	Cavendish Bridge, Lockington
Holme Pierrepont; Sand and Gravel	HPSG-XSV	Cavendish Bridge, Lockington
River Terrace Deposits (Undifferentiated)	RTDU-XSV	Syston
Shawell Sand and Gravel	SLSG-XSV	Shawell
Wolston Sand and Gravel	WOSG-XSV	Slip Inn

Table 17 Geology of Allocated Sites and Alternative Sand and Gravel Sites

Allocated Area	Description	BGS Code
Brooksby	Glaciofluvial Deposits; Sand and Gravel Glaciolacustrine Deposits, Mid Pleistocene Rotherby Clay; Clay, Silt and Sand	GFDMP-XSV GLLMP-XCZS RYCL-XCZS
Cadeby	Glaciofluvial Deposits; Sand and Gravel	GFDMP-XSV
Husbands Bosworth	Glaciofluvial Deposits, Mid Pleistocene; Sand and Gravel	GFDMP-XSV
Lockington	Hemington Member; Sand and Gravel Holme Pierrepont Sand and Gravel Syston Sand and Gravel	HETD-XZV HPSG-XSV SYSG-XSV
Shawell	Dunsmore Gravel; Sand and Gravel	DMG-XSV
Flash Farm, Huncote (AS)	River Terrace Deposits1; Sand and Gravel River Terrace Deposits 1 to 2; Sand and Gravel	RTD1-XSV T1T2- XSV
Thurlaston Huncote (AS)	Glaciofluvial Deposits River Terrace Deposits 1	GFDMP-XSV RTD1-XSV
Slip Inn, Ashby Parva (AS)	Wolston Sand and Gravel	WOSG-XSV
North Kilworth (AS)	Till, Mid Pleistocence; Diamicton	TILMP-DMTN

Table 18 Allocated and Alternative Site Geology

Description	BGS Code
Alluvium; Clay; Silt Sand and Gravel	ALV-XCZSV
Dunsmore Gravel; Sand and Gravel	DMG-XSV
Glaciofluvial Deposits; Sand and Gravel	GFDMP-XSV
Hemington Member; Silt and Gravel	HETD-XZV
Holme Pierrepont Sand and Gravel	HPSG-XSV
Oadby Member; Diamicton	ODT-DMTN
River Terrace Deposits1; Sand and Gravel	RTD1-XSV
Rotherby Clay; Clay, Silt and Sand	RYCL-XCZS
River Terrace Deposits 1 to 2; Sand and Gravel	T1T2-XSV
Syston Sand and Gravel	SYSG-XSV
Till, Mid Pleistocence; Diamicton	TILMP-DMTN
Wolston Sand and Gravel	WOSG-XSV

Note: Oadby Member; Diamicton (ODT-DMTN) although not itself an aggregates producing deposit does appear to be associated with substantial concealed deposits. Till, Mid Pleistocene; Diamicton (TILMP-DMTN) may also be associated with concealed deposits

The first part of the BGS code may be entered into the 'Computer Code' field of the BGS Lexicon of Named Rock Units database, at:

- http://www.bgs.ac.uk/lexicon/home.cfm

This provides definitions of terms that appear maps and in publications produced by BGS.

To facilitate the defining of the ACAs, Table 15 groups together all the actively exploited bedrock geology and Table 16 performs the same function for the superficial deposits.

Through the identification of currently exploited and potentially exploitable aggregate resources it is possible to select the geological descriptions listed in the above tables and apply them to the BGS mapping for the project area in order for the Aggregate Character Areas and sub areas to be spatially defined (see Figure 6 and Figure 7). Sections 5.2 to 5.5 provide a brief description for each of the ACAs and their constituent sub areas.

The following assessment of the archaeological resource (Section 6) has been largely confined to the four main ACA (Fluvial Sand and Gravel, Glaciofluvial Sand and Gravel, Leicestershire and Rutland Limestone and Charnwood and Upper Soar Igneous Rocks, with minimal reference within the current report to their respective sub areas. Tabulated data and archive summaries for each of the sub areas are held within the project archive.

5.2 Aggregate Character Areas

5.2.1 Fluvial Sands and Gravels

The Fluvial Sands and Gravels ACA essentially represent those parts of the project area where sand and gravel river terrace deposits are known to be present. This ACA, which accounts for 306 km^2 or 12% of the project area, extends across much of Leicestershire and Rutland. As a consequence the ACA is located over a range of landscapes types exhibiting a wide variety of contrasts. However the common theme of these contrasting landscapes is that they all follow the courses of the rivers and valleys.

The ACA has been has been further divided into seven sub areas: Lutterworth Lowlands, Mease/Sence River Terrace Deposits, Soar Valley, Trent Valley, Vale of Belvoir, Welland Valley and Wreake Valley. Each of these sub areas are considered separately below.

Lutterworth Lowlands

Forming part of the Fluvial Sands and Gravels ACA the Lutterworth Lowlands sub area is located in the south-west of the project area and is defined by the River Swift and its tributaries. The surrounding area is characterised by flat to slightly undulating farmland with a predominance of pasture.

The aggregate resource for this area includes Dunsmore Gravel, Shawell Sand and Gravel and River Terrace Deposits 1. Sand and gravel is currently being extracted at Shawell Quarry by Lafarge Aggregates Ltd.

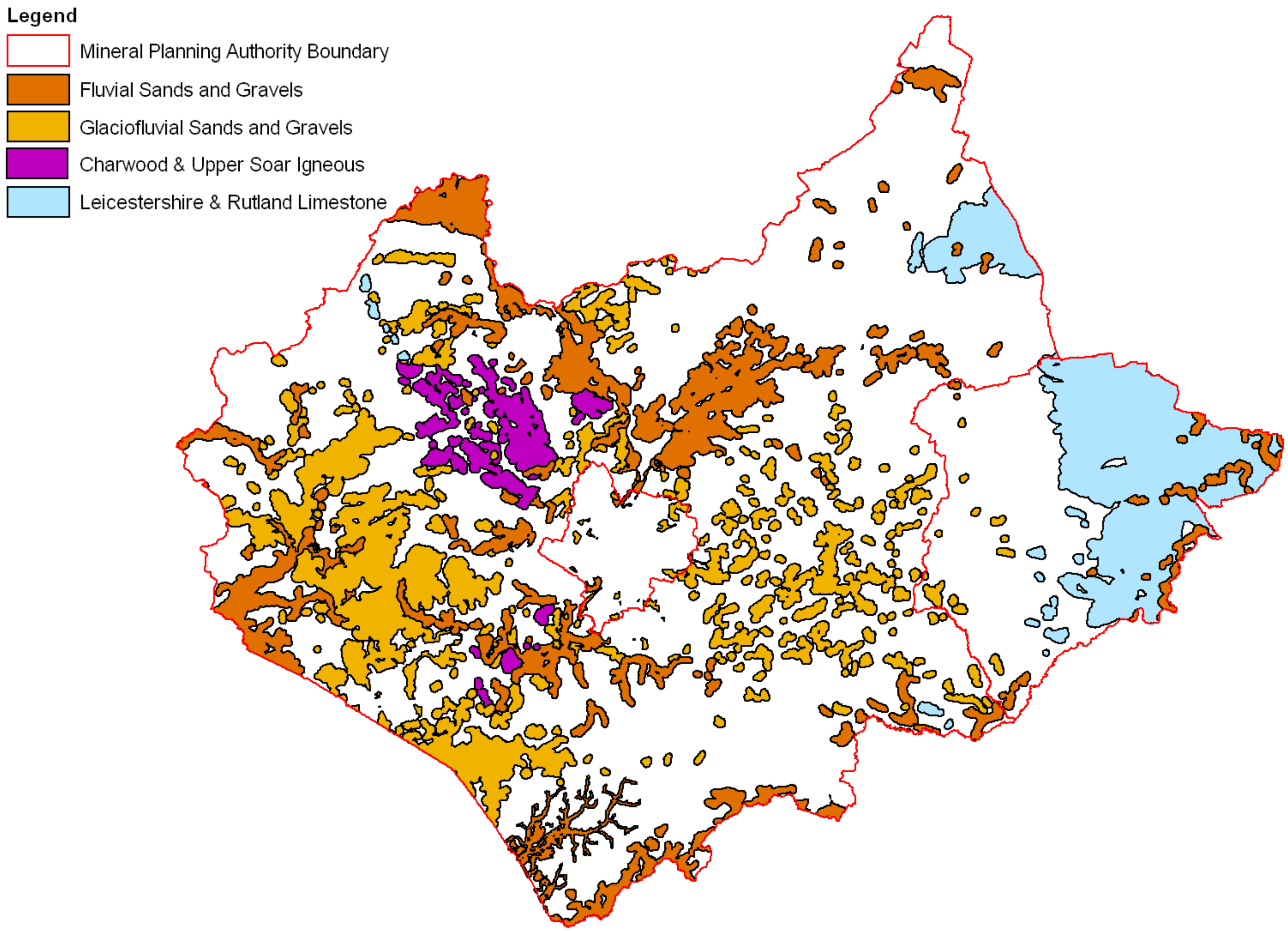


Figure 6 Leicestershire Archaeological Resource Assessment Aggregate Character Areas

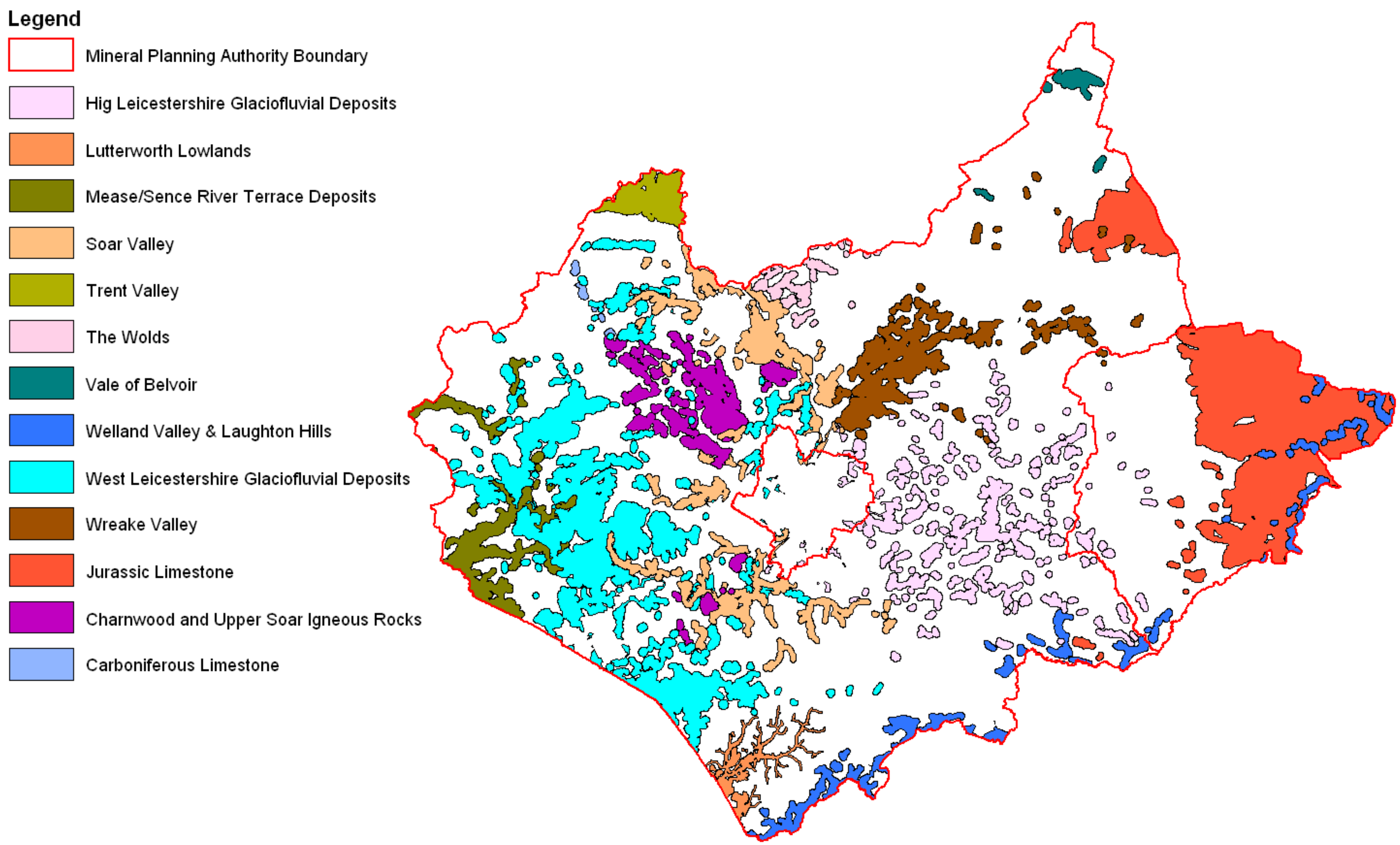


Figure 7 Leicestershire and Rutland Archaeological Resource Assessment Sub Areas

Mease/Sence – River Terrace Deposits

This sub area comprises the river terrace deposits associated with the Rivers Mease and western Sence. The latter, part of the wider Trent catchment, rises close to Coalville and flows through the western part of the county into the River Anker, which forms a section of the Leicestershire – Warwickshire border. The River Mease is a lowland clay river, which rises at about 130 metres OD in the Coal Measures of north-west Leicestershire close to Shackerstone. Like the Sence the Mease also flows westwards and leaves the county at the point where Leicester, Derbyshire and Staffordshire meet and goes on to join the River Trent in Staffordshire. Most of the sub area lies within the Mease/Sence Lowlands Landscape Character Area, but with the northern banks of the Mease and its tributaries falling within The Coalfield LCA. The Mease Sence Lowlands LCA is an area lying between about 75m and 120m in height and falls gently from north-east to south-west. This area has an undulating landscape with frequent small valleys. Agriculture is predominantly mixed arable and pasture with frequent hedgerow trees. The settlement pattern for this area is generally one of small villages with an even scatter of farmhouses linked by minor roads.

The aggregate resource for this sub area is generally made up of sand and gravel of the 1st and 2nd river terraces. The aggregate deposits in this area are not currently being exploited although they have been considered as mineral consultation areas.

Soar Valley

This sub area follows the course of the River Soar which roughly divides Leicestershire in two. The valley itself is an elongated floodplain with the Wolds to the east and Charnwood Forest to the west and joins the Trent Valley at its northern end. Land use across this area varies with both the soils and topography. North of Leicester pasture is predominant on the floodplain whilst arable farming in more frequent on the upper valley sides. Along its course the character of this area has been affected by the urban development of Loughborough at its northern ends and, most significantly, Leicester further south. The area covered by larger settlements is not considered in depth here since they do not fall within the scope of the project. The Upper Soar to the south of Leicester also falls within this Aggregate Character Area as well as tributaries to the west.

The aggregate resource of this sub area mostly consists of 1st, 2nd and undifferentiated sand and gravel river terraces. At several points along the course of the Soar the sand and gravel river terraces lie beneath alluvial deposits. Sand and gravel extraction has occurred at a number of places along the River Soar including Flesh Hovel Lane (north of Quorn), Cossington and Wanlip, all to the north of Leicester, and at Narborough Road (east of Wigston) and Huncote; south of Leicester. However none of these sites are currently active.

The Trent Valley

This sub area occupies that part of Leicestershire lying within the Trent Valley. The sub area is located to the north of Castle Donington and Kegworth at the north western tip of the project area. To the north and west the sub area is bounded by the River Trent with the Soar lying to the east. The River Trent also forms the county boundary with Derbyshire and this section of the Soar with Nottinghamshire. This is an area of flat open floodplain and although the landscape is dominated by a mixture of both arable and pasture agriculture, the impact of the power generating industry, the road network and sand and gravel extraction has been considerable. Whilst some former sand and gravel workings have be restored to agricultural use others remain as open water often maintained for recreational use providing wildlife habitats.

This is one of the smaller sub areas identified by the project which, despite its size, contains a significant aggregate resource. Large scale sand and gravel extraction has taken place along a significant stretch of that section of the River Trent which forms part of Leicestershire's northern boundary with Nottinghamshire. Extraction here includes sites at Cavendish Bridge and Tamworth Road, both of which have ceased operations and also at Lockington/Hemington. The aggregate resource of this area is comprised chiefly of Holme Pierrepont and Hemington Terrace sand and gravel deposits.

Vale of Belvoir

This is one of the smaller sub areas and is located in north east Leicestershire. The deposits that make up this sub area are found around the village of Hose to the south and at Bottesford to the north. A further deposit included in this sub area is located a little further east beyond the Belvoir Scarp at Knipton. The landscape of the Vale of Belvoir forms a flat plain supporting mixed dairying and large scale arable farming.

Whilst this is an area recognised within the Leicestershire Minerals Development Framework as having a sand and gravel aggregate resource this is not currently being exploited. The aggregate resource contained within this sub area is of sand and gravel River Terrace Deposits.

Welland Valley and Laughton Hills

The Welland Valley and Laughton Hills sub area follows much of Leicestershire and Rutland's border with Northamptonshire and at its north-eastern end the sub area lies on the Rutland Lincolnshire border.

In the south-west this sub area is on the southern edge of the Laughton Hills which may be characterised as a high rolling area where minor tributaries of the River Avon drain southwards off the ridge of the hills. Much this part of the sub area is mixed agriculture with pasture predominant over arable.

Moving north-eastwards into the Welland valley proper the landscape may be characterised as a wide shallow river valley. Again the land use for this part of the sub area is a mixture of arable and pasture. On the floodplain much of the landscape can be characterised as being predominantly pasture in medium sized fields enclosed by mixed hedges. The affects of industry along parts of the River Welland has been significant, as have modern agricultural methods. This has resulted in the loss of many ecologically important semi-natural grasslands.

At its northern end this sub area lies within the eastern part of Rutland and is focused upon the West Glen River and River Gwash.

Some extraction has taken place at North Kilworth and at Cathorpe for a borrow pit. Sand and gravel is currently being extracted at Husbands Bosworth. The aggregate resource for the sub area consists largely of 1st and 2nd River Terrace Deposit although some Mid Pleistocene Glaciofluvial Deposits are also included. Some sections of these river terrace sands and gravels are likely to lie below the alluvium deposited by the Welland.

Wreake Valley

This sub area's main focus is along the Wreake Valley; however it also extends south into High Leicestershire along a number of small tributaries and north into the Wolds. A number of Glaciofluvial deposits located on the Belvoir Scarp as far north as Stathern have also been included within this sub area.

The Wreake Valley is a flat bottomed river valley with gently sloping sides with an average width of between 1.5 and 2.5 kilometres. The valley contains a mixture of arable and pasture. To the east of Melton Mowbray the River Wreake becomes the River Eye and the landscape is more rural in character. This area is of ecological interest, most notably for the presence of wetlands. From an archaeological and historic perspective the development of the landscape can be seen through the presence of ridge and furrow, old pollards, hedgebanks and enclosure.

Sand and gravel in this sub area is currently being extracted at Brooksby Quarry. The aggregate resource for this area consists of a range of sands and gravels which include Undifferentiated River Terrace Deposits, Birstall, Wanlip and Syston sands and gravels. Glaciofluvial deposits are also present as are, significantly, Bytham Formation Sand and Gravel deposits which comprise fluvial, lacustrine and organic deposits of the Bytham River. The Bytham River is a fossilised palaeosystem the course of which may be traced from the south-west of the county around Hinckley, passing under Leicester and along the Wreake Valley; its deposits have been recognised as being of national importance.

5.2.2 Glaciofluvial Sands and Gravels

The Glaciofluvial Sands and Gravels ARA represents those sand and gravel deposits associated glacial action and were laid down by the glacial meltwaters issuing from, or flowing beneath, ice sheets. The sequence of these deposits is complex with the units that have been mapped typically exhibiting intricate relationships.

This ARA comprises three sub areas: High Leicestershire, The Wolds and West Leicestershire Glaciofluvial Deposits which are considered separately in detail in below.

High Leicestershire – Glaciofluvial Deposits

Most of the High Leicestershire Glaciofluvial Deposits sub area is located within north-west Harborough and across much of the High Leicestershire Landscape Character Area. Some deposits included in this area, however, extend almost as far north as Melton and as far east as Oakham in Rutland. Glaciofluvial deposits are also mapped within the Leicester City and Oadby & Wigston administrative boundaries although these were not considered to be within the scope of this assessment since they lie beneath urban areas and do not constitute areas of possible aggregate extraction. The area extends as far south as Saddington.

The sub area may be characterised topographically as consisting of a hilly plateau dissected by radiating watercourses, which have formed moderate to steep sided valleys separated by broad ridges. The landform of the area is rolling, predominantly rural and contains a mixture of arable, on the flatter and more gently sloping ridge areas, with grassland on the steeper slopes and valley bottoms. Small villages and scattered farms are typical of this area

The primary aggregate resource for this area consists of dispersed Mid-Pleistocene Glaciofluvial Deposits spread across an area that extends up to 210m OD. Currently these deposits are not being actively exploited as an aggregate resource although deposits have been considered here as mineral consultation areas (MCAS).

The Wolds Glaciofluvial Deposits

The Wolds Glaciofluvial Deposits sub area lies within the northern part of Charnwood District. The River Soar forms the western boundary to this sub area with the Leicestershire Nottinghamshire border defining its northern extent. The Wolds sub area reaches as far east as the A46 which follows the line of the Fosse Way Roman Road. Barrow-upon-Soar lies just to the south of the sub area. The landscape here supports a mixture of arable and pasture and may be characterised as rolling with many stream valleys draining west to the Soar and north towards the Trent.

Whilst this area does contain a limited aggregate potential the deposits are far from extensive in nature and are not being actively worked. Much of this sub area also overlies the mineral resources extracted by the Barrow-upon-Soar Gypsum mine. The plaster production plant supplied by the mine is the largest of its type in the world and supplies most of the UK's bagged plaster (Bloodworth, A J, Bate, R, Highley, D E, and Child R A, 2004). The primary aggregate resource of this sub area consists of middle Pleistocence glaciofluvial deposits of sand and gravel.

West Leicestershire Glaciofluvial Deposits

This sub area comprises sizable blocks of the western part of Leicestershire and covers an area stretching from Magna Park in the south to East Midlands Airport in the north and from Little Orton in the west on the Leicestershire Warwickshire border to sand and gravel deposits located at Wanlip and Mowsley to the east. The sub area covers a wide geographical area and contains a range of landscapes of contrasting character. These include rural western parts of the Upper Soar with its generally open and gently rolling landscape and a large tract of the Mease/Sence Lowlands characterised by an undulating landscape with frequent small valleys. This sub area extends further north into the eastern part of The Coalfield which also has a gently undulating landform but with a more dense settlement pattern and the effects of past and present coal and clay working still visible. The most northerly parts of this sub area are found in the Langley Lowlands which is a well wooded area with a rolling landform dissected by minor watercourses draining northwards towards the Trent or eastwards towards the Soar.

The sands and gravels have and continue to be exploited at several places across the sub area. Quarries here include Dunton Bassett, Huncote, Sandfield and Slip Inn none of which are active quarries at present although there are plans to reopen Slip Inn. Sand and gravel extraction is currently ongoing at Cadeby Quarry. The predominant aggregate resource for this sub area consists of Mid Pleistocene Glaciofluvial Deposits. The southern part of this area also includes Dunsmore Gravel and Wolston Sand and Gravel.

5.2.3 Leicestershire and Rutland Limestone

The bulk of this ACA is located on the eastern fringes of the project area where there are two blocks of Jurassic Limestone, one located within the Leicestershire Wolds on the Leicestershire – Lincolnshire border; the other takes in much of the eastern part of Rutland. A third, significantly smaller block of Carboniferous Limestone from north-west Leicestershire is also included.

Jurassic Limestone

The Jurassic rocks comprise Lower and Upper Lincolnshire Limestone and, in Rutland, Blisworth Limestone Formation. This forms part of a band of Limestone stretching from Whitby in the north-east to the Dorset coast in the south. In Leicestershire the limestone, whilst being a potential aggregate resource, has not been exploited on any significant scale. Although there is also history of large scale ironstone extraction during the late 19th and early 20th centuries here this was principally for the purposes of iron production and not as a building material.

Within Leicestershire the Jurassic limestone lies within a landscape that may be described as generally rolling, drained by numerous valleys and predominantly rural in character. Here arable farming tends to be located on the ridges whilst pasture dominates in the valleys. Small to medium sized villages and individual farmsteads are characteristic of this part of the Aggregate Character Area combined with low levels of woodland cover and little in the way of parkland. The most southerly extent of the Leicestershire Jurassic Limestone lies at the northern tip of the Cottesmore Plateau. Here the landscape becomes more open and flatter. Further north this character area encroaches on the southern fringes of the Knipton Bowl; a north-east facing basin, deeply incised by the River Devon.

In Rutland much of the Jurassic limestone within the Cottesmore Plateau is characterised by a fairly flat open landscape gently dipping from west to east. This is a rural, predominantly arable landscape that includes a large number of open fields and low hedges. Also present here are area some large blocks of woodland.

In the Rutland the limestone has been quarried at Clipsham, Greetham, Witham and Woolfox, with a further site at Thistleton yet to commence, and on a significantly larger scale at Ketton, however, the operation here is for cement production and is not considered as an aggregate resource.

Carboniferous Limestone

The outcrops of Carboniferous Limestone also included within this character area form a string of inliers running north to south almost entirely within the Langley Lowlands of north-west Leicestershire. Here the landscape may be characterised as having a rolling landform, mixed agriculture with medium to large fields enclosed by well-kept mixed hedgerows. The aggregate resource comprises a number of Carboniferous limestones including Cloud Hill Dolostone Formation, Milldale Limestone Formation and Ticknall Limestone Formation.

There are two active quarries within this sub area: Breedon Hill and Cloud Hill. The operation at Breedon Hill includes some of the best exposures of dolomitised Dinantian limestones in the country. The quarry is an important supplier of decorative aggregates producing around 250,000 tonnes per year. The operation at Cloud Hill produces approximately 1.6 million tonnes of aggregate per year, with the largest markets being for road stone and commercial developments. Both quarries are run by Breedon Aggregates.

5.2.4 Charnwood & Upper Soar Igneous Rocks

This ACA, located in the western half of Leicestershire, is split into two parts; the larger section lies within Charnwood Forest with a smaller section being found close to the Upper Soar in the south-west of the county.

The Charnwood Forest section is set within a particularly distinctive landscape that has been shaped by underlying pre-Cambrian rocks. These have contributed to producing a varied, hilly landform with exposed crags, rocky knolls and fast flowing streams. This part of the sub area sits almost entirely within the National Forest and has, for Leicestershire, a high proportion of woodland cover that combines with farmland, heathland and parkland to form some of Leicestershire's most distinctive landscapes.

Many of the igneous rocks from here are of limited economic value, however, a significant proportion have long been used as a construction material. Within Charnwood Forest the extraction of hard rock is currently concentrated at three main sites: Bardon, Cliffe Hill and Mountsorrel. Whitwick, Charnwood and Groby quarries are not currently active. The aggregate resource for this part of the area consists of a volcaniclastic siltstones and diorites. Existing permitted reserves are deemed adequate to address demand as up to 2021 (Section 4.3.4).

The smaller Upper Soar section, in the south-west of the county is set within an elongated basin which has an open rolling landscape with distinct high level ridges, little woodland and mixed agriculture.

Croft Quarry is the only active quarry here with Clint Hill, Sapcote currently dormant and Calver Hill now a waste disposal site. The aggregate resource of the Upper Soar comprises coarse-grained igneous rocks, mainly quartz diorites.

It was not considered necessary to break this Aggregate Character Area into smaller sub areas and consequently discussion of the Charnwood and Upper Soar Igneous Rocks will be included both in sections of this report which relate to the ACA and to the Aggregate Character Sub Areas.

6 The Archaeological Resource of the Aggregate Character Areas

6.1 The Archaeological Resource

Tabular summaries of the known archaeological resource of each Aggregate Character Area (ACA) are presented below by period, with comments where appropriate on the likelihood of archaeological discoveries where evidence is currently lacking. These have been compiled from information contained in published syntheses and site reports, grey reports and data contained in the HER. In each table, the archaeological resource for the four ACAs is presented side by side to permit easy comparison of their archaeological resource. Attention is focused wholly upon the archaeological resource of areas suitable for aggregates extraction and hence the considerable resource of urban areas and the County's many historic villages has not been considered. The built environment resource has also been excluded from this study, although full consideration has been given to earthworks and other archaeological remains that represent the remnants of standing buildings (for example, hunting lodges or field chapels). In essence, therefore, these tables provide a distillation of the archaeological resource of the rural sectors of each of the Aggregate Character Areas, with a firm focus upon archaeological remains that may be expected during aggregates extraction.

The Palaeolithic table has been devised in a format that permits easy assessment not only of contrasts between the different ACAs but also of changes in the archaeological resource. Details are provided of correlations with Marine Isotope Stages and their approximate date ranges in an attempt to clarify for the non-specialist the confusing chronology of this period. For ease of correlation, the archaeological periods follow the Palaeolithic chronology proposed in the East Midlands Resource Assessment and Research Agenda (McNabb 2006).

The Mesolithic period exhibits a restricted range of archaeological evidence, limited principally to evidence from *caves and rock shelters, rare pits revealed during open-area excavations and lithic scatters*. These categories of evidence provide an effective descriptive framework for assessment of the variable archaeological resource of each ACA and have been employed in preference to the classificatory scheme employed for later periods.

From the Neolithic period, the range of evidence increases exponentially and by the modern comprises a bewildering variety of archaeological remains. To facilitate assessment of the archaeological evidence relating to the Neolithic and later periods, we have grouped sites and finds in each table under the functional class categories defined in the English Heritage *Thesaurus of Monument Types*. This procedure has been extended to the distribution maps that accompany this volume, thus permitting close linkage between tables and maps. The Thesaurus definitions of functional classes and monument types also form the basis of the

Leicestershire and Rutland HER and hence this approach permits direct correlations with the HER database.

6.1.1 Assesssment, Evaluation and Mitigation Techniques

Details are also provided in the following tables of assessment, evaluation and mitigation techniques that need to be considered for each of the monument types occurring within Aggregate Character Areas. These recommendations have been developed with the aim of providing a solid foundation for the development of schemes of investigation in advance of extraction and we hope will prove a useful information source for aggregates companies, consultants and contractors. Excellent summaries of these techniques are provided in the Practice Guide published by the Minerals and Historic Environment Forum in 2008 (*Mineral Extraction and Archaeology: A Practice Guide,* 17-29) and the reader is referred to that publication for a succinct summary of each technique. Further discussion of assessment, evaluation and mitigation techniques is provided in Chapter 9, together with a summary of the range of techniques that should be considered during investigation of the archaeological resource of each ACA.

6.1.2 Recent County Syntheses

Up to date syntheses of the archaeological evidence from Leicestershire and adjoining counties of the East Midlands are provided in the recently published *Archaeology of the East Midlands: An Archaeological Resource Assessment and Research Agenda* (Cooper ed. 2006):

- http://www.english-heritage.org.uk/publications/archaeology-east-midlands/

This builds upon a series of period syntheses for each of the East Midlands counties:

- http://www.le.ac.uk/ulas/publications/eastmidsfw.html

It is complemented by a recent series of papers appraising archaeological and environmental evidence from Leicestershire and Rutland (eds. Bowman and Liddle, 2004) and the Trent Valley (Knight and Howard 2004) and together these volumes provide valuable statements of current knowledge and platforms for further archaeological work in the County.

6.2 PALAEOLITHIC ARCHAEOLOGICAL RESOURCE (c. 950kya[2] TO 9,700 BP[4])

ARCH. PERIOD[1]	MIS[2]	KYA[3]	YEARS BP[4]	AGGREGATE CHARACTER AREAS			
				FLUVIAL SANDS AND GRAVELS	**GLACIOFLUVIAL SANDS & GRAVELS**	**LEICESTERSHIRE & RUTLAND LIMESTONES**	**CHARNWOOD & UPPER SOAR IGNEOUS ROCKS**
Period 1 Pre-Anglian (MIS 19-13: Cromer complex) and Intra-Anglian Glaciation (MIS 12) Lower Palaeolithic	19-12	787	-	At least four pre-Anglian interglacials and periods within the Anglian glaciation provided climatic conditions suitable for human activity. Deposits attributable to these periods have the potential for the preservation of archaeological remains. The central Midlands was dominated by the pre-Anglian Bytham River, which flowed through Leicestershire from Hinckley via Leicester, eastward parallel with the Wreake. A number of tributaries are suggested; the first joined the Bytham north of Hinckley and the second flowed south, down the later Soar valley. The subsequent blocking of the Bytham by Anglian ice sheets created Lake Harrison which spread over much of central and south-western Leicestershire. The 'proto-Trent' Ancaster River may have flowed along the Vale of Belvoir in the north of the project area.			
				A scatter of quartzite and andesite artefacts including both Clactonian and Acheulian bifaces have been recovered chiefly from the Bytham terraces; an extensive spread recovered in southwest Leicestershire may be linked to the Bytham or its Hinckley tributary. Recent discovery of a rich artefact assemblage together with organic deposits at Brooksby Quarry has a high potential to significantly advance our understanding of the scale, scope and character of Period 1 hominin activity.	Significant artefact assemblage recovered by fieldwalking in the Hinckley area probably associated with the Hinckley tributary of the Bytham. The potential for pre-Anglian and intra-Anglian *in situ* occupation deposits associated with the buried Bytham and shorelines of Lake Harrison should be considered.	A single apparently rolled Acheulian hand-axe, of uncertain provenance, may possibly be associated with buried pre-Anglian and intra-Anglian rivers and stream valleys. Geological conditions may offer opportunities for artefactual and environmental preservation.	The discovery of two hand-axes, produced from volcanic Charnian tuff, suggests the use of exposed rock sources in the Charnwood area. Consideration should be given to the possible utilisation of rock outcrops as shelters/caves, subsequent glacial and periglacial action may seal associated deposits.
				Assessment, evaluation and mitigation: as the Anglian ice sheets spread across both Leicestershire and Rutland they erased the majority of any archaeological remains. However, the recovery of artefacts and organics within river terrace deposits, particularly associated with the Bytham and its tributaries, together with the potential for rock shelters in igneous hard rock landscapes, or fissures/grabens in limestone landscapes indicate the potential for highly significant, occasionally *in situ* deposits. All such deposits should be searched for (close transect and targeted fieldwalking, geophysical and borehole modelling of subsurface landscapes) and investigated prior to quarrying (targeted archaeological investigation, and/or archaeological monitoring during extraction).			
Period 2 Pre-Levallois Lower Palaeolithic	11-8	427	-	The period is characterised by a fluctuating climate including two extended warmer intervals, the Hoxnian (MIS 11, 427-364kya) and Purfleet (MIS 9, 334-301kya) interglacials. It also witnessed the formation of the present pattern of river systems, including the Trent, Soar, Wreake, the eastern and western Sence, Mease and the Welland, together with the progressive evolution of gravel terraces, palaeochannels and the associated potential for sealed riverbank deposits. Whilst there is currently no evidence for human activity in the project area, the rich sequence of Clactonian and Acheulian industries that developed from the Hoxnian in the Thames Valley and East Anglia emphasises the suitability of this period for human activity.			
				No finds are currently recorded; however, significant palaeoenvironmental deposits have been recorded and should be located for appropriate investigation and analysis.	No finds are currently recorded; however, the potential for significant palaeoenvironmental deposits should be noted.	No finds currently recorded; however, geological conditions may offer opportunities for environmental preservation.	Despite an absence of evidence the potential for as yet unrecorded archaeological remains within the ACA should be considered.
				Assessment, evaluation and mitigation: early consideration should be given to the identification and location of appropriate deposits with the potential to preserve evidence of hominin activity and the preservation of environmental evidence. Prior to the impact of quarrying, or related activities, targeted investigation and recording of such deposits should be undertaken.			
Period 3 Levallois Lower Palaeolithic	8-6	301	-	The climatic conditions were dominated first by the Wolstonian cool stage (MIS-8), followed by the subsequent Aveley interglacial (MIS-7), culminating in the severe MIS-6 glaciation and the apparent human abandonment of Britain. Despite good evidence from the Thames valley, East Anglia and as far northwest as Pontnewydd, evidence of occupation from the East Midlands remains sparse.			
				Scatter of artefacts including Acheulian and Levallois bifaces predominantly derived from the contemporary river terraces. Examples from Huncote, Syston and Barrow Upon Soar with faunal remains including mammoth at Syston and Cossington, woolly rhinoceros from Barrow Upon Soar. Palaeochannels of the Soar have been recorded at Syston. Terrace sequences are recorded from the Trent, Soar, Wreake and Welland. The Trent has produced extensive artefact assemblages close to its confluence with the Soar, suggesting an intensity of activity yet to be recorded in Leicestershire.	Limited evidence of human habitation/activity. A significant exception is the concentration of finds from Eaton, on the Belvoir scarp, including a wide range of lithic type from Acheulian, possible Levallois, to the Upper Palaeolithic. Faunal and other environmental remains have been identified upland glacial deposits may offer circumstances and conditions suitable to localised preservation.	No finds are currently recorded; however, local geological conditions offer the rare potential for the preservation of bone and shell. In addition, the erosion, fracturing and surface subsidence of limestone landscapes offers the potential for near *in situ* and otherwise captures artefactual and environmental evidence.	Despite an absence of evidence the potential for as yet unrecorded archaeological remains within the ACA should be considered.
				Assessment, evaluation and mitigation: as Period 2.			
Human abandonment?	Late 6-4	140		There is no evidence of human occupation within Western Doggerland following the severe glaciation of MIS-6 and the extent of ice coverage remains uncertain. Similarly evidence of a hominin presence is absent during the subsequent Ipswichian (MIS-5e) and early Devensian (MIS-5d-a & 4) interstadial. Despite this, deposits originating during this extended period present significant opportunities for the recovery of floral and faunal evidence important to our understanding of late Pleistocene ecology. Notable examples include pollen derived from lake deposits at Wing, Rutland, dated to the MIS-5 interstadial and the subsequent early glacial phases, and Ipswichian mammalian fauna from Barrow Upon Soar.			

Period 4 Mousterian	3	60	-	By the beginning of MIS-3 Britain was re-colonised by Neanderthals, facilitated by a climate that provided short, cool, arid episodes alternating with warmer periods such as the Upton-Warren interstadial. Whilst no Neanderthal remains have been found in this country, their occupation of Britain is indicated by a sparse scatter of diagnostic tool types, notably the 'bout coupé' hand-axe, only one of which has been recorded from the project area, although two others are recorded from the wider county and its immediate vicinity.			
				No finds have been recovered within the project area, however, a bout coupé hand-axe comes from the edge of the Soar valley at Aylestone, Leicester and, immediately outside the project area, a second from the Devensian gravel terraces of the Welland at Marston Trussel, Northamptonshire. Both suggest the importance of the river valleys to Neanderthal communities, whilst the latter indicates the as yet unrealised Mousterian and Upper Palaeolithic potential of the Welland valley.	No finds currently recorded, however, the potential for significant archaeological remains and palaeoenvironmental deposits should be noted.	A single 'plausibly Middle Palaeolithic' flake tool was recovered from a cryogenic fissure during work on the Wing to Whatborough pipeline. Its recovery underlines the potential for the recovery of archaeological remains from periglacial features, coupled with the advantageous geological conditions which may offer opportunities for both high quality significant archaeological and environmental preservation.	A probable bout coupé hand axe, datable to the Mousterian re-occupation of Britain after MIS4, provides some evidence of Neanderthal activity in the Charnwood sub area.
				Assessment, evaluation and mitigation: the potential for rock shelters and possibly caves exists in the igneous hard rock and limestone landscapes within the project area, these should be actively sought and investigated for material indicative of hominin activity and associated environmental remains. The potential for open-air sites should likewise be investigated, utilising appropriate desk-based and fieldwork techniques. Of note in this context are ridges, hilltops or interfluves, particularly in calcareous areas. Consideration should be given to the survival of *in situ* deposits buried by slope-foot accumulations or over-bank flooding of the river terraces.			
Period 5a Early Upper Palaeolithic	2	-	40,000	Upper Palaeolithic activity has been identified either side of the Dimlington Stadial of *c.*25,000 to 13,000 BP, the former correlating with the first appearance of anatomically modern humans (*Homo sapiens sapiens*) between *c.*40,000 and 35,000 BP. Where available, evidence indicates the use of tent-like structures, hearths, the introduction of sophisticated burial practices and symbolic expression as depicted both on their artefacts and on cave walls. Debate continues as to the interaction between these in-comers and resident Neanderthal communities, together with the extent to which they overlapped chronologically. This is a period of increasingly sophisticated interpretation based upon a growing body of archaeological data, the latter phases characterised by archaeological discoveries at Creswell Crags in the north of the region.			
				No finds currently recorded, however, the potential for significant archaeological remains and palaeoenvironmental deposits should be noted. In that context peat deposits from Syston, dated to c. 37,420 BP illustrate a cold treeless landscape, with associated plant, insect mollusc and faunal remains.	The chance surface find of a weathered and patinated core rejuvenation flake from Whatborough Hill might indicate an Early Upper Palaeolithic site. The potential for significant archaeological remains and palaeoenvironmental deposits should be noted.	A significant Early Upper Palaeolithic faunal and artefactual assemblage was located on a ridge between the valleys of the Chater and the Welland, at Glaston. Evidence of use of natural rock shelter as a hyaena den around which were scattered the bones of woolly rhinoceros, mammoth, wolverine, early horse and hyaenas. A second phase of activity shows hominin (Neanderthal) use/reuse of shelter as a hunting refuge. Two flint leafpoints, one with impact damage, were recovered alongside a small lithic assemblage, suggesting *in situ* knapping. Radiocarbon assay of animal bones found above and below one of the leafpoints proved a date of c 42,000 cal BP.	No finds currently recorded, however, the potential for significant archaeological remains and palaeoenvironmental deposits should be noted.
Human absence	2		25,000	Dimlington Stadial: human abandonment of Britain, coinciding with the return of full glacial conditions and ice-sheets. This was accompanied by a regression in mean sea level, with ice sheets reaching their maximum extent between *c.*22,000 and 18,000 BP. Reoccupation of Britain occurs c. 12,600 BP with a final rapid cooling phase, the Loch Lomond re-advance (c. 10,800 BP) interrupting this process.			
Period 5b Late Upper Palaeolithic	2	-	13,000 - 9,700	Fieldwalking in the Trent-Soar confluence has produced a 'Cheddar point', the characteristic flint tool of the early stage of the late Upper Palaeolithic (12,600-12,000BP), together with potentially contemporary material. Further material is known from the outside the project area in the Trent Valley at Farndon (partly sealed within alluvium). A second, slightly later, convex-backed blade or 'federmesser' (12,000-10,800BP) distinctive of the wooded landscapes of the Late Upper Palaeolithic has been recovered from the Devensian terraces at Castle Donington. The potential for contemporary palaeoenvironmental deposits should form a key component of research strategies for individual sites and palaeochannels of the late glacial Trent have been located and examined at Hemington.	The discovery of a substantial sealed Terminal Upper Palaeolithic (10,300-9,700BP) 'long blade' flint scatter at Launde (Oadby Till) raises the potential for the discovery of surface sites in similar localities. The evidence suggests a single episode of activity, with knapping of blades, bladelets and possibly arrowheads around a central hearth. The hill top location suggests the site was chosen as a vantage point to observe the movement of game in the surrounding valleys. Pollen analysis of peat deposits spanning the late glacial (11,250 BP)to early Holocene (8,100BP) from Slip Inn Quarry, Ashby Parva depict a re-forested landscapes with pine and birch woodland giving way to alder, hazel and lime.	No finds currently recorded, however, the potential for significant archaeological remains and palaeoenvironmental deposits should be noted.	An *in situ* open-air campsite at Newtown Linford, represent an important addition to the small number of 'Creswellian' or Late Upper Palaeolithic (Archaeological Period 5b; 13,000-9700ya) sites recorded within the region. The assemblage, some 450 flints including two 'Cheddar points', knapping debris and evidence of a possible hearth, indicates a well preserved site apparently situated on a low ridge overlooking the River Lin, perhaps using the narrow gorge as a hunting/ambush site.
				Assessment, evaluation and mitigation: as Period 4..			

Notes: [1] Archaeological periods follow the chronological framework proposed in McNabb, J. 2006. The Palaeolithic, in N. Cooper (ed.) *The Archaeology of the East Midlands: An Archaeological Resource Assessment and Research Agenda.* Leicester: University of Leicester Archaeology Monographs 13.
[2] MIS: Marine Isotope Stage
[3] kya: thousand years ago (period falling outside limits of radiocarbon dating)
[4] BP: uncalibrated years before present (within limits of radiocarbon dating)

6.3 MESOLITHIC ARCHAEOLOGICAL RESOURCE (c.9700 BP TO c.4000 Cal BC)

<table>
<tr><th rowspan="2">ARCHAEOLOGICAL ASSOCIATIONS</th><th colspan="4">AGGREGATE CHARACTER AREAS</th></tr>
<tr><th>FLUVIAL SANDS AND GRAVELS</th><th>GLACIOFLUVIAL SANDS & GRAVELS</th><th>LEICESTERSHIRE & RUTLAND LIMESTONES</th><th>CHARNWOOD & UPPER SOAR IGNEOUS ROCKS</th></tr>
<tr><td rowspan="2">Caves and rock shelters</td><td>Not applicable.</td><td>Not applicable</td><td>The limestone areas of the two counties present the possibility for the preservation of archaeological and palaeoenvironmental remains within fissures and sinkholes formed in the natural geology, both are evident as cropmark and/or mapped features. In this context the potential for the preservation of environmental remains should be considered, due to the calcareous ground chemistry (c.f. Glaston, Period 5a, Early Upper Palaeolithic). A possible example of deliberate exploitation of such features may be the recovery of human bones from a 'trench' in a stone quarry at Waltham. The presence of caves and voids in the limestone of Breedon and Cloud Hill quarries and the recovery of Mesolithic material from both sites raises the possibility of a similar archaeological potential.</td><td>Caves are not a natural feature of this geology; however, exposed outcrops and glacially formed cliff faces may have offered shelter and vantage point for Mesolithic hunting groups. Despite Mesolithic material recovered from Bardon Hill, Warren Hills and Buddon Wood in Charnwood and from Croft Hill, in the Upper Soar, there is currently no convincing evidence for utilisation of such potentially attractive topographic zones in this period.

It is possible that as yet undiscovered rock shelters might lie beneath head, scree or other slope deposits (as demonstrated most spectacularly by the recent discovery of a cave with in situ LUP archaeology, buried by talus that had accumulated in front of Church Hole Cave at Creswell Crags: Pettitt et al 2009).</td></tr>
<tr><td colspan="4">Assessment, evaluation and mitigation: the potential for and likely location of any fissures, caves or rock shelters affected by quarrying must be identified (e.g. by walkover surveys, aerial photography, radar or other geophysical techniques) and investigated for material indicative of Mesolithic activity or contemporary environmental remains, as part of the assessment process. Particular attention should be focused upon areas where these features may contain well preserved remains, such as those sealed by head, scree or colluvial deposits; if associated with palaeoenvironmental remains, their importance is likely to be enhanced. Well preserved and especially in situ, remains may warrant their exclusion from proposed extraction. Where such remains are deemed appropriate for mineral extraction or where such remains are identified during schemes of mitigation, a strategy for their full excavation, recording and environment sampling, including the use of relevant specialist scientific support, must be devised and implemented (as proposed for Palaeolithic cave sites: 6.2 above).</td></tr>
<tr><td rowspan="2">Buried archaeological remains, sites, pits, etc.</td><td>Analysis at a national level has indicated a Mesolithic preference for settlement on free-draining soils, with proximity to water courses and wetland habitats a further determining factor (Cooper 2004). Whilst numerous surface scatters reflect this distribution, buried/stratified finds are rare, usually confined to isolated features, often pits.

Recent work at Asfordby, however, located an apparent occupation site, located on a low sand and gravel ridge/terrace overlooking the Wreake Valley. A targeted area excavation recovered c. 8,000 worked flints, burnt bone fragments, charcoal, and possible structural evidence with stone settings and post-sockets.

The scatter is seen as being potentially a rare example of a chronologically intermediate site between the established British earlier and later Mesolithic periods, placing the occupation in the first half of the ninth millennium BP. Evidence of later Mesolithic activity was also recovered including a large deposit of worked flint recovered from a treethrow and of later Mesolithic date. Further tree throws were recorded elsewhere on site, indicating forest clearance. One of these features produced a C14 date from charcoal at the crossover between the late Mesolithic and early Neolithic.</td><td>As Fluvial Sands & Gravels: the free draining soils on the glacial drift may well represent areas favourably occupied by Mesolithic hunter gatherer communities. To date, however, no excavated features, or stratified remains have yet been investigated.</td><td>Notwithstanding the noted preference for free-draining soils, survey with the ACA, notably on the Wing-Whatborough pipeline, identified 8 of 9 Mesolithic sites on ironstone ridge-top positions. Cooper (2004, 25) suggests the evidence point to the use of higher ground, ridges and the plateau edge, to provide vantage points, perhaps overlooking hunting grounds below.

A scatter of excavated Mesolithic features have been recorded in the ACA, including a rare, stratified Early Mesolithic flint assemblage recovered during an excavation at Market Overton, refecting two phases of activity and comprising both Star Carr (c. 9,700BP) and Deepcar-type (c. 9,300BP) material. A pit containing a Late Mesolithic flint assemblage was recovered during excavations at Ridlington; from the same area a multi-period lithic scatter was found occupying a ridge top promontory.</td><td>As Leicestershire and Rutland Limestones: Cooper notes the apparent use of high ground to overlook the surrounding landscape; a notable example includes a lithic scatter from Bardon Hill. Stratified Mesolithic flint beneath alluvium, adjacent to a stream palaeochannel, and sub-alluvial features including partial ring slots were recorded during investigations at Croft Quarry.</td></tr>
<tr><td colspan="4">Assessment, evaluation and mitigation: detailed close interval fieldwalking represent the best evaluative technique for the identification of Mesolithic sites, this should be supported by appropriate schemes of trenching, test pitting. However, the small, dispersed features that might relate to Mesolithic activity are unlikely to be recovered in trial trenches or by other evaluation technique. Mitigation by strip, map and sample is recommended as the most effective technique for locating features. Dating is often problematic, and resources should be provided for the dating of associated organics by radiocarbon and/or of sediments by OSL</td></tr>
</table>

Lithic scatters	Fieldwalking across Leicestershire and Rutland has seen a five-fold increase in the number of recorded sites, with a particular focus along the river valleys and adjacent landscapes. However, reappraisal of Mesolithic data on the HER has identified a bias toward the attribution of this material to the late Mesolithic/early Neolithic (Cooper 2006, 5), with a consequent under-representation of earlier sites. Significant lithic scatters have been recovered at Medbourne, Brooksby/Rearsby and at Misterton (early and late Mesolithic material). A significant residual Mesolithic component has been recovered from excavated sites at Eye Kettleby, mirroring a similar large scatter at Rearsby. The potential of the ACA is perhaps best indicated by looking more broadly at the immediate vicinity: a remarkable excavated Early Mesolithic assemblage has been recovered from Swarkestone Lowes, noted by the excavators as a 'rare resource', while widespread, if sparse, Late Mesolithic material has been recovered from fieldwalking elsewhere in the Trent Valley. A notable find from immediately north of the sub area includes the recovery of an antler harpoon. Assessment of the available data has suggested more analysis and additional targeted fieldwork is required to properly establish the distribution and character of Mesolithic activity in the vicinity (Cooper, L., 2006, 5-6).	The apparent bias toward Mesolithic settlement located on free draining soils, and their preference for ridge top and plateau edge sites, is exemplified by the wealth of Mesolithic material recovered from the ACA. Extensive scatters have been recovered from Sharnford, Barkby Thorpe, Ashby Parva and north of Medbourne. Analysis of data from Northamptonshire and Leicestershire, either side of the Welland, shows substantial scatters recorded on ridges forming the watershed of the Soar-Avon, Welland and Wreake.	Whilst the majority of Mesolithic material is derived from the lighter, drift derived soils, important sites have recorded on limestone and associated geologies. Of particular note is a substantial Early Mesolithic flint scatter from Uppingham, producing diagnostic Star Carr type material (c. 9,700 BP), including cores, debitage and tools. The site is situated near to a spring on Northampton Sand, a situation recorded for many Mesolithic sites in the area. Further remains have been recorded at Thistleton quarry and at Glaston, whilst in east Leicestershire, at Bescaby fieldwalking revealed an extensive flint scatter of broadly dated from the late Mesolithic to Early Neolithic material. To the west, fieldwork on the Carboniferous Limestone inlier at Cloud Hill revealed a scatter of blades and blade cores, subsequent evaluation suggested the material had been buried under alluvium. Finds from Breedon Hill indicate activity on the hill prior to the construction of the later Iron Ag hillfort, possibly again reflecting the Mesolithic preference for vantage point. Finally, a significant lithic assemblage was located at Grace Dieu, comprising both cores and blade cores.	Colluviated slopes, 'ancient' woodlands and heath, protected from ploughing, may preserve important Mesolithic sites, and the location of sites in these areas should be prioritised during assessment and evaluation. A sparse distribution of individual flints and flint scatters, broadly dated from the Mesolithic to early Neolithic, includes more substantial scatters from Buddon Wood, Bardon Hill and from fieldwalking at Swanmote, Charnwood.
	Assessment, evaluation and mitigation: a synthesis of past discoveries of Mesolithic stone and other artefacts should be conducted, with specialist advice on dating and interpretation where appropriate. Preliminary work may identify a requirement for a more detailed stage of artefact analysis to establish the date, cultural affinities and research potential of the collection (compare Collcutt 2006, 47-48). This must be conducted by a lithic finds specialist with expertise in the identification and analysis of Mesolithic artefacts. Systematic fieldwalking and/or test-pitting may be required to clarify the distribution of finds and the character and date of the material and guide the location of further non-intrusive evaluation by geophysical survey or evaluation trenching.			
Other finds	Palaeoenvironmental evidence from the early Holocene in the form of organics from palaeochannels and former water bodies have been recorded from Birstall and at the Austin Friars site, in Leicester. Palaeochannels at Warren Farm, Lockington-Hemington have been sampled and provide a detailed picture of changing conditions from the Late glacial to the late Bronze Age. In contrast to elsewhere in the Trent Valley where evidence of wooded floodplains are found, upper Soar valley appears have been largely open grassland.	*As Fluvial Sands & Gravels*: palaeoenvironmental remains have been recorded from Slip Inn Quarry, Ashby Parva. Analytical study of these deposits types where encountered, including close interval sampling of peats to identify short-term events such as localised clearance episodes, evident from charcoal grains and changes in the pollen profile should be undertaken and accompanied by multiple C14 dates.	Despite an absence of evidence the potential for as yet unrecorded archaeological remains within the ACA should be considered.	*As Leicestershire & Rutland Limestones*.
	Assessment, evaluation and mitigation: particular attention should be paid to the identification and investigation of Mesolithic palaeochannels and other wetland contexts likely to preserve associated organic finds, with appropriate provision for scientific dating and analyses of associated organic finds (e.g. isotope analysis of human bone).			

6.4 NEOLITHIC TO MIDDLE BRONZE AGE ARCHAEOLOGICAL RESOURCE (c.4000 cal BC - c.1150 cal BC)

ARCHAEOLOGICAL ASSOCIATIONS	AGGREGATE CHARACTER AREAS			
	FLUVIAL SANDS AND GRAVELS	**GLACIOFLUVIAL SANDS & GRAVELS**	**LEICESTERSHIRE & RUTLAND LIMESTONES**	**CHARNWOOD & UPPER SOAR IGNEOUS ROCKS**
AGRICULTURE & SUBSISTENCE				
Fields, field systems and linear boundaries	No excavated evidence for the presence of field systems of the period has been identified within the two counties. However, as yet untested cropmark complexes, notably at the head of the Welland and Avon may prove to have an early origin. Investigation of linear and rectilinear boundary systems along the Fen edge in Lincolnshire has demonstrated their origin in the Middle Bronze Age. It has been suggested that the lack of similar evidence across the East Midlands may indicate significant interregional contrasts in the agricultural economy and the organisation of the agrarian landscape. Investigation of the evidence for systems of land allotment in this period should be regarded as of high priority	*As Fluvial Sands & Gravels*. In common with the other ACAs, whilst cropmark evidence for enclosure clusters or field systems exists, these remain untested and are likely to be of later prehistoric date. It is possible that clearance of woodland may have begun on the more lightly wooded areas, such as the fluvial sands and gravels gradually extending to heavier soils and more densely wooded areas.	*As Fluvial Sands & Gravels*. Cropmark evidence across the Jurassic limestones and associated geologies of east Leicestershire and Rutland (e.g. Market Overton, Ryhall and Essendine), much of which is likely to be natural or of later date, may indicate the presence of early field systems. An example of a localised enclosure cluster lies on the headwaters of the Eye/Wreake, at Brentingby. Multiple ditch systems are a notable feature of the ACA, with examples at Essendine, Tixover and Tinwell. Excavation of a triple ditch system at Oakham suggests the formation of the boundary during the Middle Bronze Age.	In common with the other ACAs, evidence for field systems or other boundary works of this period has yet to be recovered.
	Assessment, evaluation and mitigation: desk based assessment, including examination of available aerial photography and historic mapping provides a good starting point for the identification of field systems and linear boundaries. Evaluation techniques including geophysical survey and trail trenching can elucidate the character of buried remains, but their full extent, and the identification of their more epheora components can best be achieved through active monitoring of soil stripping. Strip, map and sample techniques should be employed routinely to test the hypothesis that fields were a late development in Leicestershire and Rutland. This is consistent with the methodology recommended for study of the Late Bronze Age and Iron Age landscape and in particular the relationship between settlements and field systems that is manifested most clearly by cropmark plots of the Trent, Soar, Wreake and Welland Valleys (Table 6.5).			
DOMESTIC				
Unenclosed occupation foci	Evidence of settlement throughout the period is sparse. However, excavated examples indicate a wider potential for similar remains to be present. Excavations at Croft, Rothley and Eye Kettleby have produced rare evidence of occupation. At the latter, activity spanning the Early to Late Neolithic was identified focused on a possible sunken-featured structure producing a finds assemblage including Woodands-style Grooved Ware and lithics suggesting seasonal exploitation of animals, the working of hides and the butchery of meat (Finn 2011). A comparable structure was recorded at Rothley Lodge, situated near the bottom of a north-facing slope, to the west of the Soar. It produced several thousand decorated pottery sherds, lithics and a remarkable engraved stone plaque displaying a rare example of figurative art. At Rothley Temple Lodge, excavation produced evidence of a Late Neolithic a circular post-built structure dated by Grooved Ware pottery and C14 samples to c. 2700 – 2500 BC. Surrounding this was evidence for at least a further two possible structures, along with numerous pits containing significant quantities of artefacts.	No structural remains dating from this period have been recorded so far. However, extensive lithic artefact provide evidence of thin background scatters might signify occupation sites or specialised activity foci, and would merit further survey and excavation work to establish their character and refine our knowledge of date.	*As Glaciofluvial Sands & Gravels*	Extension to the north-west of Croft Quarry disturbed soils overlying the exploitable hardrock, revealing evidence of stream-side settlement close to the confluence of the Soar and Thurlaston Brook. A structure comprising possible palisade gullies for a post-ring roundhouse has been recorded and dated by radiocarbon and lithic evidence to the early Neolithic.
	Assessment, evaluation and mitigation: desk-based analysis and appropriate fieldwalking strategies (augmented by test-pitting), provide the most effective prospection strategies for the identification of potential settlement sites. It remains likely, however, that the better preserved remains will lie concealed beneath alluvium or colluvium and hence be invisible prior to extraction. Consequently, given the difficulties of identifying structural remains, the most cost effective strategy for identifying settlements of this period is the application of strip, map and sample techniques to areas designated for quarrying. Particular emphasis should be placed upon provision for scientific dating and the location, recovery and analysis of environmental samples to elucidate the changing environment.			

Burnt mounds	The main component of this monument type is a mound or spread of burnt and heat-shattered cobbles or pebbles, usually incorporated in a matrix of charcoal enriched soil. Associated with the mound are sometimes frequently founds troughs, for holding water and fire pits or hearths, presumably used to heat the stone. A scatter of burnt mounds has been recorded along the Trent, Soar and Wreake Valleys, as well as in their wider catchment (e.g. Hugglecote & Scraptoft Glaciofluvial S&G), in all cases the lie alongside an existing or former water sources. It is likely that the position was also influenced by ready access the suitable cobble stone and wood. The function(s) of these monuments remains obscure; they appear to reflect repeated activities potentially stretching over an extended period as suggested by the discovery of multiple mounds in close proximity at Castle Donington, Brooksby and alongside a minor tributary of the River Sence, at Hugglecote. Various suggests as to their exact purpose have been made including an association with cooking (animal bone was recovered from one of the mounds at Castle Donington), specialised industrial activities and/or bathing, it is possible that they served more than one function. All the identified burnt mounds datable to this period are currently focused on the Fluvial Sands and Gravels.	Burnt mounds have been recorded within the ACA, located along tributary streams and seasonally wet valleys, exploiting local sources of cobble stone often occuring within glacial outwash deposits. Examples have been noted at Dunton Bassett and Hugglescote, and can be anticipated in similar circumstances.	No evidence of burnt mounds have been recorded from the ACA, however, recent discoveries near Newark, Notts. of several piles of burnt stones next to limestone-dug pits that may have been intended to hold water (Knight et. al. 2011), together with a cluster of burnt stones recorded beside a palaeochannel in Mercia Mudstone suggest that the distribution may have extended more widely. Neither of these sites, unfortunately, is dated, but together they signal the need for reassessment of current notions on the distribution of burnt mounds.	The potential for as yet unrecorded archaeological evidence within the ACA should be considered, especially alongside the edges of existing and former streams and watercourses.
	Assessment, evaluation and mitigation: subject to the post-depositional processes, specifically the deposition of alluvial and/or colluvial cover, geophysical survey (detailed magnetometry) provides an effective prospection technique for the location of these features. Fieldwalking surveys might reveal concentrations of burnt stones on field surfaces or in the sides of drainage ditches, etc., but generally the location of burnt mounds in valley bottom locations adjacent to streams has ensured that the diagnostic concentrations of heat-affected stones and any associated structural remains are sealed by alluvium and hence not easily located prior to topsoil- or subsoil-stripping. Strip, map and sample techniques provide the most reliable methodology for the identification of burnt mounds and associated features. As with settlements, particular emphasis should be placed upon provision for scientific dating and for the location, recovery and analysis of environmental samples to elucidate the changing environment and developing agrarian economy.			
		RELIGIOUS, RITUAL & FUNERARY		
Barrows, ring ditches, cremation cemeteries and isolated burials	No clearly attributable Early Neolithic funerary monuments (long barrows, long enclosures, chambered cairns) exist within Leicestershire and Rutland, although cropmarks at Misterton, Ketton and Harston, may represent ploughed out examples. The potential exists for unrecognised examples, particularly barrows, given their identification in the surrounding counties. Analysis of the evidence from Northants. suggests a focus around the head of the Nene. Round barrows and ring ditches are the most abundant form of later Neolithic-early Bronze monument, existing in a range of settings, either isolated, in 'cemeteries', or monument complexes. The majority survive as cropmarks, but a small number have evidence of surviving mounds.	*As Fluvial Sands and Gravels*: The prominent ridge top position of these glacial deposits increases the potential for the presence of barrows. At Earl Shilton the excavation of two round barrows and the probable presence of a third, revealed a pair of large, circular, ring ditches each some 27m diameter. Apparently associated with these were a line of large more or less square pits, running from the crest of the hill downwards on both sides, and towards the adjacent valleys indicating their continued importance as landscape features. A Bronze Age cremation cemetery and associated funerary landscape was recorded during soil stripping at Cadeby Quarry, features included a very precisely defined circulat ring ditch with a central pair of rectangular cobble filled pits the	*As Fluvial Sands and Gravels*: A possible Early Neolithic long enclosure has been recorded at Ketton from aerial photographs. Barrows have been excavated at Eaton, Tixover, Sproxton and most recently Barleythorpe. At Sproxton excavation revealed a multi-phase sequence, commencing with the construction of timber circles and concentric stone kerbs. Three satellite burials were subsequently inserted indicating the barrow functioned as a burial monument for around 200 years. At Eaton a sequence of four central burials, all received differing burial rites. The recent excavation at Barleythorpe revealed a triple ditched barrow surrounding two burials, the central of which including an Early Bronze Age Food Vessel, the second, appeared to have been buried with a collection of deliberately placed flints including much earlier Mesolithic and Neolithic material.	During the late 19th century various Bronze Age finds were recovered from Mountsorrel Quarry including a pygmy cup, a collared urn, a miniature vessel, a 'javelin head', two loomweights and a 'gouge'. These finds suggest a cemetery site Whilst currently not located in Leicestershire or Rutland, Later Neolithic and earlier Bronze Age burials are known from locations otherthan barrows, including caves and rock fissures (e.g. Church Dale, Derbys.

	Recent excavations at Lockington and Cossington targeted barrow cemeteries at the confluences of the Trent-Soar and Soar-Wreake. The recent excavation of Barrow IV (Hughes 2000) revealed demarcation of the site with a palisade, defining a possibly pyre site; an adjacent pit contained a rich Early Bronze Age ceramic and metalwork group, including two gold bracelets. Three barrows were excavated at Cossington, all in response the gravel extraction, the first two in the 1970s. The most recent work recorded a barrow without an initial burial, possible constructed as a cenotaph. The continued significance the cemetery was maintained through the prehistoric period, acting as the focus of a EBA cremation cemetery, followed by evidence of later Iron Age and Roman ritual deposition and finally an Anglo-Saxon inhumation cemetery (Table 6.7). Excavations at Eye Kettleby on the gravel terrace south of the Wreake revealed an Early to Middle Bronze Age monument complex and cremation cemetery. The Early Bronze Age activity occupies a promontory with pairs of opposed 'D'-shaped enclosures and ring ditches. These monuments became the focus for evolving ritual activities including the burial of structured deposits, urned and unurned cremated remains (Finn 2011). Early Neolithic pits excavated at Asfordby, Eye Ketteby and Husbands Bosworth are thought to have had a mortuary function, possibly containing burials, and example at Eye Kettleby appears to have been visibly marked, subsequently acting as a focus for a later Bronze Age pit alignment.	function of which awaits post-excavation analysis.		
Causewayed enclosures, cursus monuments henges and pit circles	Causewayed enclosures are known across the south and east of the region, focused on the river valleys of the Welland and Nene. The first example in Leicestershire being identified at Husbands Bosworth overlooking the head waters of the Avon. The potential for as yet unrecognised monuments remains possible, notable in area of current pasture where aerial photography has to date been ineffective. North of Lockington the cropmark of a possible cursus terminal or large mortuary enclosure has been recorded from aerial photography; this represents the only identified example of the monument type in either county, however, examples are known from Aston on Trent, Derbys. and Normanton on Soar, Notts., close to the county boundary. No certain henges are noted from Leicestershire and Rutland, a single cropmark with supposed opposed entrances recorded from aerial photographic evidence at Earl Shilton, appears more likely to be part of a barrow cemetery. Pit circles are recorded at Oakham and Rearsby and are thought to have marked the location of timber posts.	Geophysical survey by ULAS located a major Neolithic monument at Husbands Bosworth, Leicestershire - a causewayed enclosure dating from around 3000 BC - the first of its kind known from the county. The monument consisted of a circular open area, 150m in diameter, originally enclosed by interrupted banks and ditches, and would have served for meetings and ceremonies for the early farming communities living in the surrounding Soar, Welland, Swift and Avon valleys. Further topsoil stripping was then monitored to the north and south-west of the monument. This has located archaeological remains of Neolithic, Bronze Age and Iron Age date in the areas surrounding the causewayed enclosure.	At Oakham, a sequence of three pit circles was recorded, believed to have originally contained timber posts. The circles were associated with Late Neolithic impressed wares and an adjacent small ring ditch surrounding a crouched burial.	No monument of these classes has been recorded within the ACA. Regional distribution of causewayed enclosures suggests a low potential for this monument type to occur in the character area.
	Assessment, evaluation and mitigation: for all of the above monuments, which are currently known principally from cropmark data, assessment should include investigation of the air photographic and, wherever possible, lidar resource, combined with walkover surveys to locate earthwork remains, particularly in woodland or pasture. Useful evaluation techniques include geophysical survey to locate buried features, field walking to determine possible associations with surface artefacts and targeted trial trenches to establish the level of preservation, date, etc. Where identified in advance, some sites will warrant preservation *in situ*., e.g. the Husbands Bosworth causewayed enclosure, subsequently scheduled). However, sites that are unexpectedly revealed in the course of extraction should be fully excavated, with appropriate consideration of the structural, artefact and environmental evidence. Cremation pit clusters are unlikely to be detected by aerial survey or other airborne or ground-based prospection techniques. Such remains may best be located by the use of strip, map and sample techniques, supported by appropriate specialist input.			

		LITHIC SCATTERS, MISCELLANEOUS FINDS, ETC.		
Lithic Scatters	Lithic scatters as indicators of activity foci, are widespread and increase in the late Neolithic and Bronze Age; however, their interpretation remains obscure. Clay (2002) has analysed data from an area straddling the Welland/Avon watershed, suggesting proximity to water sources was an important factor in their location, with southerly facing slopes preferred. A higher density of site than typically noted was observed in the valley of the Swift, a tributary of the Avon, where a longstanding tradition of fieldwalking has been practiced. Particularly frequent scatters in intensively fieldwalked areas, focused upon the river terraces. More may be concealed beneath alluvium or colluvium.	*As Fluvial Sands & Gravels*. Clay (2002) notes no clear preference for soil types with the highest proportion of sites occurring in boulder clay areas, the latter frequently capping glacial sands and gravels.	*As Fluvial Sands & Gravels*	*As Fluvial Sands & Gravels*
Miscellaneous finds	The deposition of fine metalwork in water is a recognised feature of the period, and significant groups of material have been recovered from Aston and Attenborough, whilst a Middle Bronze Age sword was recovered from the Trent at Ratcliffe on Soar, adjacent to the sub area. Associate structural and artefactual remains may also be anticipated, potentially including the recovery of log-boats	Middle Bronze Age metalwork mainly from stray finds includes side looped spearheads, palstaves and long-bladed rapiers	*As Fluvial Sands & Gravels*	Great Langdale GroupVI polished stone axes are the most common type from the region, however, the Charnwood area is the source for Group XX axes, two examples of which have recently been recorded from Rothley Lodge, the precise source remains unknown. Bradley (1989, 5) notes that archaeological fieldwork is required to establish evidence of local production sources, including detailed inspection of outcrops to identify production waste.
	Assessment, evaluation and mitigation: desk-based assessments need to collate and assess all existing information on finds scatters and single finds as a prelude to further work, given that this may identify potential activity foci meriting further evaluation and mitigation work. Arable areas proposed for development are likely to require routinely systematic fieldwalking. Activity foci identified during fieldwalking are likely to require further evaluation by geophysical survey and/or trial trenching. To improve retrieval rates for metalwork, it is recommended that a metal detector be attached to quarry conveyor belts as routine practice.			
		ENVIRONMENTS		
Palaeo-environmental analysis, etc.	Analysis of the Trent-Soar confluence identified former river/stream channels dating to the Neolithic (Brown et al 2007). Pollen cores from Late Neolithic palaeochannels at Hemington indicate open grassland habitats, fringed by oak and hazel woodland with increase evidence cereal cultivation. Similar data was recovered from Narborough, where partial clearance of the floodplain is demonstrated by the early 3rd millennium. Rich insect assemblages recovered allow assessment of the climatic and environmental conditions. The area has also yielded a significant accumulation of 'bog oaks', the sampling of which have provided a robust sequence of dendrochronology dates. Further palaeochannels are also known from Croft, Castle Donington and Kirby Muxloe. At Castle Donington at group of timber posts, interpreted as the remains of a fish weir, was located during archaeological monitoring of gravel extraction, subsequent dating suggested a date of 3600-3300 cal. BC. Human remains dated to the Early Neolithic were recovered from a palaeochannels during monitoring of gravel extraction at Birstall, Leics.	No specific environment data has been recovered from the Glaciofluvial Sands and Gravels ACA, however, localised potential such as the early Holocene peat deposits recorded at Slip Inn Quarry, Ashby Parva (Table 6.3) should be anticipated.	At Sproxton the burning of tree stumps on the later site on the Early Bronze Age barrow is dated by radiocarbon analysis to 3990-3810 cal. BC. Soil and snail data indicate cultivation followed by the development of pasture with no evidence of woodland regeneration prior to the construction of the monument. As mentioned in Table 6.3, the limestone areas of the two counties present the possibility for the preservation of archaeological and palaeoenvironmental remains within fissures, sinkholes and caves formed in the natural geology, both are evident as cropmark and/or mapped features.	Early Neolithic environmental evidence comes from palaeochannels deposits near to the Croft site.
	Assessment, evaluation and mitigation: geoarchaeological assessment of river and stream valleys and modelling of palaeochannels, particularly of the Trent, Soar, Wreake and Welland is recommended. Particular attention should be focused upon areas where environmental remains may survive, notably palaeochannels, but also those sealed by head, scree or colluvial deposition, consideration might also be given to the use/exploitation of geological features for placed or structured deposits. Where sites are associated with palaeoenvironmental remains, their importance is likely to be enhanced.			

6.5 LATE BRONZE AGE AND IRON AGE ARCHAEOLOGICAL RESOURCE (c.1150 cal BC – AD42)

ARCHAEOLOGICAL ASSOCIATIONS	AGGREGATE CHARACTER AREAS			
	FLUVIAL SANDS AND GRAVELS	**GLACIOFLUVIAL SANDS & GRAVELS**	**LEICESTERSHIRE & RUTLAND LIMESTONES**	**CHARNWOOD & UPPER SOAR IGNEOUS ROCKS**
	AGRICULTURE AND SUBSISTENCE			
Field Systems and pit alignments	The Late Bronze Age witnessed the development of more intensive land management regimes; evidence for this is represented within the archaeological record in the form of extensive field and long distance boundary systems. These may have developed from pit clusters such as those located at Lockington and possibly functioned as territory markers. Also within the confluence of the Rivers Trent and Soar to the north of Kegworth an evaluation which included topsoil magnetic susceptibility, fluxgate gradiometer and earth resistance surveys identified ditch features and a pit alignment. To the west of Measham aerial photography has identified several pit alignments, one over a kilometre long, on deposits associated with the River Mease and also south-west of Congerstone close to the River Mease. At Burton and Dalby south of the River Eye aerial photography has shown up cropmarks of what appears to be an irregular field system. Complex sets of pit alignments have been recorded as cropmarks at Tixover Grange in the Welland Valley and to the south of Essendine close to the West Glen River.	Little evidence for field systems or pit alignments within this ACA to the east of Leicester. Within the western part of the ACA just south of Newbold Verdon a good cluster of pit alignments have been recorded on a small plateau, 125m – 140m OD, off which several small streams flow to the south and overlooking Rothley Brook to the north. East of the village of Normanton-le-Heath aerial photographs showed a complex series of rectangular enclosures and double ditched linear features. Excavation identified a well stratified chronology of a series of enclosures spanning the Iron Age and Roman periods. Again the site occupies a plateau about 140m OD overlooking several small streams.	No evidence for field systems recorded on the Carboniferous limestone however the hillfort at Breedon Hill would most probably have represented some kind of focus for agricultural activity in the surrounding area. On the Jurassic limestone a fairly low density of this site type has been recorded on the HER although aerial photography has produced evidence for pit alignments to the south of Bescaby, Croxton Kerrial and Sproxton. Several siteshave been identified to the north, east and south-east of Ryhall and overlooking the River Gwash including a rectilinear field system west of Essendine Road and a complex set of ditches and a pit alignment south of the Freewards plantation.	Very little evidence for field systems recorded on the HER; however close to Beacon Hill at Bowdon Rough, Cattens Rough and Broombriggs Cottage Farm possible prehistoric field systems preserved as a series of banks in rough grassland have been recognised from aerial photography and walkover survey.
	Assessment, evaluation and mitigation: Searches and analysis of aerial photographic evidence can aid in the identification of possible field and boundary systems; interpretation and plotting of this evidence will help to guide the development of evaluation and mitigation strategies. Over less intensively cultivated areas, such as across parts of the Charnwood & Upper Soar Igneous Rocks ACA evidence from Lidar survey could reveal features potentially forming elements of field systems. Where considered appropriate geophysical survey should be carried out to shed further light on the spatial arrangement of field boundaries and what relationship these may have to occupation sites. The character, level of preservation and possibly date of field systems and pit alignments may be established by undertaking a programme of targeted trial trenching to inform the development of an appropriate mitigation strategy. Strip, map and sample is likely to represent the favoured mitigation strategy.			
	DEFENCE			
Hillforts	The general topography lacks readily defensible locations; however Bury Camp, just east of Ratby, sits astride the Fluvial and Glaciofluvial Sands and Gravels ACAs. This 3.6 heactare site is a rectangular univallate hillfort with a c.5m high bank and ditch. Four gaps located at the centre of each of the sides may represent original openings; other gaps are probably modern.	Only Bury Camp, which is located across this and the Fluvial Sands and Gravels ACA, is recorded on the HER for this area.	Breedon Hill hillfort is located on the most northerly of the ACA's Carboniferous limestone outcrops close to the Leicestershire/Derbyshire border. The site originally occupied about 9.5 hectares but has been significantly reduced by quarrying. The summit was surrounded by a single bank and ditch and investigations indicate that there was a considerable hilltop settlement here throughout the Iron Age and probably continuing into the Roman period.	Included within this ACA is Beacon Hill hillfort which overlooks Black Brook to the west, Wood Brook to the north and the settlement of Woodhouse Eaves to the east. Finds recovered from this site suggest that it may have Late Bronze Age origins. The main earthworks comprise a bank and ditch running around approximately 75% of the hill top. To the east a smaller outer bank can be traced. No excavations have taken place though geophysical survey work has been carried out on a section of the rampart which showed that gaps in the earthworks were filled with linear anomalies and an irregular triangular enclosure within the ramparts was recorded.
	Assessment, evaluation and mitigation: This is very rare class of monument that undoubtedly played an important role in Iron Age society. Understanding these sites more fully should help us shed further light on the evolution of settlements and territories and consequently should be considered as prime candidates for preservation *in situ*. Where development is likely to have an impact it will need to be preceded by a full assessment of the air photographic and available Lidar evidence; walkover surveys can also be useful for identifying earthwork remains. Non-intrusive surveys of earthwork remains and geophysical survey should help to identify both within and outside an enclosure. Prior to the granting of any permission there will be a need to establish the level of preservation, character, date and extent of any archaeological remains through a programme of evaluation trenching. This will help to inform a more detailed mitigation strategy that will need to be agreed upon in cases where evaluation has not demonstrated the need for preservation *in situ*.			

<table>
<tr><th colspan="5">DOMESTIC</th></tr>
<tr><td rowspan="2">Occupation/settlement sites and enclosures</td>
<td>A thin scatter of sites across this ACA providing some evidence for settlement. In the Trent Valley investigations carried out in advance of construction at Willow Farm Business Park identified at least two circular post-built structures together with hearths, stakeholes and linear gullies. Also within the Trent Valley north-east of Junction 21a of the M1 a combination of aerial photography, fieldwalking geophysics and excavation has identified Iron Age/Romano British settlement including hut circles, ditches and enclosures.

Along the Soar Valley north of Leicester evaluation trenching at Dishley Grange identified evidence suggesting a small Late Iron Age/early Romano British agricultural settlement including intercutting enclosure/boundary ditches and related features. South-east of Gravelhole Spinney, Wanlip at least two structures, one a circular building the other containing pottery suggest and Iron Age settlement. About 1 kilometre south-west of Hallam Fields, Birstall excavations identified a D-shaped enclosure containing a round house with a smaller enclosure adjacent containing a second round house.

In the south of the ACA north of Stanford Reservoir on sand and gravel deposits associated with the river Avon a farmstead complex is suggested by the presence of a square enclosure, a large D shaped enclosure and three possible circular houses visible as cropmarks.</td>
<td>Settlement sites in the west of this ACA include possible hut circles or barrows alongside a clothesline enclosure at Swepstone recognised from aerial photographs. At the western edge of Hinckley, on the Leicestershire/Warwickshire border and sitting between Harrow Brook and Sketchley Brook archaeological investigations identified a middle Iron Age settlement comprising two main elements; an enclosure containing principal and ancillary roundhouses with a smaller enclosure adjacent which may also have contained a roundhouse and to the east a further area of unenclosed settlement with four more roundhouses. Radio carbon dating and environmental sampling showed the site to have been in use for a relatively short time, 400-200BC, and that land clearance had been taking place in the vicinity.

At Enderby, overlooking the River Soar to the east, two sites have been recorded; one comprising an enclosure and four round houses south-west of Grove Farm and a possible roundhouse on Leicester Lane.

East of Leicester at Skeffington a cropmark complex including at least one ring ditch, a pit alignment, a possible enclosure and pit clusters indicate a possible settlement site.</td>
<td>Few settlement sites recorded within this ACA. A circular stone scatter found during an excavation in 1977 north of Bottom Plantation, Sproxton was interpreted as either a barrow or a house although no dating evidence was found.

At Greetham Quarry excavations have identified two early Iron Age roundhouses, a four-post building and evidence for a small middle Iron Age settlement comprising two enclosures, pits containing pottery and a possible house structure. Enclosures suggestive of settlement have also been located north east of Belmesthorpe and north-east of Welland Spinney, Rutland.</td>
<td>Apart from Beacon Hill hillfort the only settlement site recorded on the HER within this ACA is at Wood Lane Mountsorrel where fieldwalking, geophysical survey and subsequent evaluation has recorded features including postholes, gulleys a possible enclosure ditch and pits; finds included fragments of pottery and flint flakes.</td></tr>
<tr><td colspan="4">Assessment, evaluation and mitigation: assessment will need to include a detailed analysis of available air photographic evidence combined with walkover survey to look for surviving earthwork remains; particularly in areas of parkland or woodland that remain undisturbed by modern ploughing. Where Lidar information is available this again should be examined for vestigial earthwork remains. Where sites are under arable cultivation a structured programme of fieldwalking and geophysical survey aimed at locating potential settlement sites will need to be considered as part of any evaluation; this is likely to be followed up with targeted trial trenching aimed at establishing the level of survival, character, date and extent of any remains. On those sites where remains have been identified and a decision in favour of development has been made an appropriate mitigation strategy will need to be agreed upon. On those sites identified through cropmark evidence the most effective strategy is likely to be a strip, map and sample. Where appropriate provision should also be made for scientific dating and the analysis of well-preserved environmental materials, specialist analysis should, in particular, be given to animal remains.</td></tr>
<tr><td rowspan="2">Burnt mounds</td>
<td>Within the Trent Valley two burnt mounds are recorded less than 60m apart north of Willow Farm Business Park; although fire-cracked stones were recorded at the most southerly of these the site had been heavily truncated by soil stripping no cut features were identified. The more northerly mound included a hearth and two troughs (one filled with clay fragments suggestive of a daub superstructure) and a group of irregular pits and burnt stones.

At Sutton Farm, Broughton Astley, trial trenching identified a burnt mound close to the River Soar and at Brooksby Quarry a burnt mound was recorded during soil stripping.

Although this type of monument is relatively rare this ACA has a good potential to contain further examples close to rivers and streams.</td>
<td>At Scraptoft fieldwalking, geophysical survey and trial trenching revealed a burnt mound consisting of a sub-circular pit containing fire-cracked river pebbles and stone fragments.</td>
<td>To date no burnt mounds have been identified from within this ACA. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.</td>
<td>No burnt mounds have been identified within this ACA. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.</td></tr>
<tr><td colspan="4">Assessment, evaluation and mitigation: concentrations of burnt stones may be identified during the course of walkover survey. This class of monument is found most frequently in valley bottoms close to streams that would have provided a reliable source of water and may be sealed by alluvial or colluvial deposits. A strip, map and sample methodology is likely to provide the most appropriate mitigation strategy for burnt mounds and associated features. Provision should be made for scientific dating and analysis of any environmental samples recovered.</td></tr>
</table>

RELIGIOUS, RITUAL AND FUNERARY				
Cemeteries/funerary sites	Whilst round barrow cemetery sites will generally date from the early to mid Bronze Age as monuments within the landscape they will have continued held a meaning and been important to people in the Iron Age. At Cossington, for instance, the Iron Age Settlement is relatively close to the earlier cemetery with one of the barrows retaining particular significance evidenced by the deliberate burial of pottery vessels in the remains of the mound and in pits close by. Iron Age Funerary evidence has proved to be elusive and there are few burials of first millennium date across the East Midlands as a whole. It may be that excarnation, perhaps with cremation represented the dominant tradition, leaving little trace in the archaeological record. At Wanlip excavation of an Iron Age farmstead recovered an Iron Age cremation burial centrally placed within a rectangular structure 6.5m by 5m. Isolated urned cremation burials have also be recorded at Dishley Grange. At Tixover Grange two small square enclosures are visible as cropmarks on aerial photographs taken in the 1980s and could potentially represent the remains of Late Bronze Age square ditched barrows.	Very little in the way of funerary evidence recorded on the HER for this ACA. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.	The only funerary site recorded on the Carboniferous limestone is at Breedon Hill where excavations in the 1960s recovered two fragmentary skeletons, one with an Iron Age model shield. On the Jurrasic limestone at Barroden cropmarks of at least four rectilinear enclosures could potentially represent a square barrow cemetary site.	No funerary sites for this period are recorded on the HER for the Late Bronze Age to Iron Age. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.
	Assessment, evaluation and mitigation: analysis of aerial photography may identify new sites and any desk-based assessment will need to include a thorough investigation of cropmark records to establish the potential for further sites. Useful results may be obtained through carrying out a range of evaluation techniques, including fieldwalking and geophysical survey. Evaluation trenching should aim to establish the level of preservation, date and likely extent of remains.			
TRANSPORT				
Trackways	Rivers and streams represented a readily exploitable natural communications network often directly linking settlements as well as passing through a landscape that was relatively easy to negotiate. In the Trent Valley at Lockington-Hemington air photo evidence suggests the Iron Age settlement was dissected by a double ditched feature, presumably a trackway, which also has a pit alignment running along it. Geophysical survey at Warren Farm, Lockington identified a sinuous anomaly thought to be a trackway running through an area of enclosures. Several possible trackways probably associated with settlement or enclosure sites at Dishley Grange, Hoby with Rotherby, Queniborough, South Kilworth and Thussington.	Few sites recorded on the HER within this ACA. Aerial photography has identified probable sites at Barwell, Blaby and Twycross.	Evidence for trackways recorded on the HER is scarce for this ACA with the only recognised site being at Walk Farm, Great Casterton. Here a double ditch thought to be a trackway to the south of a possible field system was noted on aerial photographs.	No examples of trackways dated to this period are currently recorded on the HER. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.
	Assessment, evaluation and mitigation: timbers forming the remains of trackways are likely to be concealed beneath alluvial deposits and possibly buried within fluvially redeposited sands and gravels. Assessment will need to identify palaeochannels and possible wetland areas that have a high potential for surviving structural remains; however the most effective strategy for their identification will be through a programme of continuous archaeological attendance along with appropriate contingency provisions including resources for environmental sampling and analysis since it is probable that such contexts will have a good potential to include other environmental remains. Where trackways have been identified from aerial photography or Lidar the most effective recording strategy is likely to be a strip, map and sample exercise.			

		MISCELLANEOUS: FINDS SCATTERS AND FINDSPOTS		
Lithic and pottery scatters	Lithic scatters occur frequently across this ACA. A significant proportion of this material has been recovered during the course of fieldwalking and is likely to be of Neolithic or early to mid Bronze Age in date; however scatters may also include material attributable to the Iron Age. Since interpretation of lithic artefact industries can be complex any assessment of archaeological potential needs to consider the possibility that some assemblages could be an indicator for activity during this period. Fieldwallking has recovered significant quantities of Late Bronze Age and Iron Age pottery with higher concentrations noticeable within the Welland, Wreake/Eye and Soar valleys, providing a strong indicator of settlement distribution.	As with the Fluvial Sands and Gravels ACA much of the lithic material will be attributable to the Neolithic to Middle Bronze Age; however it is also possible that there will be some material of a later date. Several Iron Age querns have also been recovered across the ACA Burbage, High Cross, Nailstone and Thurcaston. Whilst perhaps not quite as densely distributed as within the fluvial sands and gravels Late Bronze Age to Iron Age pottery does occur frequently across the ACA.	Much of the lithic material recovered from this ACA is likely to predate this period; however on land affected by a proposed access road for Thistleton Quarry fieldwalking identified a scraper of possible Mid-Late Bronze Age. On the Carboniferous Limestone fieldwalking north of Grace Dieu Wood, Bellton recovered a small quantity of Iron Age pottery. More sizable assemblages of Iron Age pottery have been recovered at Breedon Hill in addition to about 40 Beehive querns. Generally a low density of pottery finds recovered across the Jurassic limestone although clusters have been identified at Greetham, Thistleton and Tixover.	A relatively thin scatter of lithic material recovered from this ACA much of which is likely to be Neolithic to Mid Bronze Age in date. Fieldwaking at Halstead Road, Mountsorrel recovered a coherent assemblage of concave and straight-edged scrapers often found in Mid-Late Bronze Age contexts. At Croft Quarry a topstone from an Iron Age or early Roman beehive quern was recovered from the spoil. Few pottery scatters identified across this ACA. A fieldwalking at Bardon Hill recovered a small amount of pottery with an early Iron Age and providing evidence for activity during this period.
Metalwork	The densest concentrations of metal finds within this ACA can be observed on deposits associated with the Rivers Soar and Wreake. In addition the distribution pattern would appear to indicate some association between metal finds and rivers with many recorded findspots being located just outside the ACA on higher ground overlooking the valleys.	Most frequent occurrence of metal finds recorded both of the HER or through PAS are within the western parts of of the project area; for example just to the north of Market Bosworth and in the area surrounding Heather. Aross High Leicestershire although a relatively thin scatter of finds is recorded by the HER and PAS these do appear to show some correlation with the sand and gravel deposits that form this ACA and providing a possible indicator for a preference for settlement on higher free draining soils.	A low density of findspots recorded right across this ACA with most sites located on the Jurrasic limeston between Whitwell and Thistleton.	A low desity of finds recorded on either the HER or the PAS database.
	Assessment, evaluation and mitigation: Information relating to all surface and plough soil finds should be collated and considered for desk based assessments and can provide a useful indicator for potential areas of activity which may require further evaluation and mitigation. Particular attention should be given to information recorded through the Portable Antiquities Scheme which has over recent years enhanced our knowledge of the spatial distribution of surface finds, especially metalwork. Across the project area there has been a good tradition of fieldwalking and this has contributed significantly to our understanding of the distribution of Late Bronze Age and Iron Age sites; further similar systematic programmes should be encouraged as a prospection strategy for sites of all periods.			

6.6 ROMANO-BRITISH ARCHAEOLOGICAL RESOURCE (AD43-c.AD410)

ARCHAEOLOGICAL ASSOCIATIONS	AGGREGATE CHARACTER AREAS			
	FLUVIAL SANDS AND GRAVELS	**GLACIOFLUVIAL SANDS & GRAVELS**	**LEICESTERSHIRE & RUTLAND LIMESTONES**	**CHARNWOOD & UPPER SOAR IGNEOUS ROCKS**
AGRICULTURE AND SUBSISTENCE				
Fields and field systems	Relatively few field systems have been recognised across the ACA. At Great Easton a number of linear features were identified during trial trenching; these could be interpreted as ditches associated with field systems and the Roman and Iron Age pottery contained within them suggest settlement nearby. Trial trenching and subsequent strip, plan and sample at The Grange, South Kilworth also uncovered a probable field system of 1st-3rd century Roman date. At Pontylue Farm, Syston, linear cropmark features forming a probable field system were identified from aerial photographs and confirmed during and archaeological evaluation of the site; Gradiometer survey was subsequently carried out across the site area to determine the layout and extent of the features identified during evaluation. Evaluation in advance of sand and gravel extraction at Lockington revealed a complex of features including a range of enclosure ditches and linear features interpreted as representing field boundaries with a Romano-British date.	Trial excavations at Burton-on-the-Wolds identified ditches forming part of a field system of probable Iron Age or Roman date. The presence of small parallel and perpendicular ditches and gullies identified during evaluation at Earl Shilton may also be indicative of a managed Roman agricultural landscape. Rapid assessment of the transcribed cropmark evidence for this ACA shows occasional linear features possibly representing fragments of field systems; characterising these features would however require further work.	No field systems for this period have been identified on the Carboniferous Limestone. On the Jurassic Limestone at Ketton Quarry a significant quantity of Roman occupation evidence has been recovered during the course of fieldwalking and limited excavation; this may be associated with cropmarks interpreted as representing former fields or enclosures. At Thistleton Quarry, Market Overton an archaeological evaluation which included geophysical survey and trial trenching identified a number of linear features of possible Roman date thought to reflect a field system. A further possible Roman field system has also been identified north-east of Saltby where cropmarks of five small linked enclosures have been noted.	Whilst there are no currently recorded instances of field systems with a Roman date on the HER for this ACA, the scatter of finds and settlement sites within and in close proximity suggest a potential for their future identification.
	Assessment, evaluation and mitigation: Potential field boundaries may be identified from searches of available aerial photographic evidence which, once plotted, may be used to inform the development of an appropriate mitigation strategy. When considered appropriate a geophysical survey may prove useful in further defining the spatial arrangement of field boundaries and any relationship they may have to occupation sites. Where features are identified they may be characterised through targeted trial trenching which can also aid in determining the current state of preservation and the nature of any further work. Strip map and sample is likely to be the preferred mitigation strategy.			
DEFENCE				
Fortifications	A number of sites have been identified within this ACA that contain features which may have defensive characteristics; these include the ramparts surrounding the Roman town of Great Casterton which sits partly on the Fluvial Sands and Gravels and partly on Leicestershire and Rutland Limestone ACA and survive as earthworks. Excavation revealed narrow V-shaped ditches which appear to have been replaced in the mid 4th century by a broad shallow ditch and bastions.	At Ibstock a large area of Roman occupation including a cemetery and industrial areas has been interpreted as representing a town. This settlement may have developed from a possible early Roman fort suggested by the presence of curving ditch with a V-shaped section recorded during a watching brief. At High Cross, the Roman settlement of *Venonae,* a cropmark of a multangular double ditch may represent the defences of the town. Just north-west of the settlement aerial photographic evidence from Smockington Hollow shows a rectangular enclosure with rounded corners. Excavations of the ditch during road widening showed it to be about 2 metres wide and a little over a metre deep backed by a ditch approximately 3 metres wide.	The Roman fort north-east of Great Casterton was identified from cropmarks; small scale excavations were undertaken to investigate the defences, gates and several interior buildings have contributed to the suggestion that the fort was built c. 43-45, reduced c.70 and deserted c.80.	No fortifications dated to the Roman period are recorded on the HER for this ACA, and the potential for their discovery is not deemed great.
	Assessment, evaluation and mitigation: the rarity and potential national importance of fortifications associated with the Roman Conquest means that there is a strong likelihood that preservation *in situ* will be the most favoured option. A full assessment of the air photographic evidence combined with walkover surveys identifying earthwork remains will form core components of any pre-determination work. Non-intrusive techniques, including measured surveys of extant earthwork remains and geophysical survey, should be employed to clearly define the extent of a monument and to locate previously unrecognised features both within its boundaries and its environs. The character, date, and level of preservation of remains should be established through evaluation trenching which will be followed up with and agreed detailed mitigation strategy; this will involve the full excavation of threatened areas unless the case for preservation *in situ* has been clearly demonstrated.			

		DOMESTIC		
Rural settlements	Few Roman rural settlement sites have been identified within this ACA. Enclosures and small circular features seen on aerial photographs to the north of Ratcliffe Lane Lockington are likely to represent the closes and round houses of an Iron Age/Romano-British date which are now scheduled. Features including ditches and enclosures at Warren Farm may represent a continuation of the scheduled site; these were identified from aerial photographs, fieldwalking and geophysical survey. The significance of the site was confirmed with trial trenching which suggested continued activity on the site possibly from the 4/5th century B.C. to the 4th century AD. North-west of Dishley Grange a combination of aerial photography, geophysical survey and trial trenching identified a site with two phases of activity which included square enclosures with gullies dated to the late Iron Age/early Roman period. Reorganisation by the mid 2nd century is characterised by more structured linear boundaries and rectilinear enclosures.	A metal detectorist working to the north-east of Thurlaston recovered a large quantity Roman material including metalwork, pottery and a tegula suggesting a settlement site. Metal detecting has also lead to the recovery of large quantities of Roman metalwork suggesting a settlement site with a possible metalworking industry. At Glenfield a complex of ditches and postholes was recorded during excavations. The assemblage of finds suggests a Romanised agricultural community located within the immediate hinterland of Roman Leicester.	The ACA present relatively little evidence Roman rural settlement, although both Iron Age rural sites, as well as Roman villas, towns and findspots are recorded. It is anticipated that the paucity of evidence is entirely the result of limited archaeological excavation.	Current data presents no evidence of Roman rural settlement. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.
	Assessment, evaluation and mitigation: a detailed analysis of all available air photographic evidence will form a key component of any desk-based assessment together with a systematic appraisal of information held within the HER and historic map data. Assessment should be combined with a walkover survey to look for any surviving earthwork remains that have not been destroyed by modern ploughing. Where earthwork remains are recognised a full measured survey will be required to determine the extent of any visible features. Earthwork remains are likely to merit preservation *in situ*. Any evaluation is likely to involve systematic fieldwalking over arable sites and geophysical survey to be followed up with a programme of targeted trial trenching aimed at establishing the level of preservation, character and date of surviving remains. Where sites are known from cropmark evidence adoption of a strip, map and sample methodology will probably form the most appropriate approach on sites where development is considered to be acceptable. Adequate provision needs to be made for scientific dating and for the analysis of environmental material.			
Villas	A reasonable scatter of the villa sites recorded on the HER are within or close to this ACA. In the Welland Valley villa sites have been located east of the Roman small town of Medbourne at Saddlers Cottage, east of Upper Leighs Farm (Drayton I) and east of Bringhurst a suggested villa site has also been recorded north-east of Caldecott. On the western edge of the project area villa sites have been identified east of *Tripontium,* south of Shawel sand and gravel quarry, and north of *Manduessedum*. North east of Lockington close to the confluence of the Rivers Trent and Soar a suggested 2nd -4th century villa consisting of a rectangular building (c.40m long) with a projecting wing to the north, with other building and enclosures around it has been located on the fluvial sands and gravels. The general distribution of villas suggests that there is favouring of sites off the alluvial floodplain within in or close to river valleys. Access to the road network, providing links to towns may also have been a determining factor.	Across this ACA there is a fairly thin scatter of villa sites. Use of aerial photography has helped in the identification of possible sites at Alder Hall in Peckleton and south-west of Mount Pleasant in Claybrooke Magna. Fieldwalking has revealed positive results at Barkby Thorpe, Osbaston, Shangton and Frolesworth. Limited excavation evidence to date; however work carried out in the 1940s south-west of Glooston Wood found building foundations along with flue tiles, *tessera*, slate, pottery and tile fragments; similar material together with a mortar floor has been recovered at Black Piece and Calver Hill in Sapcote. Although glaciofluvial sand and gravel deposits tend to be at a higher elevation than those within the fluvial deposits villa sites still tend to favour locations with access to the rivers.	Very few villas recorded on the HER for this ACA and all of these are on the Jurassic Limestone in the east of the project area. South of Thistleton Gap quarrying and subsequent excavations revealed an extensive range of buildings including a small Roman winged corridor house with mosaics and hypocausts. Close to Rutland Water Dam two villa sites have been recorded one on the northern and one on the southern side of the River Gwash. Analysis of aerial Photography identified a cropmark of stone building foundations at Ryhall from where Roman pottery was found after ploughing.	Late 19th century finds including pottery, plaster, tile, slate, *tesserae* and animal bones may tentatively suggest the presence of a villa site at Mountsorrel Quarry. East of Sapcote excavations carried out during the 1950s, 60s and 70s revealed building foundations along with tessera, tile, plaster and pottery.
	Assessment, evaluation and mitigation: villas represent a rare archaeological resource across the project area and are potentially of national importance and likely to merit preservation *in situ*. Full assessment of air photographic evidence will form an essential component of any pre-determination work as will an informed appraisal of HER and topographic information. Walkover surveys should aim to identify surface features and geophysical survey may also be used to locate structural remains. Where ground conditions are conducive a systematic programme of fieldwalking can help define any focus of activity. To establish the degree of preservation, character and date of surviving remains evaluation trenching will be required. Where evaluation establishes that remains are not of sufficient importance to merit preservation *in situ* an agree mitigation strategy will need to be developed that involves and appropriate level of excavation, recording and analysis.			

Small towns	Of the 12 Roman small towns identified within the project area 5 are located either wholly or partly within the ACA: Barrow (Roman name unknown), Caves Inn Farm (*Tripontium*), Great Casterton (Roman Name unknown), Mancetter (*Manduessedum),* and Medbourne (Roman name unknown). Barrow lies to the north of Leicester where the Salt Way crosses the River Soar; it is however uncertain whether the significant quantities of pottery, building materials, coins and small finds recovered during metal detecting represent a large settlement or a series of small sites. At Caves Inn, especially on the Leicestershire side of Watling Street, heavy quarrying has made it difficult to determine the extent of the settlement. Excavations have identified wells, gullies, pits, timber buildings, burials and some iron slag and furnaces. The earliest phase of settlement at Great Casterton appears to be the Roman fort, immediately east of the town. Pottery kilns, evidence of bronze working and large quantities of slag have been recovered. The provision of defences enclosing much of the settlement may be an indication that this was a high status settlement. Mancetter was a large Roman settlement most of which lies in Warwickshire. An early legionary half fortress lay under the modern village and the town may have grown up as a *vicus* exploiting specialising in the production of *mortaria*. Medbourne has produced very dense scatters of pottery and building material and fieldwalking has defined the settlement as being mostly along the Gartree Road with a substantial northern extension.	High Cross (*Venonae*), on the Leicestershire/Warwickshire border, was probably established here because it sits on the junction of Watling Street and Fosse Way. Antiquarian accounts mention large numbers of Roman coins and building material. Excavations during the 1950s produced evidence of timber buildings fronting the main roads. Fieldwalking has defined the shape of the finds scatter around the road junction. The only evidence for any industry here is in the form of iron slag. Willoughby on the Wolds (*Vernemetum*) straddles Leicestershire/Nottinghamshire border on the line of the Fosse Way. While most of the town lies on the Nottinghamshire side of Willoughby Brook evidence has also been recovered on the Leicestershire side suggesting the presence of a settlement throughout the Roman period. A large area of Roman occupation considered to represent a town site has been identified at Highfield Farm to the north of Ibstock with a cemetery and evidence for pottery and tile kilns. The site is clearly aligned on a Roman road running west-north-west to east-south-east which joins up with Ryknield Street in Derbyshire to the west.	Thistleton (Roman name unknown) is the only small town to be located entirely within this ACA. Excavations have produced evidence for various buildings including, a temple complex, industrial processes, agriculture and burials. A gradiometer survey of the area identified numerous strongly magnetic patches just to the south of the main settlement possibly representing Roman limestone quarry pits providing stone for building construction. The town is located close to ironstone deposits which, from the evidence of iron tap slag combined with strong magnetic features, were being actively exploited by a local metal working industry.	The only settlement within this ACA is Barrow which straddles the igneous rocks of Chanwood and the fluvial sands and gravels associated with the River Soar.
	Assessment, evaluation and mitigation: although located on fluvial sands and gravels the Roman settlement at Market Harborough lies within the urban area and so is not considered within the scope of this ARA. Roman towns have the potential to contain preserved archaeological remains of national importance and the recognised area of settlement at Mancetter, High Cross and Great Casterton are scheduled and preservation *in situ* will, other than in the most exceptional of circumstances, form the preferred strategy. Where proposals for development will impact upon towns and their immediate hinterlands a detailed assessment of air photographic evidence combined with non-intrusive surveys (including measured surveys of earthworks and geophysical survey to locate features associated with the settlement) will be required to determine the likely extent and character of surviving remains. Work at High cross as demonstrated that systematic fieldwalking can help in defining the extent of settlement. Evaluation trenching is likely to be required to characterise, date and establish the degree of preservation of remains which, if permission is granted, will inform an appropriate mitigation strategy.			
INDUSTRIAL				
Corn-drying kilns/ovens	Two corn drying ovens were identified during excavations on land adjacent to great Casterton Primary School just north of the ramparts surrounding the town. To the north east of Great Casterton a large villa complex excavated during the 1950s included features identified as corn driers.	A Romano-British site at Desford identified during the course of trial trenching revealed evidence for a corn drying oven with good preservation of organic remains including nutshell, burnt bone, charcoal and barley grains.	One corn drier has been identified just to the east of Rutland Water dam. This site is about 30 north of a villa site and a few metres further south but just outside the ACA a further corn drier has also been identified	No examples of this monument type have are recorded from this ACA. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.

Pottery and tile kilns	From the 2nd to the 4th centuries mortaria produced at Mancetter; over 70 kilns have been recorded south of the defended Roman enclosure (on the Warwickshire side of the border) and there remains the potential for further sites to be present within the project area. Fieldwalking south-west of Billsdon’s Hollow, Lubbesthorpe revealed a small but dense scatter of Roman pottery, a collection of Roman kiln bars and fragments of kiln lining indicating the presence of a pottery kiln. Kiln bar fragments recovered east of Normanton Park, Thurlaston suggest a pottery kiln site. At Great Casterton separate investigations during the 1950s and 60s identified two pottery kilns alongside Ryhall Road; a further three kilns were discovered to the north of the primary School in 2004/5 which appear to have ceased production at some point during the early 3rd century.	At least four pottery kilns have been identified through a combination of fieldwalking and excavation either within or close to the Roman small town at Highfied farm north of Ibstock. Kiln sites have also been identified during building work at Desford and further south during fieldwalking at Tooley Park Farm, Peckleton. A cluster of at least four probable pottery kiln sites have been indentified during fieldwalking north-west of Leicester in the area around Thurcaston, Cropston and Ansty. Between Enderby and Fosse Way over 600 sherds of pottery, tile and pieces of kin bar have been recovered suggesting a pottery kiln.	No pottery kiln sites recorded on the HER on the Carboniferous Limestone. On the Jurassic limestone two pottery kiln sites have been identified at Thistleton and Greetham.	The only pottery kiln site recorded on the HER within this ACA is at Fishpool Spinney Enderby.
Metal working	Metalworking sites on the fluvial deposits of the River Wreake/Eye are suggested by the presence of slag recovered at Brooksby Quarry and Stapleford Park. Quantities of slag recovered at various locations around Medbourne Roman small town indicate a cluster of metalworking sites exploiting the underlieing ironstone bedrock.	A low density of mmetworking sites are recorded on the HER for this ACA. Lead working was taking place east of Lea Grange Farm, Twycross, and evidence for a blacksmith’s workshop a furnace has been found at Ibstock. At Desford evidence for metalworking dating from the 2nd-4th centuries has been recovered.	No metalworking sites recorded on the HER on the Carboniferous limestone, however frequent ironstone deposits are found within areas where the Jurassic limestones dominate. Ironstone is being exploited and worked at several locations with slag found at Clipsham, Empingham, South Luffenham, Sproxton, Thistleton and Tixover.	No Roman metalworking sites are recorded on the HER for this ACA. However, the potential for as yet unrecorded archaeological evidence within the ACA should be considered.
	Assessment, evaluation and mitigation: Whilst there is a strong likelihood that evidence of industrial activity to be present within or close to known areas of settlement predicting industrial activity within a more isolated and rural contexts can prove problematic. In developing our understanding of the nature and intensity of industrial activity a more informed picture of the way in which the local economy evolved and functioned will be gained. Investigation of sites and structures is likely to include a recommendation for full excavation and provision should also be made for specialist analyses of any artefacts and environmental remains that are recovered.			
Quarries	Little direct evidence for quarry sites exploiting the fluvial sands and gravels although it is likely that deposits would have provided raw materials for construction.	Generally very little evidence for quarrying held on the HER. At Melton Road, Burton on the Wolds excavations did identify a complex of large intercutting quarry pits which may represent a source of raw materials used for construction.	At Thistleton Quarry, two probable 1st to 2nd century limestone quarry pits were identified during evaluation work in advance of a proposed access road to the present quarry.	One quarry site of Roman date is noted in the HER for this ACA at Groby Upper Parks Farm where both granite and slate appear to have been extracted. At Home Farm Groby an outcrop of dark slates may have been quarried by the Romans; the presence of this site, however, relates to bedrock geology rather than the superficial deposits which define this ACA.
	Assessment, evaluation and mitigation: specialist analysis of quarried materials may help in identifying the location of potential raw material sources. It ids however probable that evidence for quarrying during the Roman period will have been lost during later periods of extraction. The use of strip, map and sample techniques may yield positive results in the location of quarry sites; however accurate dating will depend upon the discovery of associated datable material.			
RELIGIOUS< RITUAL AND FUNERARY SITES				
Inhumation/cremation burials and structured deposition of animal remains	Cremation burials have been identified at a number of sites including: just east of the settlement at Mancetter, Cossington Grange and Bottesford; cemeteries have been located at Barrow-Upon-Soar and Great Easton. At Quorndon trial trenching uncovered evidence for two burials, probably one adult and one juvenile; and at Barrow Upon Soar several skeletons of possible Roman date were revealed during quarrying in the late 19th century. At Great Casterton archaeological work carried out to the north of the Roman town revealed the north-western corner of a later 3rd to 4th century inhumation cemetery consisting of 133 graves arranged in rows with the skull facing to the south-west. Grave goods were found in a small number of the inhumations, with about a quarter of the graves containing nail fragments and a similar number were stone lined or cists burials.	Acidic conditions within sand and gravel will often result in poor preservation of human remains; at Rothley Sandpit, Thurcaston a Roman beaker was recovered from a feature identified as a possible grave although no human reams were present, two further burials identified at this site include one inside an oolitic limestone coffin with lid and encased in gypsum plaster. North-east of Ibstock excavations north of Highfield Farm identified several possible graves however no bone was recovered. Six collections of human remains in a generally poor condition were found at Enderby. At Sapcote Gravel pit burials thought to be Roman have been recovered during the early 19th and early 20th centuries.	No inhumation or cremation sites are recorded on the Carboniferous limestone however a number of sites have been identified on the Jurassic limestone to the east. Trial trenching at Thistleton Quarry identified two 3rd century inhumations, possible cemetery sites are recorded at Empingham and Whitwell, whilst just to the east of Ketton Quarry excavation recorded up to eleven 3rd/4th century inhumations in five graves.	The only burial site not on the HER for this ACA is at Mountsorrel Quarry where discoveries made during the late 19th century included two possible burial chambers.

	Assessment, evaluation and mitigation: whilst there will typically be an association between funerary and settlement sites predicting the presence of inhumations or cremation burials is difficult. The use of a strip, map and sample mitigation strategy may provide and adequate framework for identification of such remains during quarrying. On sands and gravels where conditions tend to be acidic a high level of vigilance and experience is required to recognise remains that are poorly preserved. Where human remains are recovered scientific dating and appropriate socialist analysis (e.g. for isotope or DNA analyses) will be required for which sufficient contingency resources will need to be made available.			
Temples and shrines	Very little evidence for shrines or temples held on the HER for this ACA other than a stone slab described as a Roman alter slab within the 13th century St. John the Evangelist Church, Caldecott; this may, tentatively, suggest the presence of a Roman temple.	A large quantity of finds including pottery, over 170 brooches, other jewellery, in excess of 460 coins and fragments of statues were recovered during fieldwalking and metal detecting at Glebe Farm, Sutton Cheney. This evidence in association with geophysical survey results suggest a high status, possibly a temple, site.	At Thistleton Roman town a combination of techniques including fieldwalking, geophysics and excavation has identified a temple complex.	No temple or shrine sites recorded on the HER this ACA.
	Assessment, evaluation and mitigation: desk based assessment and fieldwalking in combination with geophysical survey and analysis of aerial photography can highlight the potential for the presence of this type of site. Typically, however, temples and shrines will only be identified during soil stripping. The level of preservation and date of surviving structural remains may be established through evaluation trenching. These sites, even in cases where preservation of remains is poor, are likely to be of such significance that preservation *in situ* will be recommended. Evidence of shrines and temples needs to be anticipated in the context of both rural and urban settlements and employing a strip, map and sample methodology should provide an appropriate framework for establishing their location. Sites will need to be fully excavated with appropriate provision made for specialist analysis in cases where preservation *in situ* is not recommended.			
	TRANSPORT			
Roads and trackways	An extensive Roman road network may be recognised across the project area. The Fosse Way connecting Leicester (*Ratae Corieltauvorum*) with Lincoln (*Linum Colonia*) to the north-east and Cirencester (*Corinium*) and Exeter (*Isca Dumnoniorum*) to the south west traverses fluvial deposits associated with the Upper Soar to the south of Leicester and crosses the River Wreake to the north of the city. Watling Street running from Chester (*Deva Victrix*) to Richborough (*Rutupiae*) forms the border between Leicestershire and Warwickshire and lies on deposits associated with the confluence of the Rivers Anker and Sence around Mancetter. In south-west Leicestershire Watling Street crosses fluvial sand and gravel deposits associated with the River Swift before passing through the Roman settlement of *Tripontium* south of the sand and gravel quarry at Shawell. Also identified as a possible Roman road is Lutterworth road connecting *Tripontium* with Leicester which at its southern end is very straight and is followed by the parish boundary. Further east the main road from Melton to Leicester, which crosses over sand and gravel deposits associated with the River Wreake, was formally known as 'Le Strete'; 'Street' names typically refer to Roman roads. A hollow way or cutting was noted during the 1960s alongside a straight footpath; it has been suggested that this may represent a minor Roman route from the Red Hill Roman town in Nottinghamshire probably going to Leicester.	The Gartree Road runs south-east out of Leicester into Northamptonshire via Medbourne Roman town. The Fosse Way, Mancetter Road and *Via Devana* all cross glaciofluvial deposits and provided Leicester with communication links to the western parts of the project area and beyond Watling Street marks the Leicestershire-Warwickshire border and also crosses areas where the superficial geology is characterised by glaciofluvial sands and gravels.	On the Jurassic limestones Ermine Street, connects London (*Londinium*) with Lincoln (*Lindum Colonia*) and York (*Eboracum*), passes through Great Casterton and follows the line of the A1. A Roman road, visible on aerial photographs, runs south from great Casterton to Tixover and probably beyond. The Drift Roman road connects Thistleton with Ermine Street to the south and probably with Newark to the north.	Comparatively little evidence held on the HER for roads and trackways within this ACA. At the eastern edge of the ACA the suggested western extent of the Saltway Roman road may have linked the small town at Barrow with the Fosse Way and ultimately with Ermine Street in Lincolnshire. On the western side of the ACA a possible Roman road running roughly north-west to south-east may be represented partially by the line of the A511 and ultimately connecting with the Fosse Way at Leicester. This may be connected to the *Via Devana* by a minor road that meets just to the north of Cliffe Hill Quarry. In Markfield just west of the junction of Stanton Lane and the A50 a possible Roman road has been suggested by the presence of a scatter of stones about 20 feet wide.
	Assessment, evaluation and mitigation: existing documentary, archaeological and landscape evidence for roads constructed during the Roman period will need to be collated for desk-based assessment which should be accompanied by a walkover survey to investigate for evidence of a surviving agger. Geophysical survey and analysis of aerial photography will inform any subsequent requirement for trial trenching to locate and characterise any surviving remains. Preservation *in situ* may be required where sections of the Roman road are particularly well preserved. Otherwise any appropriate mitigation strategy is likely to require a detailed planning of the route combined with further targeted excavation aimed at examining any variations in methods of construction or repair.			

MISCELLANEOUS: FINDS SCATTERS AND FINDSPOTS				
Coins and coin hoards	Fluvial deposits associated with the Rivers Soar and Wreake/Eye represent areas with the densest concentrations of reported Roman coin finds. A high frequency of finds can also be observed in the Welland Valley particularly around Medbourne Roman Small Town and the suggested small town at Market Harborough. Fairly dense scatters can also be observed along the courses of the Rivers Sence and Swift in the west and along the River Gwash in the east between Great Casterton and Rutland Water.	A lower density of coin scatters than can be observed in the Fluvial Sands and Gravel ACA with the possible Roman small town to the north of Ibstock representing a particular hot spot.	A low density of Roman coins recorded within this ACA with possible concentrations to the south of Exton and around Empingham.	Coins and coin hoards are poorly represented within this ACA.
Miscellaneous metalwork	Relatively dense scatter of metalwork finds recorded within this ACA particularly along the lengths of the Rivers Sence, Soar, Swift and Wreake/Eye largely as a result of metal detectorist activity.	A fairly even scatter of metalwork finds recovered during metal detecting and surface finds mostly recovered during fieldwalking.	Recorded metalwork finds are very thinly distributed across this ACA. Despite this sparce evidence the potential for as yet unrecorded archaeological remains within the ACA should be considered	*As Leicestershire & Rutland Limestones*.
Other finds	Systematic field walking, chance finds and archaeological interventions has resulted in the recovery of a wide range of material mostly pottery but also glass, quern stones, tile and other building material.	Pottery scatter mostly recovered during fieldwalking makes up most of the material recorded in this ACA.	Fairly low density of findspots recorded on the HER for this ACA possibly reflecting relatively low levels of archaeological work undertaken in what is, essentially, one of the more isolated parts of the ACA.	Very low density of find spots recorded; a few pottery finds recorded around the edges of the ACA. Diamond shaped roofing slates were found at the Roman slate quarry north-east of Groby Parks Farm.
	Assessment, evaluation and mitigation: In addition to data captured by the HER, assessment should include consideration of finds data held by the Portable Antiquities Scheme, which both supplements existing data sets and indicates the applicability or otherwise of metaldetecting as a prospection techniques.			

<table>
<tr><th colspan="5">6.7 EARLY MEDIEVAL ARCHAEOLOGICAL RESOURCE (c. AD 411-1066)</th></tr>
<tr><th rowspan="2">ARCHAEOLOGICAL ASSOCIATIONS</th><th colspan="4">AGGREGATE CHARACTER AREAS</th></tr>
<tr><th>FLUVIAL SANDS AND GRAVELS</th><th>GLACIOFLUVIAL SANDS & GRAVELS</th><th>LEICESTERSHIRE & RUTLAND LIMESTONES</th><th>CHARNWOOD & UPPER SOAR IGNEOUS ROCKS</th></tr>
<tr><th colspan="5">AGRICULTURE AND SUBSISTENCE</th></tr>
<tr><td rowspan="2">Fields and field systems</td>
<td>The river valleys and lighter soils of Leicestershire and Rutland were extensively utilised in the late Roman period, the agrarian economy structured around the villa estate. Some degree of continuity has been postulated for this estate structure, possibly forming the basis of later medieval boundaries/administrative unit. It is equally possible this coincidence is due to the retention of natural agrarian territories (Liddle 1996 & 2004; Bowman 2004).

Despite the absence of evidence, the frequent coincidence of settlement s and cemeteries suggests a substantial degree of continuity between the 4th and 6th centuries. However, palaeo-environmental data points to a move from specialised market driven agriculture to subsistence, mixed-farming practices.

Evidence of field ditches abound in the archaeological record. However, their extent, function and landscape structure has not been the subject of detailed archaeological enquiry. It is not therefore possible to determine the extent to which the rural fieldscape survived the end of Roman Britain and the establishment of the Anglian kingdoms.

The establishment of the openfield, champion landscapes of the late Saxon period (9th and 10th centuries) appears to go hand-in-hand with the widespread nucleation of the settlement pattern. Central and eastern Leicestershire and Rutland are very much part of this process, however, the important role of meadow, particular in the valleys should be noted.</td>
<td>As Fluvial Sands and Gravels. Despite the absence of recorded field systems dated to the Early Medieval period, the region possesses extensive evidence of Romano-British settlement, together with a scatter of data indicating preferential utilisation in the post-Roman period, avoiding the suggested withdrawal from the claylands (Bowman 2004, 120).

The establishment of the openfield system remains obscure, it is possible that wholesale restructuring took place without regard to the character of underlying soils, it is equally possible that preferential selection brought some sections of the landscape under plough earlier than others. The lighter soils of the sands and gravels may provide some evidence of this significant social and agricultural revolution.</td>
<td>No field systems that may be dated to the Early Medieval period have so far been recorded.

It is possible that the late Roman withdrawal from the heavy clays, led to the regeneration of scrub and heathland. However, Bowman has noted the possibility that the absence of late Roman and Anglian settlement may equally indicate a less intensively managed move to landscape of pasture and woodland.</td>
<td>The largest tract of remaining waste in medieval Leicestershire, it remained common pasture until its 19th century enclosure. The importance of Charnwood is apparent in the placement of manorial centres at Groby, Barrow, Shepshed and Whitwick around the periphery of the waste.

The field patterns of this ACA are largely a product of the late enclosure of a landscape previously dominated by heathland and woodland. Planned enclosure is the dominant HLC field type, ridge and furrow is uncommon, with the exception of Charley, occurring only on the edges of the ACA.

Roman finds from Charley and 11th century documentary references, suggests the presence of small tracts of tenanted arable land within the Forest and the potential for a dispersed settlement scatter.</td></tr>
<tr><td colspan="4">Assessment, evaluation and mitigation: development should be preceded routinely by analysis of available ground survey data (existing earthwork survey, aerial photography and/or LiDAR) this should be supplemented by walkover surveys aimed at locating and recording landscape features such as ridge and furrow, earthwork banks and ditches. Significant and extensive landscape features may warrant retention unaffected by the impact of future extraction. Any subsequent excavations should include provision for work to establish the extent and layout of ridge and furrow, with the aim of elucidating their chronological development and stratigraphic and spatial relationships with earlier and later features (e.g. Roman field ditches). Strip, map and sample investigation will provide the most effective frameworks for the identification of Early Medieval field systems and settlements as well as establishing their relationship with later ridge and furrow. It will also provide the most appropriate context within which targeted sampling and artefact retrieval can be undertaken. Intrusive investigation should focus upon the examination of ditch intersections to investigate the development of any field system that are identified, and upon the retrieval of datable pottery and other finds (with the proviso that field ditches rarely yield significant quantities of material).</td></tr>
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Fish weirs	Anglo-Saxon exploitation of rivers is well documented, with some 43 fish weirs and traps have been recovered from Hemington, dating by radiocarbon analysis to between 8th and 11th centuries. Investigation by Chris Salisbury shows the Hemington weirs to be closely comparable to examples from Colwick, Notts. and to weirs found in the Severn estuary. The weirs, post and braced wattle fence structures with a wicker trap at its apex, were apparently situated in the shallows of the active channel, and appear to have had a short 10-20 year functional life. Opportunistic recording during gravel extraction has led to partial recording of a significant number of examples, however, systematic archaeological investigation remains lacking (Ripper and Cooper 2009). It is anticipated that similar weirs will exist on a smaller scale along all the major water courses of Leicestershire and Rutland, particular attention should be given to the Soar, Wreake and Welland.	No fish weirs or traps are recorded within the ACA. The glacial origin of the sediments and their propensity to erosion make the presence of fish weirs unlikely. It is possible that, subsequent stream formation will leave exposed glacial deposits onto which weirs are formed. Streams traversing or fringing the glacial sedimentary deposits should be monitored during extraction in case associated riverine structures are present.	None has so far been recorded, but alluvial and terrace deposits associated with tributary streams traversing or fringing the limestone escarpment should be monitored during extraction in case associated riverine structures comparable to those recorded in the Trent are recorded during extraction.	None has so far been recorded, but alluvial and terrace deposits associated with tributary streams traversing or fringing Charnwood Forest should be monitored during extraction in case associated riverine structures emerge.
	Assessment, evaluation and mitigation: the presence of riverine structures buried within fluvial deposits is hard to establish in advance of excavation. However, as at Hemington, fish weirs, bankside reinforcement, dams and associated structural remains, can be identified by appropriate programmes of archaeological attendance and monitoring. Mechanisms to allow for effective targeting of attendance should be provided. Desk-based assessments utilising available aerial photography and/or LiDAR survey, should attempt to identify the presence and sequence of palaeochannels deposits and other environments with the potential for preserving riverine structures. These high-potential areas should be monitored continuously during extraction to ensure that associated remains are identified and recorded. A contingency allocation is recommended in the event that significant structural remains are recovered.			
	CIVIL			
Administrative structures and moot sites	Documentary records note meetings of the Mercian council at Croft, it may have been one of a number of possible Middle/Late Saxon estate or administrative centres. By the late 9th/10th century the shire units were becoming established. The administrative subdivision in both counties was the wapentake or hundred, the terms appear inter-changeable and originate in the 10th century. There is some indication that the hundred may have functioned as a subdivision of the wapentake (e.g. Sparkenhoe). Domesday notes four Leicestershire wapentakes, Framland, Gartree, Goscote and Guthlaxton. Sparkenhoe Hundred is first mentioned in the Leicestershire Survey of 1130, however, Cox suggests a much earlier date based on place-name evidence. The suggested and known moot sites appear central to the wapentake structure (Hundehoge (possibly Shipley Hill), Cossington; Guthlaxton Meadow, Cosby), often located on communication routes to shire seat at Leicester. To date none of the suspected moot sites have been successful excavated and indeed, may have left little in the way of an archaeological trace.	*As Fluvial Sand and Gravel.* Records note the meeting of the Mercian council at Glen (Great Glen) and Gumley in the 8th and 9th centuries. They are known to be royal residences and the centre of substantial estates. Similar multiple estates suggested at sites including Claybrooke Parva and Market Bosworth. The Claybrooke estate may have its origins in the former *territorium* of the Roman small town of *Venonnae*, centrally located to he later documented estate. Based in place-name evidence the later Saxon hundredal structure, established in the 10th century, may have included Sparkenhoe Hundred as a subdivision of Guthlaxton wapentake. A moot site is suggested at Shericles Farm, Peckleton.	No moot sites are recorded in the Leicestershire portion of the ACA, however, the Rutland Hundreds of Alstoe and Martinsley were listed in Domesday as subsidiary to Nottinghamshire, whilst the Wrandike and East Hundreds (originally the single wapentake of Witchley (Hwicceslea)) belonged to Northampton. The Soke of Oakham, included in Martinsley, had its own court, due to its association with the Saxon royal house. Moot sites are suggested at Alstoe Mount, Martinsley in Martinsthorpe parish, possible 'Wrongedich' in North Luffenham and the court of the East Hundred at Witchley Heath or Warren in Edith Weston and Ketton parishes.	Place-name evidence indicates a local meeting place for Charnwood Forest at or near Swanimote Rock, (the peasant's moot).
	Assessment, evaluation and mitigation: documentary and place name evidence may identify some of these sites. Leicestershire's suggested moot sites, encompass wapentake, hundred and smaller subregional courts) e.g. Swanimote (Charnwood), Thinghou (Diseworth), Spelthorn (Oadby) and Spellow (Appleby Magna). Many moot sites are close to ready means of communication, particularly the former Roman roads (e.g. Guthlaxton Meadow, Cosby), and tend toward a central place within their jurisdiction. Of the sites currently known in the County, there is a consistent topographical similarity in the choice of location; they tend to occupy low hills with a commanding view of the surrounding area). Although difficult to identify, and potentially preserving only ephemeral archaeological traces such as pits, post-holes, stray finds and shallow grave cuts, this is an important and poorly understood class of monument that is essential to an understanding of developing forms of local government from the sub-Roman to later medieval periods.			

Parish/County boundaries: earthworks	Boundaries between parishes and counties are occasionally marked by linear earthworks potentially of medieval or earlier date. One example the Tipnall bank follows the parish boundary between Hemington and Castle Donington for about 2km. Excavation revealed a bank with an associated trench to the north. The bank seemed to exploit the natural levee of an old channel; a sections revealed an early ditch sealed by Tipnall Bank. Further work on these boundaries is a priority, and survey and excavation are essential where sections may be destroyed by development.	*As Fluvial Sand and Gravel*.	*As Fluvial Sand and Gravel*. A possible example of a reused if not contemporary earthwork boundary is offered by King Lud's Entrenchments, Croxton Kerrial. The longevity of boundaries has been demonstrated by excavations of Roman and earlier sites adjacent to much later parish boundaries (e.g. Egleton/Hambleton).	As Fluvial sand and gravel.
	Assessment, evaluation and mitigation: walkover surveys will seek to identify earthwork boundaries correlating and where possible correlate these with parish, wapentake or county boundaries. Linear boundaries will need to be surveyed where threatened by quarrying, and trenches should be excavated across them to establish their date and character and seek buried land surfaces or other remains. Buried soils may be preserved beneath standing earthworks, and may preserve palaeobotanical, molluscan and other environmental remains with potential for elucidating the environment prior to construction of the bank. Resources must be made available for the recording, sampling and analysis of any buried soils located during excavation.			
DOMESTIC				
Rural settlement	The archaeological evidence suggests a correlation between the incidence of late Roman settlement and early Anglian material (Ravenstone). It is likely that the bulk of the late Roman population, were taken over in this transfer of control Increasing archaeological data, including surveys at Medbourne and the Langtons in the Welland valley, indicate a dispersed settlement pattern, at its most dense in the stream and river valleys. Place-name evidence supports the archaeology, providing some indication of a dispersed hamlet/farmstead settlement pattern. Earliest components those using the suffix '–ham', e.g Wycomb and those with topographical elements '-dun', '-bourn', '-ford', etc. Recent excavations at Eye Kettleby and Castle Donington, both situated on the gravel terrace above the floodplain, have recorded important Anglo-Saxon settlement sites. At the former this included 18 post-built structures and 23 sunken-featured buildings (SFB). Finds included over 2,500 sherds of pottery, loomweights, bone combs. Late 9th century Danish conquest of Mercia, led to the establishment of Leicester as one of the Five Boroughs, possibly providing the stimulus for formation of the later county. Whilst there is very little archaeological evidence of Danish orScandinavian settlement, place-names, predominantly a feature of northeast and central Leicestershire suggest the settlement of both existing and new landscapes, especially the Wreake valley. The early 10th century recapture of Leicester by Aethelflaed may have provided the stimulus for the replanning of the rural settlement pattern, with dispersed hamlets and farms giving way to nucleated villages with their surrounding open fields.	*As Fluvial Sands & Gravels*. Archaeological evidence strongly suggests a Late Roman and Saxon withdrawal from the heavier clay soils of central Leicestershire. It is possible that this may not have affected the lighter glacial soils, particularly of central and east Leicestershire. West of the Soar previous studies have noted a rapid fall-off in the evidence of early Anglo-Saxon settlement (see below), However, recent results at Cadeby and Measham provide some evidence for preferiential utilisation of lighter glacial sand and gravel soils. In both instances investigation has produced evidence of early Saxon remains including SFBs and associated feature. Later Saxon and medieval nucleated villages shows a strong correlation with the scattered glacial sands and gravels of both west and east Leicestershire. It is likely that many such settlements overlie or lie in close proximity to an earlier Anglo-Saxon 'seed' settlement.	Recent investigations at Barleythorpe have indicated the presence of an early/mid Anglian occupation site immediately north-east of the village. At Harston excavations associated with ironstone extraction in the 1930's revealed an SFB and associated pit, dated to the 7-8th century	The Charnwood Forest area appears to have been sparsely settled throughout the Anglo-Saxon period. Activity around the periphery of the forest may be discernable.
	Assessment, evaluation and mitigation: assessment needs to include detailed study of the available cropmark data, which might possibly reveal sunken-featured buildings, a review of finds obtained by fieldwalking or casual discovery, as well as consideration of documentary and place name evidence. Fieldwalking of arable sites and geophysical survey to locate sub-surface features should be considered during evaluation, together with targeted trenching to establish the level of preservation and character of any potential sites. Strip, map and sample techniques may provide the most effective methodology for mitigation, as sites of this period may be expected to comprise scatters of features that may only be identified during large-scale stripping (and in some cases may be buried beneath alluvium, colluvium or coversands). Particular emphasis should be placed upon provision for scientific dating and for the location, recovery and analysis of environmental samples to elucidate the changing environment and developing agrarian economy.			

	RELIGIOUS, RITUAL AND FUNERARY			
Anglo-Saxon cemeteries and isolated burials	Sparse place-name evidence suggests the potential for the continuity of religious practice into the post-Roman period. Celtic and Romano-Celtic deities may have continued to be worshipped in rural areas. Pagan Anglian, predominantly inhumation cemeteries of the 5th to 7th centuries, are widely distributed across the river terraces. Notable antiquarian assemblages are recorded from Barrow Upon Soar, Wanlip, Rothley, Queniborough and Glen Parva, with the more recent excavated cremation cemetery at Thurmaston. In common with settlements, the distribution of cemeteries is biased towards east Leicestershire and in particular the Soar, Wreake and Welland valleys. Individual burials are also encountered and there is scattered evidence for the re-use of earlier prehistoric monuments, e.g. Cossington. The Middle Angles were absorbed into Mercia in 7th century. In 653AD Peada invited Christian missionary into the region to begin a campaign of conversion centred on the minster church (e.g. Rothley Grange Christian cemetery 7th-10th centuries). The late Saxon churches indicated in the Domesday Book, reflect the decline of the minster church and an increasing number of manorial dedications founded on estate centres, prefiguring the development of the parochial structure.	As with the rural settlement distribution, west Leicestershire appears to have been significantly less densely occupied than lands east of the Soar. However, areas of lighter soils coinciding with recorded late Roman activity, the valleys of the Mease and Sence rivers may have a greater potential (e.g. the hall house excavated at Ravenstone). Recent excavation at Cadeby Quarry has revealed a scatter of early Saxon features including at least one burial. Antiquarian excavation of a barrow at Stoke Golding is reported to have recovered Anglo-Saxon artefacts. The glacial sands & gravels of south-east Leicestershire appear to have retained and/or attracted settlement or utilisation in the post-Roman period; this is perhaps especially the case where they lie in close proximity to water courses or communication routes (former Roman roads). A significant number of Leicestershire's 18th and 19th century antiquarian recorded cemeteries were derived from former gravel pits.	A number of antiquarian and more recently excavated cemeteries are recorded, at Market Overton, recorded following iron stone extraction, Great Casterton, closely associated with the former Roman town, North Luffenham, Empingham and most recently an unusual cremation cemetery at Glaston. The available evidence suggests a strong bias toward former Roman settlement centres and the major water courses (Gwash, Chater and Welland). Limited excavation of the Mercian monastery and minster church at Breedon on the Hill, founded in c. 675AD by monks from Peterborough (Medehastede), has revealed part of the associated graveyard. Excavation as Ketton , revealed the site of the former settlement of Newbottle, including a number of Late Saxon hall houses, a timber church and the cemetery.	The Charnwood Forest area appears to have been sparsely settled throughout the Anglo-Saxon period. Activity around the periphery of the forest may be discernable.
	Assessment, evaluation and mitigation: cemeteries and other burial sites are not easily detected in advance, but potential locations may possibly be identified by assessment of available finds data (particularly that obtained from the Portable Antiquities Scheme), documentary sources, air photographs and walkover surveys aimed at identifying earthwork traces. Potential sites may be investigated further by fieldwalking, metal detecting or geophysical survey, combined where appropriate with trial trenching. Some sites will warrant preservation *in situ*, but otherwise an appropriate level of archaeological excavation may provide a suitable mitigation strategy. Generally, given the difficulty of identifying funerary sites in advance of development, a strip, map and sample mitigation strategy may provide the most effective strategy for identification and recording of burials ahead of extraction. Sufficient contingency resources need to be available for scientific dating and appropriate specialist analyses in the event that human burials are retrieved (e.g. for isotope analysis of human bone).			
	INDUSTRY			
Textiles	Evidence of spinning and textile manufacture, including, combs, spindle whorls and loomweights: Barrow upon Soar, Castle Donington, Eye Kettleby, Kirby Bellars and Melton Mowbray	Loom weights have been recovered during excavation and fieldwalking at Cadeby, Peckleton, Sibson, Belvoir and Stoughton	No evidence of textile manufacture has as yet been recorded.	Two loomweights of Late Saxon type were found during quarrying at Mountsorrel in 1898.
Metalworking	Evidence for the production of non-ferrous metalworking in either the early or middle Anglo-Saxon periods is rare, although copper-alloy artefacts are well known in bone settlement and funerary contexts.	*As Fluvial Sands and Gravels*. Evidence of metal working, including a furnace base was identified following fieldwalking at Blaston, with further material from Great Easton	Radiocarbon dates from slag heaps in Rockingham Forest, Northants. indicates smelting was taking place in the mid Anglo-Saxon period. On the opposite side of the Welland, in the Medbourne area of SE Leics., there is evidence of iron ore smelting associated with a dispersed early-middle Anglo-Saxon settlement pattern.	*As Fluvial Sands and Gravels*
Pottery production	Archaeological investigation during gravel extraction at Barrow on Soar produced a significant quantity of early–middle Anglo-Saxon pottery utilising angular Mountsorrel granodiorite. It is suggested that a production centre may be located in the immediate vicinity. Vince has indicated the need for a survey of the Anglo-Saxon pottery of the two counties, and a rationalisation of the existing fabric typologies	No pottery production is recorded	No pottery production is recorded	Analysis of Anglo-Saxon pottery fabrics has indicated a major regional production source centred in the Mountsorrel area. A production source in the immediate vicinity is suspected
	Assessment, evaluation and mitigation: aggregates extraction provides a vital opportunity for further systematic fieldwalking or test-pitting, which would complement studies of existing collections and might locate foci of domestic, industrial or other activity. This would provide a valuable basis for further evaluation, including geophysical survey and evaluation trenching, which in turn would assist the development of suitable mitigation strategies in advance of extraction. To improve retrieval of metalwork during quarrying, it is recommended that a metal detector be attached to the conveyor belt.			

TRANSPORT				
Roads and trackways	The evidence for the continuing importance of the Roman road network is hard to evaluate, where routes surviving today it is likely to have remained of significance in the post-Roman period. The proximity of Anglo-Saxon burial sites along former Roman roads attests to their continuing use and importance.	*As Fluvial Sands and Gravels*	*As Fluvial Sands and Gravels*	*As Fluvial Sands and Gravels*
Bridges	The recent discovery of the remains of a timber bridge at Cromwell, Notts., dated by dendrochronology to the middle Anglo-Saxon period shows the importance of these nodal points on the transport network. A further crossing point of the Soar/Trent lies north of Kegworth, in Lockington /Hemington area. Domesday records a ferry at Weston, whilst a possible bridge structure was excavated at Birstall.	None are recorded within the ACA	*As Fluvial Sands and Gravels*	None are recorded within the ACA.
	Assessment, evaluation and mitigation: historic maps provide an important source of evidence for former roads and should be investigated with aerial photographs and other documentation during desk-based assessments. Provision should be made for excavation to clarify the character and spatial arrangement of tracks and roads, including the investigation of any land surface preserved beneath roads. By analogy with other periods, timber trackways could be concealed beneath substantial depths of alluvium, and perhaps buried within fluvially redeposited sands and gravels; assessment should therefore identify palaeochannels and potential wetlands with high risks of associated structural remains. High-risk locations should be monitored archaeologically, with a contingency allocation in the event of unexpected discoveries. Resources should also be set aside for environmental sampling and analysis, as such contexts may yield other important environmental remains			

6.8 MEDIEVAL ARCHAEOLOGICAL RESOURCE (1067 – 1539)

ARCHAEOLOGICAL ASSOCIATIONS	AGGREGATE CHARACTER AREAS			
	FLUVIAL SANDS AND GRAVELS	**GLACIOFLUVIAL SANDS & GRAVELS**	**LEICESTERSHIRE & RUTLAND LIMESTONES**	**CHARNWOOD & UPPER SOAR IGNEOUS ROCKS**
AGRICULTURE AND SUBSISTENCE				
Field systems: ridge and furrow and field shapes reflecting medieval Open Fields	Upstanding ridge and furrow and other earthworks such as plough headlands associated with open field agriculture. Field pattern also reflects previous open field regimes (e.g. field boundaries with elongated reverse 'S-curve' or 'dog leg' morphology). Evidence for open fields widely distributed across area but occurring most frequently on river terraces although some evidence either in the form of extant remains or observed from aerial photography suggest in some cases open fields extending onto the floodplain.	There is a strong correlation between the presence of glaciofluvial sands and gravels and earlier enclosure. In the eastern parts of the ARA, across High Leicestershire, once enclosure had taken place pasture appears to have become the dominate form of agriculture, especially on the slopes and valleys; this has resulted in good survival of ridge and furrow. Re-organised piecemeal enclosure is the most widely represented of the HLC field character types with Piecemeal Enclosure and Planned Enclosure Containing Ridge and Furrow also figuring strongly. Early enclosure is also a feature of western parts of the ARA and again Piecemeal Enclosure and Re-organised Piecemeal Enclosure are well represented. However whilst ridge and furrow is found across this part of the ARA survival is not as high here as it is towards the east.	The fertile soils of the Jurassic Limestones form a landscape across which the process of enclosure occurred relatively late. This is a flat open landscape dominated by arable farming: consequently survival of ridge and furrow is poor. Planned Enclosure along with Very Large Post-War Fields overwhelmingly dominates the HLC field types in this part of the study area. On the Carboniferous Limestone only a small proportion of the landscape has been characterised as fields. This was an area of generally late enclosure although there is some survival of ridge and furrow within the small amount of characterised Piecemeal Enclosure.	The field patterns of this ACA are largely a product of the late enclosure of a landscape previously dominated by heathland and woodland. Planned enclosure is the dominant HLC field type, ridge and furrow is uncommon occurring only on the edges of the ACA. The presence of Planned Woodland Clearance, Large Assarts with Sinuous Boundaries and Small Assarts help to highlight the fact that this area, during the medieval period, was one of the one of the more densely wooded parts of the study area.
	Assessment, evaluation and mitigation: A combination of walkover surveys and an examination of available aerial photography, LIDAR and cartographic information should establish the extent of surviving ridge and furrow and other earthworks indicative of Open Field agriculture. Survival of field boundaries with a reverse 'S' or dog-leg morphology also provides a strong indication for the enclosures of medieval strip fields. Any field survey and assessment should seek to map the layout of the medieval Open Fields for the relevant settlement. Where excavation is required this will need to establish the extent and layout of the ridge and furrow with the aim of revealing the stratigraphic and spatial relationship to other features and changes in layout over time. Any finds recovered from the furrow fill should be recorded since this material can potentially aid our understanding of the chronology of ridge and furrow.			
Woodland and waste	Low levels of woodland compared to the project area as a whole. Ancient Broadleaved Woodland coverage negligible.	This ACA has relatively low levels of woodland coverage compared to the study area as a whole. However some Broadleaved Ancient Woodland is present on the glaciofluvial sands and gravels notably on the eastern edge of High Leicestershire where ancient woodlands represent what survives of Leighfield Forest. Examples of Ancient Broadleaved Woodland is rare in the western parts of the ACA with Piper and Oakley Woods to the north of Shepshed representing the only significant blocks in this part of the ACA.	The main concentration of Ancient Broadleaved Woodland within this ACA is found within the northern half of Rutland's Jurassic Limestone which collectively forms a remnant of Leighfield Forest. The Carboniferous Limestone in the west of the study area includes large segments of Cloud Wood and Grace Dieu Wood.	Woodland coverage is reasonably well represented within this ACA with several examples of Ancient Broadleaved Woodland being mapped. Much of this woodland represents surviving elements of Charnwood Forest which formed a landscape was used extensively for hunting and also provided a hugely important local resource for wood and timber providing both fuel and building materials.
	Assessment, evaluation and mitigation: use of walkover surveys should identify any features surviving as earthworks, including banks or ditches which may relate to the management of woodland and livestock. Desk based assessment will need to examine documentary and cartographic sources to identify previous extent of woodland along with associated activities that may have been sustained within them such as, for example, charcoal production.			
Stock rearing	Sporadic archaeological evidence for animal husbandry. Evidence from field patterns suggests a reliance on arable during the medieval period although land will have been used for grazing during fallow periods. Lusher growth on floodplains provided good grazing opportunities. No known evidence for pig keeping although this is more likely to have been concentrated in more wooded areas. Some evidence for rabbit farming is known with 'pillow mounds' at Brooksby, and possibly Quorn and the site of Loughborough Park, south of Loughborough.	Archaeological evidence currently held on the HER for stock rearing is sporadic. The general trend favours arable on the lighter soils of this ACA with pasture more prevalent on the heavier clay soils. However for those villages within this area surrounding small paddocks and closes will have been used to keep livestock.	Little evidence recorded on the HER for this ACA relating to livestock rearing and management. This area is a predominantly arable; characterised by its large fields and low hedges. However small paddocks and closes on the edges of settlements may have held livestock. Woodland contained within the ACA will have provided foraging opportunities for pigs.	The poor soils across much of this area were generally unfavourable for arable farming. Large areas such Bradgate Park provided grazing for deer being kept for hunting. The relatively high levels of woodland cover also provided foraging opportunities for pigs. Grazing animals, particularly sheep would also have been important to the local economy. Rabbits were also kept on the poorer soils and evidence for warrens or pillow mounds is likely.

	Assessment, evaluation and mitigation: desk-based assessment will aim to identify sites from documentary, cartographic, place name and field evidence. Earthworks such as pillow mounds or enclosures indicative of rabbit warrens may be identified during walkover surveys. Where there is good survival of earthworks preservation *in situ* may be required. For other examples an appropriate level of excavation and recording will be required in order to understand and characterise the nature of the archaeology.			
CASTLES AND MILITARY				
Post-Conquest Castles	Leicestershire and Rutland are not heavily castellated and the known castle sites are not generally located on fluvial sands and gravels. However documentary evidence suggests the presence of a castle at Thorpe Arnold whist in Rutland the fortified moated site of Essendine Castle is located on deposits associated with West Glen River.	Two castle sites are recorded on the HER for this ACA; at Shackerstone earthworks suggest the possibility of a well fortified bailey, however there is no known documentary evidence of this being a castle and earthworks may be the remains of a prospect mound. The second site at Hallaton is more certain where there are well preserved earthwork remains of a probable mid-12th century motte and bailey castle. The low frequency of sites within this ACA would suggest that no direct correlation can be deduced between the presence of castles and the glaciofluvial sands and gravels of the study area.	The only castle site recorded on the HER within this HER is Essendine; here a complex of earthworks includes a large moated platform with a fishpond to the north and enclosure on the southern side containing a chapel.	Three castle sites are recorded for this ACA: Mountsorrel, Whitwick and Groby. Remains at Mountsorrel have been severely denuded by the affects of quarrying although parts of the bailey ditch are still visible. Earthwork remains are also still present at Groby and Whitwick.
	Assessment, evaluation and mitigation: desk-based assessments should seek to identify surviving sites from place-name, documentary and cartographic evidence; walkover surveys should locate earthwork remains indicative of castle sites and associated features. This is an important class of monument and well-preserved earthwork sites are likely to be recommended for preservation *in situ.* Where development is considered to be acceptable a programme comprising surveys of surviving earthworks, geophysical survey to locate buried remains and evaluation trenching needs to be carried out prior to any disturbance. This will establish the level and character of the remains and facilitate the development of an appropriate mitigation strategy.			
Battle sites	Bosworth Battlefield, the only registered battlefield site within the study area and sits largely on glaciofluvial sands and gravels but also on its northern and western edges on the fluvial deposits of the River Sence and its tributaries.	The north-eastern end of Bosworth Battlefield sits over glaciofluvial sands and gravels; no other battlefield sites are recorded on the HER.	At Immingham the Battle of Losecoat Field (1470) represents the only battlefield to be recorded on the HER for this ACA. This is not a registered battlefield site.	No sites are recorded on the HER for this ACA**.**
	Assessment, evaluation and mitigation: The potential for a site to contain remains associated with battles may be identified through-desk based assessment. A structured programme of systematic fieldwalking, metal detecting geophysical survey and trial trenching will inform any appropriate mitigation strategy. It should be recognised that any intrusive investigations could, potentially, uncover buried human remains; where this is the case appropriate resources should be provided for their full excavation and scientific analysis.			
CIVIL				
Parish/hundred/county boundaries	Many parish, wapentake, hundred or county boundaries will be of an unknown date and occasionally marked by linear earthworks or be defined by markers such as boundary stones, landscape features or monuments such as round barrows. Many boundaries will have been altered or redefined and have a medieval or later date. All boundaries should be investigated to ascertain date and function.	As with Fluvial Sands and Gravels.	As with Fluvial Sands and Gravels.	As with Fluvial Sands and Gravels.
	Assessment, evaluation and mitigation: desk based assessment will examine all available documentary and cartographic evidence; this should be accompanied by walkover surveys which will seek to identify any earthwork boundaries or other features in the landscape that correlate with parish, hundred or county boundaries. Where development impacts directly on boundaries these should be surveyed. Trenches should be excavated across banks and ditches to determine date and character of features. Any boundary markers that are identified should be fully recorded and where practicable should be reinstated as part of the restoration process.			
COMMUNICATIONS				
Roads and trackways	Few roads or trackways which are no longer in use are identified on the HER. Where sites have been identified they will typically appear as cropmarks, as elements of deserted or shrunken village, or as earthworks in pasture or woodland. Within the ACA no sites have been recorded although evidence for such sites is may survive across a wide range of locations.	As with Fluvial Sands and Gravels	The relatively late planned enclosure that characterises much of Rutland's rural landscape necessitated a reorganisation of its communications network dating to the post-medieval period. Roads and tracks were realigned whilst many earlier routes fell out of use; these may be recognised as linear cropmarks or earthworks.	No sites are recorded within this ACA; it is however unlikely for there not to have been any tracks or roads dating form the medieval period across this area. Cropmark and earthwork evidence may indicate the presence of these sites.
	Assessment, evaluation and mitigation: desk based assessments will need to consider historic maps together with other documentary sources and any available aerial photographs and LIDAR evidence. Where features are identified there will be a need for excavation to identify the character of roads and tracks dating from this period, including the investigation of old land surfaces preserved beneath them.			

Bridges	Many of the bridges in Leicestershire and Rutland will have medieval origins some of which, at least in part, still survive. Some bridges (e.g. Wain Bridge, Kilby and Lutterworth Bridge) are known from documentary or cartographic evidence and may within the sub-alluvial sands and gravels have preserved important remains. Evidence from the River Trent at Hemington, where the remains of three bridges were identified, illustrates how the dynamic character of the regions major rivers has resulted in the repeated need to repair and rebuild river crossings. It is likely that crossing points will migrate in response to local conditions and the impact of changes to the river, consequently, evidence may be spread up and down stream of existing or suspected crossing points, with the debris of eroded structures often washed downstream of their original location. (Ripper and Cooper 2009).	Very few bridges with a medieval date are recorded on the HER for this ACA. There remains the potential at the crossing points of rivers and streams for the remains of earlier structures to be present close by**.**	No bridges have been recorded on the HER within this ACA. Where the modern roads cross streams and rivers there may be some potential for the remains of earlier structures to be present nearby.	There are no bridges for this period recorded on the HER for this ACA.
	Assessment, evaluation and mitigation: Any desk-based assessment will need to consider documentary, place-name and cartographic sources. Assessments should seek to identify palaeochannels with a potential for crossing points and associated structural remains. Timber or stone bridges may be any buried in redeposited sand and gravel deposits as at Hemington. A continuous programme of archaeological attendance for inspection and recording may provide an appropriate approach to mitigation combined with a provision for full excavation, environmental sampling and analysis if remains are revealed during the course of extraction. The excavation, environmental sampling and analysis of well preserved remains, particularly those surviving in waterlogged environments, is likely to incur significant costs and consequently early identification of locations with a significant archaeological potential should be made a priority during the assessment stage.			
Ferries and Fords	Only one ferry crossing point (Cavendish Bridge) is recorded on the HER. Two fords are recorded along the course of the River Soar: one at Barr Bridge to the west of Barrow upon Soar and further south at on the eastern side of Quorn. It is likely that further similar sites would have been present along the rivers and tributaries of this area but have to date not been recognised.	There are no ferry crossing points recorded on the HER for this ACA. Where the existing routes cross streams and rivers there may be some potential for the remains of earlier structures to be present nearby.	*As Glaciofluvial Sand & Gravels*	*As Glaciofluvial Sand & Gravels*
	Assessment, evaluation and mitigation: desk-based assessment should focus upon documentary, cartographic and place-name evidence which may reveal examples of early crossing points. Where extraction of riverine deposits takes place this needs to be closely monitored probably through a continuous programme of archaeological attendance for inspection and recording. Where any related structural remains are identified these must be appropriately excavated and recorded prior to destruction.			
INDUSTRY				
Pottery	A 12th – 14th century pottery production centre is located at Potters Marston where up to eight kilns have been identified. Excavations in Leicester have recovered significant quantities of Potters Marston ware indicating that this was an important local producer of hand or coil made jars, bowls and jugs. The clay used to make these pots contains large igneous syenite rock inclusions the source of which has been pinpointed to less than a mile from the village of Croft.	This ACA takes in the eastern edge of the Potters Marston site discussed in the Fluvial Sands and Gravels ACA section. A kiln site was suggested after field walking to the south of Wykin recovered a tight scatter of c.800 sherds of over-fired pottery. Within the ridge and furrow of the adjacent field a flat area was observed and close by springs and marl pits have been noted which may have provided the raw materials for pottery production.	No pottery production sites have been recognised from this ACA although the clay used to make Potters Marston Ware contains igneous rock inclusions sourced at Croft.	No pottery production sites are recorded on the HER for this ACA. Stamford ware imported from just outside the study area in Lincolnshire forms a significant proportion of the ceramic material for the 9th to the 13th century.
	Assessment, evaluation and mitigation: desk based assessments will need to consider historic maps together with other documentary sources. Place-name evidence may also flag up the possibility of pottery production taking place within an area. Fieldwalking can produce important results and where significant quantities of wasters are recovered the presence of a kiln site close by must be considered to be probable. Geophysics, particularly magnetometry, followed up by targeted trial trenching can prove effective in locating pottery production sites. Where features are identified and cannot be preserved *in situ* there will be a need for excavation, recording and analysis to an appropriate level so as to ensure that the character of sites and any features present may be fully understood.			
Metal working and extraction	Metalworking sites recorded on the HER are largely confined to north-western and eastern parts of the study area. At Long Whatton iron slag was recovered from a possible metal working site and at Quorndon cartographic evidence suggests the presence of an ironstone pit. In Rutland at Tixover Grange excavations of a series of pits suggest medieval quarrying of ironstone. Slag found in the area of the deserted settlement of Fregthorpe is strongly suggestive of metal working activity.	Two metalworking sites from the medieval period within this ACA on the glaciofluvial deposits of High Leicestershire. Residues of medieval iron and bronze working along with furnaces found within the deserted settlement of Holyoaks and at Lowesby the presence of iron slag indicates a possible metal working site.	Much of the evidence for metal working recorded on the HER is located in the eastern part of the project area on the ironstones and Jurassic limestones of Rutland and Melton. Evidence for iron production includes material recovered at Empingham, Fenny Drayton and Stretton.	Limited evidence recorded from this character area other than at Newtown Linford where a reported metal working site was suggested from material recovered during an excavation in 1879.

	Assessment, evaluation and mitigation: desk based assessments should make use of cartographic and documentary information in conjunction with aerial photography and LIDAR information; extraction sites will be restricted to areas in which mineral resources are present; consequently geology maps should be consulted. Assessments should include walkover surveys to identify earthwork features. Fieldwalking can produce important results and where quantities of metal residues or slag are recovered the presence of a metal working site should be considered to be probable. Geophysics, particularly magnetometry, followed up by targeted trial trenching can prove effective in locating metal working sites. Where features are identified and cannot be preserved *in situ* there will be a need for excavation, recording and analysis to an appropriate level so as to ensure that the character of sites and any features present may be fully understood.			
Coal mining	No examples of medieval date coal mining sites are recorded in this Character Area.	Coal mining across the study area is restricted to the Coal Measures of north-west Leicestershire. One possible site is recorded on the HER just to the north of Heather where the place name evidence of Coal Pit Field suggests small scale mining activity.	No examples of medieval date coal mining sites are recorded in this Character Area.	No examples of medieval date coal mining sites are recorded in this Character Area.
	Assessment, evaluation and mitigation: desk-based assessment should aim to locate sites of early mining activity through the examination of the available documentary, cartographic and air photographic evidence, combined with a walkover survey of the application area. Evidence of mining may have been erased by later working, but traces of earlier activity should be sought and mapped to enhance our understanding of the development of the coal mining industry and its landscape impact.			
Textiles	Cloth production was an important industry during the medieval period and although documentary and place-name evidence suggests textile manufacturing was mainly concentrated in the towns corroborating archaeological evidence is scarce. Textile manufacturing was concentrated within the north-west of the project area where several mill sites, located on river courses, may have been used for fulling	*As Fluvial Sands & Gravels.*	*As Fluvial Sands & Gravels.*	*As Fluvial Sands & Gravels*
	Assessment, evaluation and mitigation: walkover surveys and searches of air photographs and documentary/cartographic records should be undertaken to ensure that archaeological remains of sites used for textile production are not missed. Unless preserved *in situ*, sites affected by development should be fully surveyed and excavated in advance of destruction.			
Stone quarrying	Building stone would have represented a valuable resource. The presence of stone building materials is largely restricted to the north of the study area. The presence of any stone quarries will be dependent upon the nature of the underlying geology. The HER suggests possible medieval slate quarries at Quorndon and Groby Park.	Evidence for one probable stone quarry site with medieval origins is recorded on the HER for this Character Area on the south-eastern edge of Cropston Reservoir.	Four quarries with possible medieval origins are recorded on the HER within this ACA. At Saltby Heath Farm, Sproxton earthworks including possible quarries may represent remains associated with a grange farm belonging to either the Abbey of Vaudey or Croxton Abbey. In Rutland quarries located on the Jurassic limestone are recorded at Manton and Greetham and possibly Clipsham. No quarries dating from the medieval period are recorded on the HER.	Two sites which were probably active during the medieval period are recorded here with three others just outside on the eastern and southern edges of the ACA. These are slate quarries exploiting the Swithland formation metamorphic mudstones rather than the igneous rocks which define the ACA. The quarrying of Swithland slate provided a valuable contribution to the economy of the area and represented an important source of local building materials which are evident in local architectural styles.
	Assessment, evaluation and mitigation: walkover surveys and searches of air photographs and documentary/cartographic records should be undertaken to establish the presence and extent of earthworks or cropmark evidence indicative of or consistent with quarrying. Sites will be restricted to those areas where mineral resources are present. Where available LIDAR data should be examined as this has the potential to reveal previously undetected, most notably where features are concealed by woodland cover. Evaluation should record the extent of quarrying.			

Milling	Whilst there is evidence for windmills and watermills across much of the study area these types of site appear to be chiefly located close to areas of settlement. Watermills and associated features, such as millponds and races, are by their nature associated with the watercourses located across the study area, consequently these feature significantly within this ARA with at least 54 HER sites recorded. A significant proportion of watermills and windmills are only known from documentary or cartographic sources with precise locations unconfirmed. A range of archaeological features may be expected, for example the mound and leat earthworks identified at Langham or the large oak structure interpreted as a 12th century wheel breast together with other oak timbers found in redeposited river gravels at Hemington. Windmills are less common within this ACA with only 12 examples recorded on the HER; these may be suggested through a combination of earthworks, and cartographic and documentary evidence. Distribution of this monument type does not appear to suggest a direct correlation to the ACA with it being the case that windmills tend to be within or in close proximity to areas of settlement.	Relatively few (12) watermills recorded on the HER for this ACA. Those watermills that are recorded are located next to the fast running streams rising in High Leicestershire in the east and Charnwood Forest to the west. Almost all of the records for this area are known from documentary and cartographic sources. A possible correlation between windmills and the geology of this character area can be suggested since windmill sites are often associated with settlements which tend to favour the free draining soils located on the glaciofluvial deposits.	Neither watermills nor windmills are well represented within this ACA. Six watermills and six windmills are recorded on the Jurassic Limestone with no sites are recorded on the Carboniferous Limestones.	Just 3 watermill sites recorded on the HER for this ACA. At two of these sites Bradgate Mill and Groby Pool mill leats are still visible as earthworks. The only evidence for a windmill site in this ACA comes from a documentary reference of a site at Stoney Stanton. The low representation of these monument types would seem to reflect the fact that this was an area in which the poor fertility of the soils were not conducive to successful arable cultivation and could support, in relation to much of the rest of the project area, relatively low population densities.
	Assessment, evaluation and mitigation: Examination of all available aerial photographs and LiDAR data together with documentary and cartographic records should be made to identify sites where there is a potential for the archaeological remains of former mills to be present. Any monument affected by development should be surveyed and excavated to an appropriate level prior to development; excavations should seek to demonstrate whether evidence for earlier structures survive. Watermills and associated remains should be anticipated in excavations of valley gravels, and in fluvially dynamic sections of rivers may lie beneath redeposited sands and gravels. There will be a need for a continuous programme of archaeological observation to accompany extraction, will provision for full excavation and analysis should structural remains be observed.			
		PARKS, GARDENS AND RECREATIONAL		
Deer Parks	No apparent direct association between the geology of this ARA and the deer parks however some sand and gravel deposits are present where watercourses run through these sites. Most of the deer parks associated with this ACA lie on fluvial deposits of the River Soar and sit along the eastern edge of Charnwood Forest. Only three deer parks are recorded on the eastern side of the study area at Essendine Burton Lazars, and a possible site suggested for Wymondham. This monument type may be identified by the presence of preserved earthworks marking the position of deer leaps and park pales. Use of some of these sites may have continued into the post medieval period.	Several examples of deer parks are recorded as either wholly or partly within this ARA. On the eastern part of the ARA along the Leicestershire Rutland border several deer parks are recorded. These form elements of Leighfield Forest, created by Henry I at the beginning of the 12th century. Deer parks in the western park of the study area are focused around Charnwood Forest which was, during the medieval period, a chase under the control of manorial lords rather than the crown. Both the Charnwood and Leighfied areas are, for Leicestershire and Rutland, well wooded and it is possible that earthwork remains could be obscured by tree cover.	Medieval deer parks are not common within this ARA. No examples are recorded on the carboniferous limestone in the west of the study area. On the Jurassic Limestone HER five sites are recorded including Essendine which also lies partly on the fluvial sands and gravels. At Old Park, Croxton Kerrial the boundary is marked by the presence of bank and ditch earthwork remains, a stone wall, an area of oak trees and cropmarks.	Four deer parks take in parts of this ACA: Bardon, Bradgate Groby and Quorndon. The main purpose for the deer park was to provide a hunting ground for the lord of the manor. Parks would be stocked with both red and fallow deer although these areas would have had additional uses such as providing a source of wood for fuel and timber. Parks needed to be fully completely enclosed usually through a combination of earthbank topped by a wooden paling fence and a ditch on the inside. Fences may be replaced by a quickset hedge or a stone wall. The enclosure would be broken by gates and "deer-leaps" which allowed deer to get into the park but not escape.
	Assessment, evaluation and mitigation: potential boundaries and other features relating to this monument type may be identified during desk-based assessments by consulting cartographic and documentary sources; this should be combined with an examination of available aerial photography. Woodland is common in areas where parks are present and so use of LIDAR data may reveal features obscured by tree cover. Walkover survey may also reveal further features. Where extraction threatens the survival of earthwork or cropmark features these should be surveyed and subjected to targeted excavation. *In situ* preservation may be required for particularly well preserved or important features.			

		RELIGIOUS, RITUAL AND FUNERARY		
Monastic foundations	Examination of the HER illustrates a favouring for rural settings across the study area with very few monastic sites being located to the south of Leicester. Nine sites are known on the fluvial sands and gravels although none of these is in close proximity to current extraction operations. At least four of these sites (Dishley, Muston, Shoby and Newhouse) are granges or probable granges operating as farms or estates belonging to religious orders exploiting the relatively fertile soils that are found within this ACA.	Nine sites with monastic origins are recorded on the HER for this ACA. To the east 6 sites are located on the glaciofluvial sands and gravels of High Leicestershire including Bradley Priory and Owston Abbey with its associated grange. Three sites are located within the ACA to the west of Leicester and although none of these would appear to be threatened by sand and gravel quarrying at Horsepool Grange is located at the edge of Cliffe Hill granite quarry	Two sites with monastic origins recorded on the HER are found on the Jurassic Limestones in the easterly parts of the study area: St. Johns Abbey, Croxton and Saltby Heath Farm neither of these are located close to aggregate quarry sites. On the Carboniferous Limestone two important sites are known: Grace Dieu Priory, just to the north of Thringstone and an Augustinian priory at Breedon Hill. The Grace Dieu site comprises extensive ruin of the priory buildings and is surrounded by a complex of earthworks including two fishponds. At Breedon Hill a minster established during the Saxon period was re-founded in the early 12th century. Apart from the church none of the other monastic buildings survive although excavations have shown the cloisters lay to the north of the church. This is also the site of an Iron Age hillfort and the large limestone quarry here has impacted significantly upon both the archaeology and the visual setting of the monuments.	Two monastic sites are recorded on the HER for this ACA. At Aldermans Haw there is documentary evidence for a two storey religious cell said to be in ruins by 1450. At Cliffe Hill, Horsepool Grange, which was granted to Leicester Abbey, sits on both the Glaciofluvial Deposits and Charnwood & Upper Soar Igneous Rocks ACA at the edge of Cliffe Hill granite quarry.
	Assessment, evaluation and mitigation: These sites require desk-base assessments and walkover surveys which will need to identify and characterise any features recognised as being of archaeological interest. This will inform the targeting of further evaluation and the subsequent development of an appropriate mitigation strategy which will be devised where preservation *in situ* is not warranted.			
Chapels, churches, crosses and graves/grave markers	The archaeological remains of most churches and chapels are located within an urban or village context and as such are unlikely be affected by sand and gravel extraction. However where sites form elements of deserted or shrunken settlements there is a greater likelihood for them to be threatened by quarrying.	Remains of churches and chapels are most likely to be affected by quarrying where they are located in deserted or shrunken villages or where they fond as outlying field chapels.	On the Jurassic limestones the archaeological remains of churches or chapels not sitting within an urban context are rare; those that there are not in close proximity to current aggregate extractions sites and are unlikely to be threatened. At Breedon Hill on the Carboniferous limestone the current church which incorporates various 8th century carved stones overlooks the Breedon Quarry. This is an operation which has had a significant impact upon both the archaeology and the setting of the area.	Church and chapel sites are rare within this ACA and only Bradgate Chapel is not in an urban context. Since this site is covered by listed building, registered garden and scheduled monument designations and is not close to current quarrying operations it unlikely to be threatened by development.
	Assessment, evaluation and mitigation: These sites require desk-base assessments and walkover surveys which will need to identify and characterise any features recognised as being of archaeological interest. This will inform the targeting of further evaluation and the subsequent development of an appropriate mitigation strategy which will be devised where preservation *in situ* is not warranted.			
		SETTLEMENT		
Moated sites	Moated sites are spread right across the study area and are well represented within this ACA. Typically moated enclosures will be located away from villages, will usually require access to a water source (e.g. a river or stream) and where they are found on river terraces could potentially be vulnerable to aggregate extraction. Moated sites may be recognised from cropmarks (e.g. west of Ratby), earthwork remains (e.g. Welham and Easthorpe Manor) or suggested from documentary sources (e.g. Beaumanor Hall). These sites have the potential to contain the preserved archaeological remains of buildings.	Moated sites are found right across this ARA; they tend to be set away from or on the edges of known medieval villages and will often be close to a water source such as a river or stream used to supply the moat. Sites may be recognised from cropmarks or earthworks and	Moated sites recorded on the HER are relatively rare within this ARA and are generally found in rural locations away from areas of known medieval settlement.	Identified sites tend to be located on the edges of this ARA and are relatively rare.
	Assessment, evaluation and mitigation: an important class of site which is not fully understood and it is probable that there are examples across the study area not yet been discovered. Desk-based assessments should seek to identify sites, which may appear as cropmarks or earthworks, using aerial photographs or LiDAR data from together. Documentary and cartographic sources should be consulted. Surviving earthworks may also be identified by walkover survey. Sites of sufficient merit will require preservation *in situ*. Where sites are not recommended for preservation there will still be a requirement for an appropriate level of excavation in advance of any extraction. Provision will also need to be made for adequate analysis of material recovered which will potentially include organic remains preserved in associated ditches.			

Shrunken and deserted villages	The distribution pattern for deserted, shifted or shrunken medieval settlements shows the eastern half of the study area to have highest concentration of sites. This monument type occurs reasonably frequently on the river terrace deposits associated with the rivers Gwash, Soar Swift, Welland and Wreake/Eye. Sites here include some which survive as earthworks potentially preserving structural, artefactual and environmental remains. Where sites, such as at Shawell, are close to quarries consideration needs to be given to the impact of any extraction upon archaeological remains relating to the former settlement and associated field systems.	Shrunken and deserted settlements are frequently located on the glaciofluvial sand and gravel deposits. This is most apparent in High Leicestershire where settlement tends to be located on the free draining sands and gravels whilst associated field systems are more commonly found on the surrounding clay soils. In the western half of the study area whilst population densities were lower than in the east what settlement there was seems largely to be concentrated on the sands and gravels.	Several examples of deserted or shrunken settlements, however these are not densely distributed across the ARA which may suggest that there has been relatively low levels of abandonment or movement of settlements in this area.	Little evidence for deserted or shrunken settlements are recorded on the HER for this ACA. There is documentary evidence for the possible destruction of Bradgate Village although it is uncertain as to its actual existence. Currently the only aggregate operation within this ACA to known to have any direct impact upon this category of site is at Ketton Quarry where excavations recovered evidence for a Late Saxon settlement probably abandoned by 1100.
	Assessment, evaluation and mitigation: desk-based assessments should examine documentary and cartographic sources, any available aerial photography and LIDAR evidence and carry out an analysis of place-name, aerial photography and LiDAR. Earthwork remains, indicative of deserted or shrunken settlements, should be identified through walkover surveys			
Finds scatters and Single Finds	Analysis of the HER indicates that the density of finds is slightly higher within this ACA than across the project area as a whole. Leicestershire has a good tradition of fieldwalking by local amateur groups; however, much of this activity has tendered to be concentrated within a few areas notably the Welland Valley south of Hallaton, along the River Swift near Lutterworth and the River Wreak west of Rearsby. Whilst results from fieldwalking has produced invaluable information the focusing on certain areas together with a lack of reporting for negative results means that the known distribution of finds is always likely to be distorted. This area has the highest density of finds reported to the PAS of all the ACAs and almost double the density of finds has been recorded here than across the project area as a whole. Sands and gravels along the course of the River Wreake and the River Scence appears to have attracted a good deal of attention from metal detectorists and the significant quantity of metalwork finds can be regarded as complementing collections derived from fieldwalking. The higher densities of pottery finds for this ACA may well represent a significant quantity of material that is derived from manure spreads and could be viewed as an important indicator for the extent of arable cultivation.	A good distribution of surface finds has been recorded on the HER for this ACA which is probably a reflection of the relatively high levels of fieldwalking activity that has been undertaken here. Pottery finds are well represented which in most cases will have derived from manure spreads. The PAS database also records a significant level of activity across the ACA which would indicate that it is the more fertile sands and gravels, most frequently given over to arable cultivation, that form areas most readily targeted by metal detector users. Fieldwalking produces best results on recently ploughed fields and best practice requires that metal detecting is carried out under similar conditions; this combined with a need to get the landowners permission to carry out any survey will distort, to some extent, the spatial distribution of recorded surface finds.	In comparison to the whole project area the levels of fieldwalking recorded on the HER for this ACA are relatively low. Part of the reason for this may be a consequence of fewer active fieldwalking groups operating in this area. This are also has the lowest density of finds recorded of all the ACAs. The absence of recorded finds may be a reflection of this being an area with a relatively low population and consequently fewer people attempting to carry out surveys. This is a fertile agricultural area that would have been actively exploited by the local population during the medieval period. Whilst, at first glance, finds may appear to be an under represented there remains the likelihood for further programmes of systematic survey to have the potential to produce positive results.	Fieldwalking and metal detecting activity across this ACA is relatively low and comparatively few surface finds are noted either on the HER or the PAS database. Much of this area is unsuited or inaccessible to fieldwalkers or detectorists since woodland and parkland forms a large proportion and there is very little arable here. The poorer soils of western Leicestershire were not able to support the same levels of population as the rest of the project area and this is also perhaps reflected in the densities of surface finds recorded here.
	Assessment, evaluation and mitigation: Systematic fieldwalking has proven to be a particularly effective technique for locating domestic, industrial or other activity. Field walking can provide a valuable basis for further evaluation, including geophysical survey and intrusive investigations which will inform any mitigation strategies prior to extraction. It would also prove useful to establish whether or not similar surveys have been carried out over an area in the past so that distribution patterns may be compared.			

6.9 POST-MEDIEVAL TO MODERN ARCHAEOLOGICAL RESOURCE (1540 – Present)

ARCHAEOLOGICAL ASSOCIATIONS	AGGREGATE CHARACTER AREAS			
	FLUVIAL SANDS AND GRAVELS	**GLACIOFLUVIAL SANDS & GRAVELS**	**LEICESTERSHIRE & RUTLAND LIMESTONES**	**CHARNWOOD & UPPER SOAR IGNEOUS ROCKS**
AGRICULTURE AND SUBSISTENCE				
Field systems: ridge and furrow and field shapes reflecting medieval Open Fields	Across the project area during this period there were dramatic changes in the agrarian landscape and economy. These changes were most notably marked by the transition from 'open field' or 'strip field' farming to a landscape of enclosure. A process of pre-Parliamentary enclosure occurs from as early as the second half of the 15th century and continues on into the early 18th. Across much of the East Midlands early enclosure, often referred to as 'piecemeal' or enclosure by agreement, is typically characterised by field boundaries exhibiting a reverse 'S' or 'dog-leg' morphology conforming to the furrow outline of strip fields. Early enclosure across this ACA has been documented by reference to the glebe terriers (Beresford, 1949) and, more recently, through the use of Historic Landscape Characterisation. From 1730 to 1850 most enclosure within the project area took place following an act of Parliament and may be referred to as parliamentary or planned Enclosure. This later enclosure is more radical resulting in much of the landscape being redrawn and laid out by surveyors to produce straight rectilinear fields and roads. Over 73% of the ACA has been characterised belonging to the Fields and Enclosed Land HLC Broad Type with a fairly even representation of fields derived from the process of Piecemeal or Planned Enclosure. Where aggregate extraction takes place the impact upon this landscape resource will be significant and it will be necessary for a full record of field shapes, boundary forms, ridge and furrow and plough headlands to be made prior to development. 20th century agricultural practices since the Second World War have, in some areas, resulted in a significant loss of field boundaries and the creation very large Post-War fields. This is most notable in areas of piecemeal rather than planned enclosure and has resulted in the amalgamation of smaller fields not viewed as conducive to modern farming methods. Intensification and moves to arable production has also resulted in a significant loss of ridge and furrow.	There is a strong correlation between the presence of glaciofluvial sands and gravels and the relatively early enclosure of open fields found in this ACA. The ACA covers some of the project area's most rural landscapes with 82% of the land characterised as belonging to the "Fields and Enclosed Land" HLC Broad Type; within this 42% (206 km^2) has been characterised as "Piecemeal Enclosure" or "Re-organised Piecemeal Enclosure". Reasons for the relatively early enclosure of the landscape within this ACA are probably related to the fact that the glaciofluvial sands and gravels represent some of the more easily worked and fertile soils within the study area and the expected financial gains from enclosure will have provided a strong inducement for a consolidation of land ownership. The process of enclosure within this ACA will have formed some of the oldest surviving field patterns within the project area with many boundaries exhibiting a reverse 'S' or 'dog-leg' morphology.	Much of the fieldscape overlying the Jurassic limestone has been formed through processes associated with planned or parliamentary enclosure. Consequently a field pattern dominated by large rectilinear enclosures with straight boundaries characterises much of this ACA. Whilst enclosure at Hambleton represents one of the earliest Acts in England the process continued into the late 19th century. Motives behind enclosure could vary but generally it signifies a conversion to pasture for animals principally destined for the London market but also as part of a drive for an improved efficiency that could be achieved by larger farms and the higher rents which could be charged as a consequence. Planned Enclosure along with Very Large Post-War Fields overwhelmingly dominates the HLC field types in this part of the study area. Only a small proportion of the Carboniferous Limestone has been characterised as fields; and these ate dominated by later planned enclosure. During the 20th century arable production has been dominate contributing to the amalgamation of small to medium sized fields, significant boundary loss and the ploughing out of ridge and furrow earthworks.	The dominant field pattern overlying the igneous rocks of Charnwood is the product of the late planned enclosure of what was previously a predominantly heathland and woodland environment. Enclosure resulted in the removal of access, for many, to timber, wood and grazing resources leaving a privatised landscape dominated by rectilinear fields with straight boundaries. About 10% of the Fields and Enclosed Land within this ACA has been characterised as either Planned Woodland Clearance, Large Assarts with Sinuous Boundaries or Small Assarts. Much of this represents a process of woodland clearance or outtakes which, in Charnwood, resulted in the removal of significant tracts of woodland during the post-medieval period. Fields characterised as representing some form of woodland clearance are relatively rare reflecting the historically low levels of woodland cover recorded across much of the project area. Consequently these field types should be viewed as important elements to the landscape providing evidence to the former extent of woodland.
	Assessment, evaluation and mitigation: desk-based assessment will need to consider documentary and cartographic evidence along with any available aerial photographic and LiDAR data in order that the processes of enclosure may be established and any features relating to this can be identified. Any desk-based assessment should be accompanied by a walkover survey which will aim to examine the nature of the field evidence including the extent of ridge and furrow and other earthworks relating to Open Field agriculture and how these features may relate to current field boundaries. Assessment should also seek to establish through examination of field boundary morphology whether field patterns represent assartment of woodland or enclosure of heath and waste. Where intrusive archaeological intervention is required this should seek to date any ridge and furrow and establish its relationship to field boundaries. Where restoration involves returning land to agricultural use the reestablishment of pre-existing boundaries should be considered; where this is not practicable fields should be of an appropriate size and morphology, sympathetic and in keeping with the wider area.			

Woodland and waste	This ACA contains a relatively low proportion of woodland cover, just 2.3% compared to 4.6% across the project area as a whole. Very little Ancient Broadleaved Woodland has been recorded here. Almost all the tree cover for this area is the product of 20th century woodland plantation although examples of 19th century plantation have also been identified.	Tree cover within this ACA (4% or 15 km^2) is comparable to the average characterised for the project area as a whole (4.6% or 113 km^2). Broadleaved Ancient Woodland is most common over eastern parts of the ACA, especially in High Leicestershire representing surviving elements of ancient woodlands that formed Leighfield Forest. Plantation woodland Most of the tree cover recognised across this ACA is plantation woodland much of which has been planted in small blocks typically of 1-2 ha. Many of these woodland blocks have been strategically placed as fox coverts and form important features in a landscape where fox hunting has made a long and significant contribution both to the rural economy and the development of the modern landscape.	Woodland coverage at 7% is well represented across this ACA with the main concentration of Ancient Broadleaved Woodland being located found over the northern parts of Rutland's Jurassic Limestone which collectively form a remnant of Leighfield Forest. Small blocks of woodland occur frequently much of which represents the strategic plantation of coverts 1-2 ha in size forming an integral part of a landscape where fox hunting has played an important role. The Carboniferous Limestone in the west of the study area includes large segments of Cloud Wood and Grace Dieu Wood.	At 21% this ACA has the highest density of woodland coverage. The igneous rocks of Charnwood which form the greater part of this ACA sit entirely within the area defined as Charnwood Forest for the Leicester, Leicestershire and Rutland Woodland Strategy (LCC, 2001) and almost entirely within the boundary of the National Forest (The National Forest Company, 20004). This has traditionally been one of the most heavily wooded parts of the project area; however by the mid 16th century poor management meant that large tracts of woodland had been severely denuded. It was only following the Inclosure Act of 1808 that new plantation results in a considerable increase in woodland cover. The igneous rocks of the Upper Soar has very little in the way of woodland cover although is does include some Broadleaved plantation around Warren Farm north of Enderby.
	Assessment, evaluation and mitigation: use of walkover surveys should identify any features surviving as earthworks, including banks or ditches which may relate to the management of woodland and livestock. Desk based assessment will need to examine documentary and cartographic sources to identify previous extent of woodland and dates for any new plantation. Some appreciation will also need to be given to the role plantation has in respect to the hunting landscape and haw blocks of woodland may relate to each other.			
Stock Rearing	Sporadic archaeological evidence for animal husbandry. Low lying areas on the floodplains provided lush pasture for cattle. Floodplains could also provide early grazing opportunities for sheep and the construction of water meadows on them could bring forward grazing season.	Archaeological evidence currently held on the HER for stock rearing is sporadic. The general trend favours arable on the lighter soils of this ACA with pasture more prevalent on the heavier clay soils. However for those villages within this area surrounding small paddocks and closes will have been used to keep livestock.	Little evidence recorded on the HER for this ACA relating to livestock rearing and management. This area is a predominantly arable; characterised by its large fields and low hedges. However small paddocks and closes on the edges of settlements may have held livestock; this may be confirmed by evidence for structures such as pig sties or cattle barns. Woodland contained within the ACA will have provided opportunities for pigs too forage.	In Charnwood their was throughout much of this period a steady increase in grazing animals, predominantly sheep and cattle but also deer, competing for finite resources of pasture and heath. Much of the remaining ancient oak woodland was felled resulting in areas of heathery waste capable only of supporting flocks of small sheep. Evidence for stock rearing may include traces of sheep folds or small stockades, possibly as earthworks or the remains of stone walls. Rabbits were also kept on the poorer soils and evidence for warrens or pillow mounds is likely.
	Assessment, evaluation and mitigation: desk based assessment will need to examine available historic mapping together with documentary sources and aerial photography. LiDAR evidence where available should prove to be of particular benefit in areas of dense tree cover. Assessment should include a walkover survey which may help to identify archaeological remains visible on the ground as earthworks. Where development is likely to affect or destroy remains an appropriate level of excavation and recording will be required to characterise the nature of any remains.			
Water Meadows	The early grass provided by water meadows played an important role in the feeding of livestock between the early 17th to the beginning of the 20th century. Whilst most prevalent across the chalklands of southern Britain examples of water meadows are recorded on the HER within the project area. At Dishley Farm the pioneer agriculturalist Robert Bakewell carried out experiments with flooding and irrigation on his land: several sluices and irrigation channel are still present. At Bradgate Park an area to the west of Cropston Reservoir was flooded during the early 19th century to improve grazing. This was achieved by the construction of a system of channels fed by a leat bringing water from the River Lyn. A reliable water supply is vital to the successful running of water meadows and the potential for the remains of this class of monument to be present are good within this ACA.	One water meadow site has been recorded within this ACA; this is fed by a small stream just to the north of Barlestone. Sluices are marked both up and downstream of the area defined on the HER and a brief appraisal of available aerial photography suggests the presence of earthworks which may be indicative of additional water meadow sites.	No water meadow sites are recorded on the HER for this ACA; however several rivers and streams are present here and closer examination of historical mapping and aerial photography coupled with ground survey may identify examples of this monument type.	No water meadows have been recorded on the HER from within this ACA although the Fluvial Sands and Gravels site recorded west of Cropston Reservoir lies adjacent to the south western edge of the Charnwood igneous rocks. Given the topography and previous management of this ACA the potential for water meadows here is likely to be low.
	Assessment, evaluation and mitigation: desk-based assessment in conjunction with a walkover survey should seek to identify features indicative of water meadows. Features indicating the presence of this class of monument can vary significantly in form and any evaluation will need to establish the full character, extent, date and level of preservation of any earthworks or associated structural remains leading to the formation and implementation of an appropriate mitigation strategy. Whilst some sites may merit preservation *in situ* for others survey and excavation according in line with an agreed scheme of works prior to extraction may be considered appropriate. Provision should be made for environmental sampling and analysis since there is a significant potential for these sites to contain preserved organic remains.			

MILITARY				
Battle sites	No civil war battlefields have recorded from within this project area.	No civil war battlefields have recorded from within this project area.	No civil war battlefields have recorded from within this project area.	No civil war battlefields have recorded from within this project area.
	Assessment, evaluation and mitigation: The potential for a site to contain remains associated with battles may be identified through-desk based assessment. A structured programme of systematic fieldwalking, metal detecting geophysical survey and trial trenching will inform any appropriate mitigation strategy. It should be recognised that any intrusive investigations could, potentially, uncover buried human remains; where this is the case appropriate resources should be provided for their full excavation and scientific analysis.			
20th Century Military Sites	Archaeological remains relating to 20th century military activity should be identified and recorded where they are threatened by development. Sites will cover remains relating to World Wars I and II and the Cold War; these include airfields, pillboxes, bunkers, anti-aircraft batteries, searchlight emplacements and prisoner of war camps and aircraft crash sites. The ACA includes Beaumanor Hall and Park, used as listening post and training centre by Number 6 Intelligence School during World War II and by GCHQ until 1970; further investigations here may reveal previously unrecognised features relating to the sites military past. The ACA also takes in parts of Husbands Bosworth Airfield which opened in 1943 for bomber training duties and by a troop carrier group.	As Fluvial Sands and Gravels. Sites within the ACA include Desford Airfield, prisoner of war camps at Garendon Park and Billesdon and underground Cold war monitoring posts at Billesdon, Cold Overton and Stoke Golding.	No sites recorded on the Carboniferous limestone; however on areas of Jurassic limestone airfields were built at Cottesmore, North Luffenham, Saltby and Woolfox.	Only one site, an underground Cold War monitoring post blasted out of solid rock at Markfield, is currently recorded on the HER for this ACA. In addition to this, however, examination of air photo evidence has identified evidence for modern military remains in the form of hut bases, probably dating from the Second World War, at Charley.
	Assessment, evaluation and mitigation: desk based assessment should consult available documentary, cartographic and photographic evidence which may aid the identification of military remains. Walkover surveys should also seek to identify surviving archaeological remains such as the foundations of pillboxes, bases of missile launch sites, earthworks indicative of anti-aircraft batteries or practice trenches or air crash sites. Preservation *in situ* may be recommended in some cases but where sites are threatened with destruction these should be evaluated, for example by geophysical survey or earthwork survey, in order that an informed mitigation strategy can be devised. All air crash sites should be considered to be of historic importance and the remains of rare aircraft types as nationally important and should not be needlessly destroyed or removed without adequate record; air crash sites can have the potential to contain *in situ human* remains and hazardous material and under the 1986 Protection of Military Remains Act anyone wishing to recover a military aircraft will need to obtain a licence from the Royal Air Force Personnel Management Agency.			
CIVIL				
Parish/hundred/county boundaries	Many parish, wapentake, hundred or county boundaries will be of an unknown date and occasionally marked by linear earthworks or be defined by markers such as boundary stones, landscape features or monuments such as round barrows. Many boundaries will have been altered or redefined and have a medieval or later date. All boundaries should be investigated to ascertain date and function.	As with Fluvial Sands and Gravels.	As with Fluvial Sands and Gravels.	As with Fluvial Sands and Gravels.
	Assessment, evaluation and mitigation: desk based assessment will examine all available documentary and cartographic evidence; this should be accompanied by walkover surveys which will seek to identify any earthwork boundaries or other features in the landscape that correlate with parish, hundred or county boundaries. Where development impacts directly upon boundaries these should be surveyed. Trenches should be excavated across banks and ditches to determine date and character of features. Any boundary markers that are identified should be fully recorded and where practicable should be reinstated as part of the restoration process.			

COMMUNICATIONS				
Roads and Trackways	There are very few roads or trackways which are no longer in use identified on the HER. It may be that some roads or tracks in use during the post-medieval period might be represented by cropmarks or as earthworks in woodland or pasture. Roadside furniture such as milestones or fingerposts may survive. During World War II many of these monuments were destroyed or defaced. Many milestones were buried close to their original locations and not recovered buy may be identified during development.	Roads and tracks in use during the post-medieval period form much of the modern road network. Some archaeological evidence may be present and identified from cartographic evidence, cropmarks or earthworks. Such evidence is, however, likely to be rare. Roadside furniture may be buried or hidden close to their original locations and be identified during development.	Virtually all roads and tracks in use during the post-medieval period have been incorporated into the modern road network. Associated archaeological remains may be present, for example at Horn where a stone–lined well marked on the 1884 OS map may have served as a toll house.	Roads and tracks in operation during the post-medieval period will mostly have been incorporated into the modern road network.
	Assessment, evaluation and mitigation: cartographic evidence in the form of historic maps represents an essential information source for former roads and tracks; documentary information together with aerial photographs and LiDAR data should be consulted during any desk-based assessment. Former tracks or roads which have fallen out of use may be identified during walkover surveys. Should tracks or roads be identified appropriate provision will need to be made for excavation in order to fully understand and characterise the nature of the evidence, both in its form and spatial arrangement. Earlier surfaces may be preserved beneath roads and these should also be the subject to further investigation.			
Canals	Several canals located within this ACA, notably along the course of the Rivers Soar, Trent and Wreake. Canals represent major construction projects involving the extraction of large quantities of material from the ground; however the impact on the landscape is ameliorated by the fact that they tend to follow the general contours of the landscape. Whilst many canals are still operating others such as the Melton Mowbray Navigation running from Melton Mowbray to Syston are now derelict. Features associated with canals including feeder channels, sluices and wharves that have fallen out of use may be not be recorded on the HER and may be affected by proposed development.	Both the Ashby Canal and the Charnwood Forest Canal run through parts of this ACA. The Charnwood Forest Canal had fallen out of use by 1804 with remains now visible as earthworks or cropmarks. Any development likely to affect remains of canals or associated features would warrant some level of recording.	No canals are recorded on the HER on the Jurassic limestones of the eastern part of the project area. The route of the abandoned Charnwood Forest Canal passes through the Carboniferous Limestone at Osgathorpe and close to Grace Dieu Priory. Any development would have the potential to affect remains relating to the construction of the canal and would merit an appropriate level of recording.	Little evidence for the presence of canals within this ACA, although the Charnwood Forest Canal does brush the most northerly extents of this area.
	Assessment, evaluation and mitigation: historic maps together with aerial photographs and other documentary information should be considered when carrying out any desk-based assessments. Features relating to the construction, maintenance and operation of the canal network may be identified during walkover surveys; particularly where canals have been abandoned and become overgrown. LiDAR information, where available, may also prove to be useful in the identification of spurs or branches of a canal system that have fallen out of use. Where feature are identified appropriate provision should be made for an appropriate level of excavation and recording.			
Bridges	Most bridges constructed during this period survive in this ACA and remain in use. However a number have been demolished or replaced as seen, for example, at Cotes Bridge or Shawell Brook and when this is the case archaeological remains may be preserved. This can provide evidence for the construction of earlier structures and would be likely to merit some level of recording should proposed development affect theses sites.	Few bridges recorded within the HER for this ACA Where structures are identified from documentary or historic map sources but are no longer present there is a good potential for archaeological evidence to survive. This can include information relating to the methods of construction for a structure. Where such remains are threatened by development an appropriate level of recording will be required.	All bridges recorded on the HER within this ACA are upstanding; however the possibility still exists for the, as yet, unidentified remains of earlier structures to be present nearby.	There are no bridges recorded on the HER for this ACA.
	Assessment, evaluation and mitigation: desk-based assessment should consider documentary, place-name and cartographic sources. Assessments should seek to identify palaeochannels with a potential for crossing points and associated structural remains. Timber or stone bridges may be any buried in redeposited sand and gravel deposits as at Hemington. A continuous programme of archaeological attendance for inspection and recording may provide an appropriate approach to mitigation combined with a provision for full excavation, environmental sampling and analysis if remains are revealed during the course of extraction. The excavation, environmental sampling and analysis of well preserved remains, particularly those surviving in waterlogged environments, is likely to incur significant costs and consequently early identification of locations with a significant archaeological potential should be made a priority during the assessment stage.			

Railways	The rail network crosses much of the project area and where practicable follows the general contour of the land, often following the course of the river valleys. This is most notable in the case of the Leicester & Swannington Railway (the first mechanically-operated public railway in the Midlands) which runs alongside Rothley Brook, the Rugby & Stamford Railway (through the Welland Valley) the Syston to Peterborough line (along the River Wreake) and the Midland Counties Railway (through the Soar Valley). Whilst most lines are still operational the remains of associated structures may be visible as earthworks.	Where possible the route of the rail network tends to avoid crossing the more elevated levels of this ACA, for example along the rout of the Ashby & Nuneaton joint Railway in the west of the project area; however the Great Northern Railway line running from Market Harborough to the Nottingham/Grantham line cut across the eastern part of High Leicestershire.	Public railways within this ACA include the Midland Railway Syston to Peterborough line constructed in 1846-8 and the great Northern Railway running from London to York which passes through Essendine. Mineral railways are also recorded on the HER for this ACA at Pilton and Market Overton.	The only public lines crossing this ACA are the Ashby & Nuneaton joint Railway which clips the northern fringe of the ACA and the South Leicestershire branch of the London & North Western Railway which clips its southern edge. Recorded on the HER within the ACA are several dismantled, mineral railways; these are associated with Groby, Peldar Tor and Mountsorrel quarries in Charnwood and further south at Stoney Stanton and Enderby. At Stoney Stanton geophysics recorded a linear feature thought to represent a former mineral railway and at Narborough Road, Huncote, just outside the ACA a desk based assessment noted the presence of earthworks relating to a cutting for a disused tramway, probably associated with the nearby quarries.
	Assessment, evaluation and mitigation: desk-based assessment should make use of documentary and map evidence and aerial photography to gain an understanding of the rail network which will include dismantled lines, sidings and archaeological evidence for associated structures. Assessment should also seek to understand extent of mineral railways, how they related to the various quarries and connected with the wider rail network. Walkover surveys should be used to identify and understand any earthwork features and exposed footings of demolished structures; geophysics can prove to be useful in identifying the line of dismantled railways. Where features are identified earthwork survey and possible targeted excavation may be required to achieve an adequate understanding of the character and extent of the archaeology.			
		INDUSTRY		
Manufacturing	Little evidence recorded on the HER for pottery production; however earthworks of an industrial site at Drayton in Harborough have been interpreted as representing the remains of iron furnaces, brick and pottery kilns. Further evidence for metalworking is also limited although at Kegworth a watermill north-east of the Manor House, originally used for grinding corn, became an iron forge during the late 18th and early 19th centuries and was later used to grind gypsum. The textile industry was broadly concentrated in the western part of the project area along the course of the River Soar. Much of the evidence recorded on the HER relating to the textile industry relates to buildings that have previously functioned as workshops for framework knitters or hosiery manufactures.	From the end of the 17th to the end of the 18th Nottingham stoneware is the main local pottery product found within the project area; no pottery production sites are recorded on the HER for this ACA. Apart from two former blacksmiths workshops no evidence for metalworking is recorded on the HER. No evidence for textile production recorded on the HER here, however since this ACA encircles much of Hinckley and Earl Shilton which were centres for framework knitting and hosiery production it is possible that as yet related unidentified sites could be present in the surrounding area. Several brick kilns recorded in this ACA, for example at Ansty Mill,, Stapleton ad to the east of Grace Die Lodge. Two lime kiln site are recorded for this ACA; at Barrow upon Soar six kilns are marked on the 1st edition OS map and a possible lime reported at Walton on the Wolds.	Other than a standing building at Tinwell, originally used as a forge, no metalworking or pottery production sites are recorded on the HER for this ACA. Textile industries were concentrated in the western half of the project area; no evidence relating to the textile industry is recorded on the HER for this ARA. Several lime kiln sites are recorded on the Jurassic limestone in the east of the project area including sites at Stretton, Pickworth and Morcott; also a malting kiln has been recorded at Great Casteton. Two lime kiln sites are recorded on the Carboniferous limestone: east of Breedon Hill and south of Grace Dieu School. A Brick kiln is also recorded on the Carboniferous limestone near Osgathorpe House.	Other than a framework knitter's workshop at Enderby and a brick kiln at Bardon marked on the 1st edition OS map very little industrial activity recorded for this ACA.
	Assessment, evaluation and mitigation: although occurring most frequently within urban areas industrial sites should also be anticipated within a rural context. Desk based assessment should examine all available cartographic and documentary sources since many sites will be either marked on early OS editions , tithe maps or mentioned in parish records, further information is likely to be obtained from aerial photography and LiDAR information. Potential sites may also be identified through fieldwalking or geophysical survey supported by targeted trial trenching. Where sites are identified a mitigation strategy will be required to excavate and record any archaeology to an appropriate level. Occasionally unexpected discoveries will require contingency funds to be made available, for example where structurally complex and artefact-rich kiln structures are identified during the course of investigations in advance or during quarrying.			

Quarries	Evidence for early quarrying is likely to have been destroyed by subsequent working; however use of map, documentary and aerial photography together when viewed alongside surviving earthworks can facilitate with the recognition of now disused quarries and chart their early history. In addition to current sand and gravel extraction sites this ACA includes clay pits associated with brickworks at Burton Lazars, Saxby and Welford. Slate continued to be quarried at Groby until the beginning of the 20^{th} century.	Modern aggregate extraction is likely to have destroyed evidence for earlier workings. Several clay pits and brick works have been recorded on the HER, for example, at Barwell, Billesdon, Stanton under Bardon and north of Sutton Cheney. Early OS mapping also marks several sand and gravel pits (Walton on the Wolds and Carlton Curlieu for example) not all of which are recorded on the HER.	Post medieval limestone quarries with associated limekilns are recorded at Pickworth, Morcott Lodge and south of Pilton. Ironstone was also being quarried in this ACA at several locations including Exton, Sproxton and between Thistleton and Market Overton. The mechanised extraction of ironstone during the late 19^{th} and early 20^{th} centuries would typically involved the removal of topsoil in bands up to 15m wide. Once the ironstone had been removed from a field it would be backfilled with the spoil from the adjacent field. In areas where this process occurred, apart from those remains relating to the quarrying itself, the potential for archaeological remains to be present will have been removed.	Large scale quarrying of the igneous rocks begins in the latter half of the 19^{th} century. Prior to this some small quarrying provided a supply of local building stone. The Swithland slate being quarried from within this ACA also made an important contribution to the local economy and again provided an important source of local building material evident in local architectural traditions. Extraction of granite continued into the 20^{th} century with much of the material being used as crushed rock for the construction industry and in road building. Modern large scale operations will have destroyed most of the evidence for earlier mineral workings; however use of map, documentary and aerial photography together with the recognition of surviving earthworks may help with the identification of features relating to earlier operations and help to reconstruct a better understanding of the archaeology of the quarrying industry within the project area.
	Assessment, evaluation and mitigation: walkover surveys and searches of air photographs and documentary/cartographic records should be undertaken to establish the presence and extent of earthworks or cropmark evidence indicative of or consistent with quarrying. Where available LiDAR data should be examined as this has the potential to reveal previously undetected, most notably where features are concealed by woodland cover. Later workings will have erased much of the evidence of earlier quarrying; however where possible the extents of earlier operations should be identified and mapped do as to facilitate an informed understanding of the development of the quarrying industry and to appreciate more fully the impact that this has had upon the landscape. Any remains associated with old quarries such as the footings of buildings or trackways should also be recorded.			
Milling	Evidence for windmills and watermills is found across the study area however their distribution suggests a strong association with areas of settlement. Watermills and associated features, such as millponds and races need to be built close to watercourses; consequently these feature significantly within this ARA. Many watermills and windmills are known only from documentary, cartographic or fieldname evidence with precise locations unconfirmed. A range of archaeological features may be expected such as ponds, leats and sluices. The moderately dense distribution of watermill within the ACA would indicate a good potential for preserved archaeological remains to be present along river courses in proposed extraction areas. Windmills recorded on the HER are fairly well represented; some, as at Desford, may have been built to replace an earlier watermill. Most windmills are known from documentary or cartographic sources although some will have been identified from earthworks interpreted as mill mounds such as at Caldecott.	Compared to the Fluvial Sands and Gravels this ACA has relatively few watermill sites. Most of these are recorded on the HER as buildings and associated archaeological features such as leats and mill ponds are likely to be present. There is also the possibility that buildings may have replaced earlier watermills as appears to be the case at Anstey where the present 18^{th} century mill may have replaced an earlier structure. A higher density of windmills than watermills are recorded within this ACA most of which are known only from documentary and cartographic sources or suggested from place-name evidence, for example Millfield Farm, Stoke Golding. Sites tend to favour higher ground and may be identified by the presence of windmill mound.	Just four watermills recorded for this ACA. Two of these survive as buildings with associated features including leats and ponds. Horn Mill at Exton which has been identified from cartographic evidence may be on the site of an earlier medieval watermill. Several windmill distributed across the Jurassic limestone although none are recorded on the Carboniferous Limestone in the western part of the project area. Most sites have been identified from cartographic or documentary sources and place-name evidence (for example Mill Field, Market Overton and Mill Dale, Thistleton). At Moor Plantation, Clipsham a low circular mound visible in plough land in the 1980s probably represent the remains of a windmill shown on a late 17^{th} century estate map.	Three watermill sites recorded on the HER for this ACA at Ulverscroft, Bradgate and to the east of Groby Pool. The HER records ten windmills with a post-medieval date for this ACA, almost all of which have been identified from cartographic evidence.
	Assessment, evaluation and mitigation: desk based assessment supported by walkover surveys should examine documentary, cartographic and photographic evidence to identify former mill sites. There will be a good potential for mills and associated structural remains on riverine locations. Where it is anticipated that extraction will affect archaeological remains an appropriate level of excavation and recording will be required. Any scheme of investigation should recognise that later structures may overlie or contain the remains of earlier buildings.			

PARKS, GARDENS AND RECREATIONAL				
Parks, Gardens and Recreational	Whilst the project area may not be renowned for its famous parks and gardens a varied range of types have be recognised here. Statistically, at 1.6% of the ACA, parks and gardens a well represented which may be compared to almost 1% for the project area as a whole. Sites here include Stanford Park in the extreme south of the project area where formal planting took place in the late 17th century with several avenues of trees remaining. In the north-west at Garendon the parkland was redesigned during the early 18th century includes several important classically influenced monuments. Also included within the ACA are sections of Bradgate, Stapleford and Tickencote Parks. An emphasis should be placed upon maintaining the integrity of the landscape as a whole	Parks and gardens cover almost 3 km^2 or 0.8% of this ACA, just below the average for the project area as a whole. Amongst these are a number of relatively small landscape gardens including those at Illston Grange, Rolleston Hall and Stackley House just north of Great Glen. At Quenby Hall the park was probably created in the late 16th or early 17th century following the depopulation of the village of Quenby; the gardens stand on a terrace created in the later 18th century; formal were laid out to the east and south of the Hall in the early 20th century, this process of change and development of landscape parks is no unusual and it is important to gain a proper understanding of how these landscapes have evolved. During the later part of the 20th century the construction of golf courses has had a significant impact upon the landscape at a number of locations. Within the ACA golf courses have been constructed over landscapes that may have previously been described as enclosed (Narborough and west of market Bosworth), common land (Burbage) and landscape park (Willesley Park). Whilst the impact of landscaping will be significant traces of former land use such as ridge and furrow may still be present.	Parks and gardens are not well represented within this ACA with only 1 km^2 or 0.5% of the area falling into this category. No landscape parks are located on the Carboniferous limestone. On the Jurassic limestone parks include Croxton, Exton and Clipsham. Recreational land use during the 20th may be observed with the development of golf courses at Empingham, Greetham and South Luffenham.	Few formal or landscaped gardens within this ACA. Small area of landscape park around Roecliffe Manor, Woodhouse. During a site visit at Maplewell Hall, again at Woodhouse, earthworks representing a post medieval terraced garden were noted.
	Assessment, evaluation and mitigation: desk-based assessments will bring together documentary, cartographic an photographic evidence and should be accompanied by walkover surveys to locate earthworks, landscape features such as tree avenues and other park and garden features which may be disturbed by development. It is often the case that landscape parks and gardens are depicted in painting commissioned by landowners and these to may help identify feature. Important park and garden features and well preserved earthworks are likely to warrant preservation *in situ*. Where preservation *in situ* is not required all earthworks and other garden features should be subject to a full survey. This should be carried out in combination with geophysical surveys to locate buried remains and, where appropriate, evaluation trenching to characterise the archaeology and establish the level of preservation prior to the development of an appropriate mitigation strategy.			
Deer Parks	No apparent direct association between the geology of this ARA and the deer parks although some sand and gravel deposits are present where watercourses run through these sites. Most of the deer parks associated with this ACA lie on fluvial deposits of the River Soar and sit along the eastern edge of Charnwood Forest. Only three deer parks are recorded on the eastern side of the study area at Essendine Burton Lazars, and a possible site suggested for Wymondam. This monument type may be identified by the presence of preserved earthworks marking the position of deer leaps and park pales. Use of some of these sites may have continued into the post medieval period.	Several examples of deer parks are recorded as either wholly or partly within this ARA. On the eastern part of the ARA along the Leicestershire Rutland border several deer parks are recorded. These form elements of Leighfield Forest, created by Henry I at the beginning of the 12th century. Deer parks in the western park of the study area are focused around Charnwood Forest which was, during the medieval period, a chase under the control of manorial lords rather than the crown. Both the Charnwood and Leighfied areas are, for Leicestershire and Rutland, well wooded and it is possible that earthwork remains could be obscured by tree cover.	Medieval deer parks are rare within this ARA. No examples are recorded on the carboniferous limestone in the west of the study area. On the Jurassic Limestone HER five sites are recorded including Essendine which also lies partly on the fluvial sands and gravels. At Old Park, Croxton Kerrial the boundary is marked by the presence of bank and ditch earthwork remains, a stone wall, an area of oak trees and cropmarks.	Bradgate Park was enlarged during the post-medieval period and following the 1808 enclosure act land was planted up with spinneys largely to improve prospect for game since Bradgate was being increasingly being used for shooting although herd of deer continued to be maintained. The 18th and 19th centuries saw several changes to the park including the building of walls to mark the northern and western boundaries and the construction of Old John tower.
	Assessment, evaluation and mitigation: potential boundaries and other features relating to this monument type may be identified during desk-based assessments by consulting cartographic and documentary sources; this should be combined with an examination of available aerial photography. Woodland is common in areas where parks are present and so use of LiDAR data may reveal features obscured by tree cover. Walkover survey may also reveal further features. Where extraction threatens the survival of earthwork or cropmark features these should be surveyed and subjected to targeted excavation. *In situ* preservation may be required for particularly well preserved or important features.			
RELIGIOUS, RITUAL AND FUNERARY				
Chapels, churches, crosses and graves/grave markers	Archaeological remains of churches and chapels, including traces of building foundations, associated graves and gravestones, may be threatened where located in open country -notably on the sites of deserted or shrunken villages (see Domestic sites above). Field chapels and isolated non-conformist chapels in rural areas may also be vulnerable to development.	As with Fluvial Sands and Gravels.	As with Fluvial Sands and Gravels.	As with Fluvial Sands and Gravels.
	Assessment, evaluation and mitigation: Chapels and churches surviving in rural areas will be identified by desk based assessments and walkover surveys. Where archaeological remains are anticipated and threatened by development an appropriate level of evaluation and subsequent mitigation strategy will be required.			

		SETTLEMENT		
Moated sites	Moated sites are spread right across the study area and are well represented within this ACA. Typically moated enclosures will be located away from villages, will usually require access to a water source (e.g. a river or stream) and where they are found on river terraces could potentially be vulnerable to aggregate extraction. Moated sites may be recognised from cropmarks (e.g. west of Ratby), earthwork remains (e.g. Welham and Easthorpe Manor) or suggested from documentary sources (e.g. Beaumanor Hall). These sites have the potential to contain the preserved archaeological remains of buildings.	Moated sites are found right across this ARA; they tend to be set away from or on the edges of known medieval villages and will often be close to a water source such as a river or stream used to supply the moat. Sites may be recognised from cropmarks or earthworks and	Moated sites recorded on the HER are relatively rare within this ARA and are generally found in rural locations away from areas of known medieval settlement.	Identified sites tend to be located on the edges of this ARA and are relatively rare.
	Assessment, evaluation and mitigation: an important class of site which is not fully understood and it is probable that there are examples across the study area not yet been discovered. Desk-based assessments should seek to identify sites, which may appear as cropmarks or earthworks, using aerial photographs or LiDAR data from together. Documentary and cartographic sources should be consulted. Surviving earthworks may also be identified by walkover survey. Sites of sufficient merit will require preservation *in situ*. Where sites are not recommended for preservation there will still be a requirement for an appropriate level of excavation in advance of any extraction. Provision will also need to be made for adequate analysis of material recovered which will potentially include organic remains preserved in associated ditches.			
Shrunken and deserted villages	The distribution pattern for deserted, shifted or shrunken settlements shows the eastern half of the study area to have highest concentration of sites. This monument type occurs reasonably frequently on the river terrace deposits associated with the rivers Gwash, Soar Swift, Welland and Wreake/Eye. Sites here include some which survive as earthworks potentially preserving important structural, artefactual and environmental remains. Where sites, such as at Shawell, are close to quarries consideration needs to be given to the impact of any extraction upon archaeological remains relating to the former settlement and associated field systems. These sites have the potential to preserve archaeological traces of a wide range of structures including ecclesiastical, manorial, domestic and agricultural. Whilst many settlements appear to have been abandoned during the medieval period others, such as at Sysonby and Eye Kettleby went through a more protracted decline surviving on into the 18th and 19th centuries.	Shrunken and deserted settlements are frequently located on the glaciofluvial sand and gravel deposits. This is most apparent in High Leicestershire where settlement tends to be located on the free draining sands and gravels whilst associated field systems are more commonly found on the surrounding clay soils. In the western half of the study area whist population densities were lower than in the east what settlement there was seems largely to be concentrated on the sands and gravels.	Several examples of deserted or shrunken settlements, however these are not densely distributed across the ARA which may suggest that there has been relatively abandonment or movement of settlements in this area.	Little evidence for deserted or shrunken settlements are recorded on the HER for this ACA. There is documentary evidence for the possible destruction of Bradgate Village although it is uncertain as to its actual existence. Currently the only aggregate operation within this ACA to known to have any direct impact upon this category of site is a Ketton Quarry where excavations recovered evidence for a Late Saxon settlement probably abandoned by 1100.
	Assessment, evaluation and mitigation: desk-based assessments should examine documentary and cartographic sources, available aerial photography and LiDAR data and carry out an analysis of place-name evidence. Earthwork remains, indicative of deserted or shrunken settlements, should be identified through walkover surveys. Where there is good survival of earthwork remains preservation *in situ* is likely to be recommended. Where the principle of development has been accepted then prior to any disturbance a full survey of surviving earthworks combined with geophysical survey should be undertaken. This will be followed up by evaluation trenching to establish the character and level of preservation of remains to inform an appropriate mitigation strategy.			

6.10 Synthesis and Overarching Themes

6.10.1 The Palaeolithic (c.950 kya - 9,701 BP)

The Palaeolithic, literally meaning 'Old Stone Age' is a division in prehistory which spans the emergence of the first tool-using humans to the retreat of the glacial ice in the northern hemisphere. In Britain, the Palaeolithic covers the period from first appearance of early hominins, perhaps as early as 950, 000 years ago (950 kya) to about 10,000 years ago (ya) and is itself conventionally divided into three periods; the Lower Palaeolithic (950 kya – 250 kya), the Middle Palaeolithic (250 kya - 40,000 ya) and the Upper Palaeolithic (40,000-10,000 ya). This division has been based largely upon the types of artefacts found from this period. In recent years archaeologists, in recognising the huge time span, and the varying climactic and geographic conditions involved, have acknowledged that that this classificatory approach is, at the very least, problematic. That said, however, this framework continues to prove useful when trying to achieve a basic understanding of the period.

Throughout the Palaeolithic sea levels were considerably lower than they are today and Britain was connected to mainland Europe through the land mass now referred to as Doggerland. The Palaeolithic spans a period of some 940,000 years and during this time there were significant climactic fluctuations. During those periods when the climate was at its coldest humans seem to have been driven south and away from Britain.

For the Lower Palaeolithic direct evidence for the first hominins in Western Europe is restricted to two sites in Spain and is likely to date to about 780 kya.

At the internationally important site of Pakefield Cliff in Gisleham, Suffolk, excavation of interglacial deposits revealed struck flints, plant and animal fossils in the Cromer Forest-bed Formation, which comprise the earliest evidence for human activity in northern Europe (c. 700 kya).

The Happisburgh project, Norfolk, was set up following the discovery, in 2000, of flint artefacts (including a handaxe) and butchered bone in the organic muds that underlie the rapidly eroding coastal cliffs. In 2004 Happisburgh I was excavated, revealing flint tools, bone, wood and other plant materials, which lay at the marshy edges of a large river. The discovery of the extinct water vole (*Arvicola cantiana*) suggests that this site dates to about 500 to 600 kya. Two further sites were discovered, Happisburgh II and III; at the latter a gravel river channel also revealed flint tools, bone and plant materials and this has been dated to at least 700 kya. If it is older than this date, then this would make it the earliest human site in northern Europe. The ancient river channel that forms the Happisburgh III site represents part of the course of a proto Thames river and its discovery has huge implications for our understanding of the earliest colonization of Europe and the types of environments in which early humans could survive (Ashton 2007).

At Boxgrove, West Sussex, an early human presence (c. 500 kya) was revealed through the discovery of remains of the hominin species *Homo heidelbergensis.*

Boxgrove also produced important evidence for the manufacturing of biface and other lithic tools along with associated faunal material. More recent discoveries for East Anglia include cut-marked animal bones and stone tools which have been taken from deposits dating possibly from as early as 600 – 700 kya. It is these East Anglian discoveries which may have important implications for the way we understand the Palaeolithic in the East Midlands since deposits of this period also occur within our region (Cooper, 2004).

Our understanding of the Palaeolithic in the region has developed significantly since the 1950s and the identification of a major pre-Anglian river channel. Known as the Bytham River this is now seen as having been a major river during the Lower Palaeolithic, or Cromerian, period. The channel has been has been traced across the Midlands flowing north-east past Coventry, into Leicestershire (along the later Soar Valley) via Leicester and Melton and on into East Anglia (Graf, 2002). In addition, many of the known artefacts from this period in Leicestershire are in or close to the 'Brooksby' sand and gravel deposits which themselves underlie the Bytham deposits. Organic remains recovered from a borehole at Brooksby contained 7-8m of water-laid sand and gravel and included plant macrofossils (leaves, bud scales and seed), pollen and other remains. This material has been dated to 480 kya (Graf, 2002) and suggests relatively mild conditions (Rice, 1991). A lower deposit included evidence of pine, fir, birch, hazel and oak woodland. The potential importance of the Bytham River deposits could prove to be significant in developing our understanding of the earliest humans in the British Isles and in fact the comparative lack of pre-Anglian archaeology associated with the other major river, the Thames, gives rise to the possibility that the Bytham was the earliest colonisation route for Britain (Graf, 2002). The Bytham was blocked *c.* 470 kya during the Anglian glaciation resulting in the formation of 'Lake Harrison'; this ice-dammed lake would have dominated much of south-west Leicestershire and probably all of Warwickshire, although no archaeological deposits have been recovered from the clay and silt lake deposits, there is a potential for lakeside occupation occurring during warmer phases.

A sizable collection of artefacts including handaxes, choppers and flake tools has been gathered from around the Warwickshire and Leicestershire border almost entirely by a single fieldworker, Ron Waite. The material is predominantly quartzite all showing varying degrees of rolling. It has been suggested that these finds were originally deposited further north and transported into the area by glaciers although is should be noted that this is a sizable collection not solely restricted to the sand and gravels but occurs on a variety of geologies and suggests a significant human presence during the Lower Palaeolithic.

Evidence of human occupation within the project area is scarce for the Middle Palaeolithic which covers the period *c*. 250kya - 30,000 ya. This is a period that sees changes in the population from *Homo Heidelbergensis* to *Homo Neanderthalensis.*. As the climate became colder around 160 kya, hominins seem to have abandoned Britain in favour of the warmer regions to the south. It is not until *c.* 58,000 ya that we have evidence of a Neanderthals re-colonisation of Britain. Very few artefacts have been found from this period within the project area but include a possible side scraper found at Blackbird Road, Leicester and probable handaxes from Stanton-under-Bardon and Aylestone

The Upper Palaeolithic which covers the period *c.* 30,000 - 10,000 ya sees anatomically modern humans moving into north-west Europe. These newcomers appear to exhibit different behaviours and employ different technologies to Neanderthals whose presence may be suggested from the evidence of material including a flint leaf point recovered from an Early Upper Palaeolithic hyena den at Glaston in Rutland (McNabb, J. 2006). Evidence across Europe suggests the emergence of symbolic expression on artefacts and cave walls and also the formal burial of the deceased. In neighbouring Nottinghamshire, at Cresswell Crags, evidence for increasingly sophisticated forms of artistic and symbolic expression comes in the form of rock art depicting images of bison, deer, bears and birds. These are the only known examples of Palaeolithic cave art in the UK and their northerly location adds to their significance. New stone tool technology based upon the controlled production of blades which may have been used unmodified or served as blanks for tools such as projectile points, knives, scrapers, burins and piercers is also developing at this time.

On the Leicestershire/Rutland border at Launde a dense sealed scatter of around 3,000 blades, blade cores and possible hammerstones was recovered during an excavation in advance of the laying of a pipeline. Of the flints recovered 57% were recorded sealed in a thin silty clay layer thought to be a weathered surface horizon of the boulder clay. The excavator interprets evidence to suggest a single episode of activity, with spatial analysis of the finds indicating knapping of blades, bladelets and possibly arrowheads, around a central hearth. The site is on a commanding hilltop with views to the north, south and east leading to speculation that the site was chosen as a vantage point to observe the movement of game in the surrounding valleys. (Cooper in Pettitt, Gamble and Last, 2008)

At Glaston in Rutland excavations revealed a scatter of semi-fossilised animal bones, including woolly rhinoceros, wolverine, early horse (*Equus Ferus*), mountain hare and reindeer. Evidence for human activity came from the discovery of a small assemblage of flint tools, including a leaf point, and knapping debris. Most of the horse bones did not appear to have been affected by hyena gnawing, however, a number of long bones appear to have been deliberately smashed to extract the marrow.

6.10.2 The Mesolithic (c. 9700 BP to c.4001 Cal BC)

The Mesolithic or 'Middle Stone Age' is the period spanning *c.* 10,000-6,000 ya and in Britain is often equated with a period of rapid environmental change as the end of the last ice age saw a rapid warming of the climate and widespread changes in vegetation pattern. The open late glacial environments were replaced by pioneer forests of birch and pine which, as temperatures continued to rise, gave way to species such as elm and lime (Myers, 2006). There was also a change in the fauna as species more suited to the postglacial forests such as red deer, roe deer, auroch, boar and elk replaced horse, arctic hare and reindeer. The combination of the warming in climate and the retreat of the glacial ice sheets together with a rise in sea levels culminated in Britain being separated from the continent.

By around 10,000 ya evidence for new technologies began to appear across much of Britain. These include assemblages containing distinctive small sharp blades called microliths. Technology changes would seem to indicate changes in hunting techniques which themselves may reflect developing economic strategies and social territories (Cooper, 2004).

Several surveys have produced evidence, mainly in the form of lithic scatters, for a Mesolithic presence in the project area. This includes sites at Medbourne, Brooksby, Grace Dieu Priory and around Misterton. Stratified flints have also been found at Croft below the alluvium next to a palaeochannel along with further work revealing a number of sub-alluvial features including partial ring slots. Stratified deposits were also found at Ridlington where a pit was found to contain 50 flints including a microlith. Most recently in 2009 over 5,000 worked flints were found below the ploughsoil at Asfordby during archaeological work carried out in advance of a residential development. Worked flint from the site included flint cores, blades, flakes, scrapers and piercers. Targeted investigation also revealed a charcoal rich former hearth and several postholes and arcs of stones, suggesting the possible position of tent-like structures. The material recovered suggests that people occupying this site were making and repairing flint weapons and tools on a large scale and it is probable that the range of activities identified from the site will have been associated with subsistence hunting.

6.10.3 The Neolithic to Middle Bronze Age (c.4000 cal. BC - c.1151 cal. BC)

The Neolithic, or New Stone Age, is often characterised as being a period that witnesses major societal changes from hunting and gathering lifestyles to a more sedentary subsistence economy based upon domesticated animals and cereal production. However, it has become apparent in recent years that this is an over simplified picture and that the Neolithic, spanning the period from *c.* 6,000-4,500/4,200 ya, offers both continuities and contrasts with the periods that came before and after (Whittle, 1999). Further to this the Neolithic may be split into Early (*c.* 6000-54/5300 ya), Middle (*c.* 54/5300-50/4900 ya) and Late (*c.* 5000/4900-45/4200 ya) phases. Alternatively a split of Early Neolithic (*c.* 6000-4800 ya) and Later Neolithic/earlier Bronze Age (*c.* 4800-3500 ya) is often used.

Geographically the East Midlands is an incredibly diverse region, this diversity of landscapes encompassing highland and lowland zones and including fenland and coastal areas. This diversity will be reflected in the archaeology as Neolithic communities will have employed a variety of techniques designed to exploit a range of contrasting environments (Clay, P. 2006).

It is often difficult to separate evidence from the Late Mesolithic and Early Neolithic since many of the same areas were exploited and there would appear to be a slow and gradual change in the technologies employed and cultural traditions. Much of the evidence for the Earlier Neolithic in Leicestershire and

Rutland comes in the form of lithic material and cropmarks. The lithic evidence is most common and comes in the form of surface scatters of flint and stone artefacts including cores, flakes, blades, scrapers, knives and arrowheads. Surface finds of this kind however, only provide an indication of the distribution of recently disturbed sites. Analysis by Clay (1999) of the lithic data for Leicestershire and Rutland identified seventeen Early Neolithic 'core areas' occurring on sands and gravel, Northampton Sand and Liassic Clays but with most from boulder clay substrata at an average height of 111m OD.

Possibly the earliest recorded evidence for this period comes from Croft close to the confluence of the Thurlaston Brook and the River Soar. Excavations here revealed small circular or sub-circular structures tentatively dated on nearby lithics to the Late Mesolithic or Early Neolithic (Beamish, 2004).

No clearly recognisable Early Neolithic monuments had been identified within the project area until relatively recently with the discovery of two opposed Long or Mortuary enclosures at Eye Kettleby, Melton Mowbray which have been dated to this period by form and an associated pit containing Early Neolithic pottery.

Prior to development geophysical survey at Husbands Bosworth identified a causewayed enclosure which bears similarities with relatively close neighbours at Barholm in Lincolnshire and Briar Hill, Northamptonshire. A limited excavation of the site produced decorated pottery with an early Neolithic date.

For the Later Neolithic twenty five 'core area' were identified by Clay (1999) from the evidence of lithic scatters. These were again located mostly on boulder clay though at a slightly lower average height of 104.3m OD.

The contribution of developer-led archaeological investigation to the research agendas for this period can be seen in the recovery and identification of Neolithic ceramics; Late Neolithic Grooved Ware pottery has been recovered from sites at Rothley Lodge, Thurmaston, Syston and Wanlip, whilst Impressed Wares have been excavated at Lockington, Enderby, Husbands Bosworth, Oakham and Braunstone.

At Husbands Bosworth Quarry a range of sites and findspots are recorded on the HER and a significant proportion of these have been discovered during the course of investigations carried out in advance of gravel extraction. Of particular significance and of National importance is a causewayed enclosure now designated a scheduled monument (MLE8358, SM30089). The monument, which was located during a programme of geophysical survey and partial excavation in advance of gravel extraction in 1998, includes two roughly circular, concentric interrupted ditches (Butler, A. 1998, Thomas, J. 1999). The ditches lie within 30m of each other and enclose an area of 1.5ha, with a minimum internal diameter of 130m. The excavation also confirmed the presence of surviving associated structural remains, including pits and other smaller ditches cut into the natural sand and gravel lying both inside the enclosed area and immediately outside the outer ditch. The excavations demonstrated that the majority of the features dated to the Neolithic period, although there were also some indications of later prehistoric activity. Field walking in the area in advance of development also located concentrations of flint material, suggesting activity during the Neolithic and Bronze Age periods (Liddle, P. 1997).

Other work carried out at Husbands Bosworth Quarry has resulted in the recovery of a range of important archaeological information, much of which has been dated to the Neolithic. This includes four ring ditches (MLE9410, MLE9419, MLE9420, and MLE9422), a crouch burial (MLE9415), two possible Neolithic cremation burials (MLE9416), a small cluster of pits containing Neolithic pottery (MLE9407) and a possible prehistoric pit containing heat cracked stones interpreted as a hearth.

It seems likely that the landscape across much of the British Midlands remained one dominated by woodland. However, it has also been suggested that as the Neolithic progressed woodland cover was significantly denuded as new technologies combined with the immigration of people introducing cereal crops and domestic animals cleared and developed their capacity to manage woodland (Rackham, O. 1989, 2003). There is pollen data from Hemington, near the confluence of the Rivers Trent and Derwent, for cereal production dating to 2880-2475BC. Elsewhere within the project area, such evidence may be regarded as scant and it has been suggested that many groups remained woodland and not field dwellers (Beamish, 2004). In support of this, environmental information, including pollen and insect fauna for the Early Neolithic derived from palaeochannel deposits near at Croft and from Kirby Muxloe, indicate a landscape of undisturbed mixed woodland.

It is likely that the Neolithic would have been a period during which many different groups of people would have been employing a variety of subsistence strategies including the herding of animals, limited cultivation along with hunting and gathering and the exploitation of resources which would probably have required a level of seasonal mobility.

Communication links and pathways to aid access to food and other resources would have been vital. Streams and rivers would have provided the most obvious permanent communication and boundary network making the confluences and heads of rivers important. It may be that the confluence of the Soar and Wreake had local significance as did Husbands Bosworth at the watershed for the Avon, Welland and Soar.

The Bronze Age in Britain, which conventionally spans the period *c.*2000-800BC, can be characterised by the introduction of new metal working technologies and the introduction of new techniques for the production of flint tools. The introduction of new pottery designs during this period is also regarded as significant.

The archaeology from the Early Bronze Age (*c.* 2250-1500BC) indicates strong continuities with the Late Neolithic despite the introduction of metal working as communities continue to employ traditional subsistence strategies including herding and cereal cultivation.

Across both Leicestershire and Rutland, in common with the other areas of the country, the most frequently occurring monument type is the round barrow and although some ring ditches may be small ceremonial enclosures many are more likely to be the remains of ploughed out barrows (Clay, 2004). Excavations of barrows and ring ditches have been carried out at Cossington, Eaton, Lockington, Melton Mowbray, Oakham, Sproxton, Tixover, and most recently at Earl Shilton. Whilst there are wide variations in funerary practices during this period the general trend seems to be a movement away from communal burials towards some acknowledgement of the individual. The building of round barrows will have served a function other than funerary; the role of the dead was shifting from being commemorated as ancestral guardians of the land to one where their monuments provided markers denoting a group's historic control and rights over a territory (Parker Pearson, 1999).

Pottery with an Early Bronze Age date has been found at several locations in Leicestershire and Rutland including examples of Beaker, Collared urn and food vessel.

Although settlement evidence has proved to be elusive, inference from known burials suggests that by the Early Bronze Age there was some expansion onto land that had been previously unexploited.

For the Middle Bronze Age, spanning the period *c.* 1500BC-1150BC, there are no known settlement sites within the project area although there is the possibility that some areas identified from surface scatters as later Neolithic to earlier Bronze Age may have continued into the Middle Bronze Age. Woodland clearance seems to continue into the Middle Bronze Age. Environmental evidence recovered from an old river channel, or palaeochannel, at Castle Donington suggests that during this period the landscape of this area contained limited woodland and an increase in meadowland and pastureland species. At Lockington crop production may also be inferred from spelt wheat recovered among charred remains found in a pit cluster.

6.10.4 The Late Bronze Age to Iron Age (c.1150 cal. BC – AD 42)

Across the project area, although relatively rare, there is some settlement evidence which may be attributed to the Late Bronze Age (*c.* 1000-800BC) with sites at Glen Parva, Kirby Muxloe, Melton Mowbray, Eye Kettleby and Ridlington in Rutland. The Late Bronze Age is a period of climatic deterioration with lower temperatures and increased rainfall. By the Late Bronze Age an increased use and availability of metal tools enabled more efficient and rapid woodland clearance and more intensive management of the land. Evidence points to management of the landscape, notably with the formation of extensive field and boundary systems (e.g. Eye Kettleby). Pit alignments, for example, which may have functioned as boundary markers, could well have been also associated with the settlement pattern and are extensively recorded across the study area.

The Iron Age across most of Britain is generally taken to cover the period 800 BC - AD 42 with the end of the period being marked by the Roman invasion. As with other periods in prehistory there is no single horizon that clearly marks the transition from the Late Bronze Age. The Iron Age is typically defined by a number of attributes including the construction of hillforts and development of new domestic pottery types, both of which have been shown to have origins in the Late Bronze Age. The Iron Age also sees the gradual introduction of iron technology and by the end of the period major social and economic changes were occurring (Haselgrove, C. 1999).

By the earlier part of the period settlement appears to be well organised with small settlements and farmsteads being most common. Animal husbandry was becoming increasingly important and this would have been complemented by the cultivation of grains and legumes and the hunting and gathering of some wild foods.

Some of the more permanent Early Iron Age settlements, Beacon Hill, Burrough Hill, Breedon Hill and Buddon Wood for example, within the project area are located on hilltops and ridge tops surrounded by defensive ditches and ramparts. The defensive nature of these settlements may be an indicator of an increasing pressure on the land, a need to establish territories and consequent conflict between neighbouring groups or tribes (Clay, P. 2004).

By the Late Iron Age there is increasing evidence for settlement in Leicestershire and Rutland much of which has been identified from cropmark evidence. Most settlement continues to have been in the form of small farmsteads; however it is during the latter part of the Iron Age that larger, agglomerated settlements with significantly larger populations begin to appear (e.g. Humberstone, Beaumont Leys and Lockington). The Late Iron Age for Leicestershire and Rutland was a period of significant change which might be characterised by a rapidly increasing population, the establishment of larger scale settlements, including Leicester which by the time of the Roman invasion was manufacturing coins and had trading links with the continent. The major settlement at Leicester which was within the southern extent of the area occupied by the *Corieltavi* may have been the tribal capital.

6.10.5 Romano-British (AD43-410)

The Roman invasion of AD43 and subsequent pacification of the indigenous tribes brought Britain into much closer contact with the Mediterranean world. The archaeological evidence for the Roman occupation may be placed into four broad categories. First, there is the evidence relating to the military occupation, secondly, that relating to urbanisation, thirdly, the spread of Roman cultural influence beyond the urban centres and finally the evidence for what was happening in the countryside.

It seems likely that it was the scale of the initial victory of the Roman military under the command of Aulus Plautius over the British which was to prompt Claudius into deciding to create a British province (Jones, B. and Mattingly, D. 1990). The following years between AD 43 and 60 are generally regarded as a period of conquest during which the Roman forces established control over most of Britain. Within four years of the invasion the south-east, areas of the south-west and the Midlands were under Roman rule.

Within the project area there is very little known evidence for the military campaign. The conquest period fortress at Mancetter on Watling Street is located just over the border in Warwickshire and evidence for an early fort at Leicester is not conclusive (Taylor, 2006). The only other evidence for a military presence comes from Great Casterton in Rutland and two other possible locations; one at Wigston Parva in south-west Leicestershire and one at Sawley in the extreme north-west of the county.

Three of Roman Britain's most important roads: Watling Street, Fosse Way and Ermine Street pass through the project area. In addition the Gartree Road, linking Leicester to Colchester, has also been shown to continue its path north-west in the direction of Chester. Other known roads within the project area include routes from Leicester south-west to Mancetter; one partially known from Leicester to Tripontium; the Salt Way linking Ermine Street and the Fosse Way and continuing into Charnwood; King Street Lane linking Thistleton and Goadby Marwood (possibly continuing to *Margidunum* near Bingham, Nottinghamshire); Sawgate Lane along the southern side of the Wreake/Eye Valley linking Thistleton with the Fosse. This communication network clearly illustrates that Leicester was an important hub. There is, however, a need to think beyond the simple mapping of roads and consider how individual routes would have been influenced by a Roman reading of the landscape and how their construction may have facilitated political control over an area (Taylor, J. 2006).

Leicester (*Ratae Corieltavorum*) is one of two major urban settlements in the East Midlands, the other being Lincoln (*Lindum Colonia*). Although evidence for a conquest period fort is still a matter of some speculation, what is clear is that Leicester developed on the site of an important Late Iron Age settlement located on the east bank of the River Soar. The formal laying out of the town did not occur until the end of the 1st and beginning of the 2nd century, possibly coinciding with the town's formal appointment as a *civitas* capital. The main phase of public building did not begin until the end of Hadrian's reign (AD 117-138) reign and into that of Antoninus Pius (AD138-161); Leicester in terms of its municipal buildings does appear to be a late starter when considering the provincial context (Cooper, N. J. and Buckley, R. 2004). Archaeological work in the city has identified the forum, bathhouse, a temple and market place (*macellum*).

Beyond *Ratae Corieltavorum* there is evidence for at least twelve Roman small towns across the project area: Witherley/Mancetter (*Manduessedum*) bisected by Watling Street and lying both in Leicestershire and Warwickshire; High Cross (*Venonae*), Caves Inn Farm (*Tripontium*), Market Harborough, Medbourne, Great Casterton, Thistleton/Market Overton, Goadby Marwood, Frisby/Kirby Bellars, Willoughby on the Wolds/Wymeswold (*Vernemtum*), Barrow-on-Soar/Quorndon and Ravenstone/Ibstock. These small towns are fairly evenly spaced across the project area and appear to have been nucleated, with all definite sites on known Roman roads and possibly all at or near road junctions. Most are also close to river or stream crossings. Other typical characteristics of these sites include a significant number of coin finds, no more than one larger stone building with other buildings being mostly timber or stone strip constructions, evidence of late Iron Age settlement, evidence of industry and/or a religious complex and often an apparent significant relationship with a villa.

Pottery and tile production and metal-working are the two most archaeologically visible industries with evidence for both in urban and rural contexts. Large-scale pottery production was being carried out at Mancetter with production also at Ravenstone, Market Overton, Great Casterton and Leicester. Fieldwalking in west Leicestershire has revealed a number of pottery production sites notably around the margins of the medieval extent of Leicester Forest and the southern margin of Charnwood (Liddle, P. 1999a). Large scale iron working is known at Goadby Marwood, Thistleton, Medbourne and Great Casterton. At Ridlington, Clipsham, Whitwell and Eaton evidence has been found for iron working within a rural context. Other industries such as leather processing, brewing and baking would no doubt have been common but are less easy to find (Liddle, P. 2004).

Agriculture would have represented the largest single form of land use and most settlements in the countryside are likely to have been involved in some form of farming activity. A crude distinction may be made between those buildings termed either as villas or farmsteads. The former would typically have been stone and tile buildings, whilst the latter were, in all probability, timber and thatch constructions. Leicestershire and Rutland's countryside during the Roman period would have been, for the most part, a well developed agricultural landscape with significant cereal production and processing. There were three extensive areas of woodland during the medieval period at Leicester Forest, Charnwood Forest and Leighfield Forest; fieldwork in these areas suggests that they may have already been in existence during the Roman period (Liddle, P. 2004).

6.10.6 Early Medieval (Anglo-Saxon) (AD411-1066)

Following the departure of Roman forces in the early part of the 5th century, central power in Britain appears to have rapidly disintegrated, as indigenous and invading groups vied for local and regional control of territories. By the 7th century, however, a number of larger kingdoms were beginning to emerge. In England these kingdoms were Northumbria, Mercia, East Anglia, Kent and Wessex. For a period it seemed as though the Midlands kingdom of Mercia under Offa might form the core of a consolidated English kingdom. Mercia, however, was under considerable pressure from Viking attack during the 9th century and instead it was the kings of Wessex who expanded from their West Saxon kingdom, south of the Thames, to eventually conquer the rest of England during the 10th century (Hill, C. 1999).

Until relatively recently evidence for Anglo-Saxon Leicestershire and Rutland was largely confined to the results gained from extensive fieldwalking programmes and the recovery of Saxon cemeteries from small scale quarrying during the 18th and 19th centuries. However modern, largely developer led, excavations have significantly improved our knowledge of the period (Liddle, P. 1999b).

There is a direct association between Saxon cemeteries and burials and the Roman towns at Leicester, Medbourne, Great Casterton, Barrow/Quorn, Kirby Bellars, Wymeswold/ Willoughby and Mancetter. At Ibstock/Ravenstone a timber hall has been excavated with an Anglo-Saxon date attributed, as has been the case with material recovered from Goadby Marwood. The only known Roman settlements not to have reported Anglo-Saxon material are High Cross, Caves Inn and Thistleton although for the last two cemeteries have been found less than a mile away. This might suggest that towns retained some significance into the Anglo-Saxon period. However there is little evidence that they retained an urban character or continued to perform an economic function. Urbanism appears to have been alien to Saxon traditions and the general picture, particularly during the earlier phase of this period, would seem to suggest that across the project area much settlement would have been characterised as dispersed and impermanent farmsteads. Large sites such as Eye Kettleby with perhaps as many as fifty recorded buildings included around 20 post-built halls could have had some form of administrative function associated with them (Knox, R. 2004).

With the departure of the Romans there appears to have been a significant decline in the population which combined with political and economic instability may have contributed to an apparent increase in woodland cover (Muir, R. 2000). However, this is a view for which there is not universal agreement and there may indeed have been little fluctuation in levels of woodland from the Iron Age into the Anglo-Saxon period (Squires, T. pers. comm)

Between the 9th and 10th centuries across large parts of central England, including Leicestershire and Rutland, the farmsteads were abandoned in favour of nucleated settlements that were to take the form of villages and towns. This concentration of the population can be associated with significant changes to the agricultural regime. The enclosed landscapes of the Roman and early Saxon period were replaced by the open field system probably around the end of the 9th or beginning of the 10th century although precise origins are unclear. The open fields would have been sizable areas of land subdivided into a large number of narrow strips, or 'lands', which were grouped into blocks called 'furlongs'. These were further grouped into larger areas called fields which were hedgeless and occupied virtually all of the available land; the strips of each farmer would be distributed over the fields. There was a communal element to this system since all the farmers would grow the same crops in a field which would be left fallow every second or third year and resources such as the oxen team would be pooled.

It is clear that major landscape changes were taking place across the project area during the Anglo-Saxon period and these changes are reflected in the modern landscape of Leicestershire and Rutland, most particularly the nucleated nature of the bulk of villages. Ridge and furrow earthworks have long been a significant feature of the landscape of the area. These features have, particularly since the second half of the 20th century, come under considerable threat from modern agricultural practices. Substantial areas of ridge and furrow have been lost to ploughing, denuding the integrity of this important historic landscape feature, long considered a defining characteristic of rural Leicestershire and Rutland.

By the 870s much of the East Midlands had come under Danish control with Leicester becoming an important fortified town or burh. Although it is unclear as to what the extent of Danish immigration and settlement was the distribution of Viking names is particularly remarkable in north-east Leicestershire along the Wreake Valley and its tributaries where almost three quarters of the place-names are either wholly or partly Viking in origin. It has, however, been noted by Bourne (2003) that the persistence of a significant number of Anglo-Saxon place-names would suggest that the colonisers did not totally displace the existing population and that geological evidence might also indicate that much Scandinavian settlement was located on the less desirable soils.

6.10.7 Medieval (AD1067 – 1539)

The period AD1050-1500 in Britain may be divided into three successive phases the first of which from 1050 to 1300 was a period of growth both in the towns and the countryside. There then followed a period of crises during the early and mid 14th century which included the Black Death. Finally there was a period of mixed fortunes from around 1350 to 1500 during which, in England, London became increasingly dominant whilst across the rest of the country some towns prospered while others went into decline (Schofield, J. 1999).

By the time of the Norman Conquest Leicester was already established as a town and retained its position throughout the medieval period at the top of the settlement hierarchy across the project area. Leicester's status is reflected by the fact that it had several (specialist) market places, a large castle, several parish churches and religious houses and, from early on, a mint. Commerce and industry also played a significant role for Leicester with cloth manufacture and wool and leather working being important for the town's prosperity. In addition Leicester also had an important administrative function and would have exercised a considerable influence politically, commercially and socially across much of the rest of the project area.

Below Leicester in the settlement hierarchy sat the market towns of Ashby-de-la-Zouch, Castle Donington, Hallaton, Hinckley, Loughborough, Lutterworth, Market Bosworth, Market Harborough, Melton Mowbray and in Rutland, Oakham and Uppingham. All of these have market places with several (Ashby-de-la-Zouch, Castle Donington, Hallaton, Oakham and Hinckley) having castles. Several market towns also contain minor religious houses (Castle Donington, Hinckley, Loughborough, Lutterworth and Melton Mowbray) along with inns and large churches.

The relationship between towns and the countryside during the medieval period is one that does not seem to be fully understood. It has, however, been suggested that the relatively high number of deserted settlements close to the larger market towns of the project area may be corroboration for the theory that the high mortality rate in urban areas was offset by immigration from the surrounding countryside (Lewis, C. 2006).

Across the project area, beyond the larger towns, the predominant settlement type is one of nucleated villages. Some villages have market charters and/or market places. Almost all villages have a parish church or chapel; many would also include a manorial complex, moated sites, fishponds and dovecotes. Most villages seem to have been established during or soon after the 9th century and are closely associated with the reorganisation and establishment of the open field system.

At Hemington sand and gravel quarry archaeological survey and excavation have combined to reveal evidence for three successive medieval bridges (MLE9629, MLE9684 and MLE9685). These would have formed an important crossing point over the River Trent. Hemington Quarry is located towards the centre of a wide floodplain, up to 8km across, formed by the confluence of the River Trent with the Rivers Derwent and Soar; with the Tame and Dove a short distance upstream. These structures clearly illustrate the importance of this crossing point and the fact there is evidence for three phases of construction show that the crossing provided an integral component to the road transport system. In addition to the bridges archaeological monitoring of the quarry has also revealed a series of palaeochannels containing both structural and artefactual evidence relating to Saxon and medieval fishing and milling industries (Cooper, L. Ripper, S. and Clay, P. 2009, p1)

Woodland was an important resource throughout the medieval period and needed to be carefully managed. Despite the aim to achieve a regime of sustainable management between 850 and 1500 clearances, which may be attested by documents and place-names, may have resulted in reduced woodland cover in places. However such reductions in cover may not have been significant and it doesn't appear to be the case that there were clearances in Leicester Forest or Leighfield Forest.

Hunting parks were introduced into England by the Normans and although the Domesday Book records thirty-six being in existence by 1086 none appear in Leicestershire or Rutland (Cantor, L. and Squires, A. 1997). It is possible that many of these could represent some continuity with the late Anglo-Saxon 'multiple estates' that would each have formed part of a larger royal administrative unit, or *regio.* Possible Anglo-Saxon estates have been suggested for The Langtons, Hallaton, Claybrooke, Market Bosworth and Lyddington (Bourne, J. 1986). Hunting was very popular amongst Norman nobility and the establishment of Royal Forests placed severe restrictions upon those living there. Over time higher nobles were granted land and many established their own hunting areas called Chases which were administered under less oppressive common law. As trees and deer became scarcer and many Royal Forests and Chases contracted, carefully managed hunting parks developed as a way of maintaining the supply of game. These hunting parks were often well wooded and would typically occur on the edge of a lord's manor. The perimeter of the area would be marked by a deep ditch and bank and a fence would be erected to contain the deer. At least fifty-five hunting parks are known to have existed in Leicester and eleven in Rutland (Cantor, L. and Squires, A. 1997) with woodland being the most important factor accounting for their distribution across the two counties. The incorporation of woodland into deer parks is often the most significant factor accounting for its survival into the early modern period and, in some cases, into the present. Most woodland, particularly within the project area, is located in areas that prove to be difficult for agriculture and the Royal Forests of Leicestershire and Rutland were both on heavy clays. It is also perhaps important to note that parks were established for a variety of reasons of which hunting would have been just one. Parks also played an important social and economic function within local communities. The shallow and infertile soils barely covering the igneous rocks of Charnwood Forest made it an ideal location for the ten parks that ring the area. There are also large concentrations of parks on the uplands of south-west Leicestershire and in the north-west on the border with Derbyshire.

6.10.8 Post-medieval to Modern (1540 – Present)

The post-medieval period spanning the early 16th to the end of the 19th centuries is generally seen as a period of transition between the medieval or feudal world and the birth of modern capitalism (Courtney, P. 2006). The period differs from earlier ones in so far as many buildings and landscape features figure significantly within the modern landscape.

In terms of landscape development one of the dominate themes of this period is the process of enclosure. The ridge and furrow arable of the open field system is replaced with enclosed pasture. At the same time many landscape parks and gardens were created often on the sites of former villages.

The earlier part of this period, 1500-1750, sees gradual changes in the agrarian economy and landscape with enclosure having a major impact upon local communities. Society was becoming increasingly stratified at the bottom of which was a growing landless class. The process of enclosure seems to have had a depopulating effect in the countryside and many cottagers or smallholders would have been severely affected by the loss of common rights entailed with Parliamentary enclosure. Early enclosure dating from the mid 15th to the mid 18th centuries tended to be by agreement and was piecemeal in nature and within the project area was predominant in the south-west and central eastern parts. Early enclosure may be traced in the modern landscape where field boundaries follow the line of the ridge and furrow producing hedge lines with a characteristic reverse S or dog-leg morphology.

Agricultural improvements accelerated during the 18th century which included new scientific systems for the breeding of cattle and sheep and new approaches to crop rotation and drainage (Campion, G. 2006). New planned farms began to develop away from the nucleated villages. The enclosure patterns also became more planned in appearance from the late 18th century with many boundaries being redrawn and laid out formally by surveyors. This reorganisation had a dramatic impact both upon the landscape and people; with a growth of larger holdings employing a growing range of mechanised agricultural innovations, coupled with a continued shift in emphasis away from arable towards pasture, all contributed towards population movements. Prior to enclosure, the majority of the population was located on the eastern side of the project area; the less fertile and shallower soils over a significant parts of western Leicestershire had resulted in a far lower density of population. This picture was changing dramatically by the late 18th century and can be linked not only to changes in the predominant agricultural regime but also to the move towards industrialisation occurring in the western half of the project area, which itself was intrinsically linked to the rich mineral resources of this part of Leicestershire.

The continued decline in woodland cover across the project area is another important theme with, during the early 17th century, the complete disafforestation of Leicester Forest and a significant reduction in the number of trees across what was the traditionally well wooded area of Charnwood (Hartley, R. F. 2000). This process of disafforestation would also appear to be occurring with Leighfield Forest.

For the earlier part of the post-medieval period the major industries of the project area continued to be farming and the wool and leather trades. Slate quarrying was important in the Swithland and Groby areas and around Coleorton by 1500 coal mining had become a well-organised industry. The hosiery industry also became established during this period with the first reference to a stocking-frame coming from Hinckley in 1640. By 1812 there were over 13,000 frames in workshops mainly in the western part of Leicestershire. By the end of the 18th century power spinning of wool and worsted using steam power had been introduced into Leicestershire and despite initial resistance to mechanisation a large number of mills were built during the first decades of the 19th century. Associated industries also developed in the western parts of Leicestershire including dyeing and finishing works and elastic web manufacture, incorporating a rubber thread into knitted fabric.

Boot and shoe manufacturing was another major manufacturing industry and by the late 19th century had developed into an industry producing footwear for markets beyond the local area. By the end of the 19th century and the beginning of the 20th a large number of multi-storey boot and shoe factories had been built, many specialising in ladies and children's footwear, both in Leicester and the fast developing suburbs such as North Evington and Humberstone (Neaverson, P. 2000).

As they became more mechanised both the textile and the boot and shoe industries required support trades, prompting many blacksmiths to start making needles for knitting machines and nails and rivets for shoe making. Millwrights became machine makers and a number of general engineering companies were established in Leicester and also Loughborough, many of which were specialist businesses such as The Brush Company with its core business in electrical engineering and transport.

Extractive industries increased in importance during the 19th century and again these were concentrated on the western side of Leicestershire; deep coal mining was underway early on during the 19th century. In both the north-west, central (Barrow Upon Soar) and east of Leicestershire limestone was burnt to produce lime for mortar and cement and used for agricultural improvement. Limestone was also extensively quarried in Rutland and the even grained stone taken from the quarry at Ketton was particularly suited to the 17th and 18th century fashion for a smooth ashlar finish on buildings (Stocker, D. 2006).

Also to become, and remaining, important was the quarrying of stone, sand and gravel. Coal and mineral resources are concentrated in western Leicestershire and their presence is responsible for industries which as well as having a dramatic, if localised, effect upon the landscape have stimulated urban growth in this part of the county.

The transport infrastructure has been to some extent linked to industrial growth and urban expansion. Several routes across the project area follow the routes of Roman roads and by the beginning of the 19th century almost 300 miles of road had been turnpiked. During the late 18th century improvements opened the River Soar for navigation first as far as Loughborough and then later to Leicester to form part of the Grand Union Canal, the construction of which was driven by the need to move coal and stone.

Railways also played a significant role in facilitating the growth of Leicestershire's fast developing industrial base. The Leicester and Swannington line opened in 1832 in order to bring coal into Leicester and throughout the rest of the 19th century the rail network continued to expand across the county.

The growth of industry and large scale coal and aggregate extraction in Leicester and western parts of the county coupled with improved transport links impacted upon the settlement pattern. In Leicester, along the River Soar and in the coalfield of the north-west of the county, urban expansion was rapid, whilst at the same time in the east of the project area the population was in decline.

The period from 1901 to the present day has seen dramatic and rapid changes in the character of the landscape both locally and on a national level. In the countryside particularly since the Second World War, agriculture has become increasingly mechanised and intensive. Large scale field boundary loss has during this period occurred right across the project area with the highest levels of hedge removals most apparent in east Leicestershire and Rutland. There has also been a significant loss of ridge and furrow earthworks across the project area. The price of grain and other crops can be subject to dramatic variations; when spikes in the market make it economically viable new areas of ridge and furrow are ploughed and crops sown; as a consequence landscape scale features with origins in the Anglo-Saxon period are lost for what is often a very short-term economic gain. In recent years some attempt has been made to halt this process through programmes such as the Higher Level Stewardship Scheme administered by Natural England. These can offer farmers financial incentives for sympathetic maintenance of important historic or archaeological features and landscapes.

The management of woodland has over the course of this period also become more industrialised and the requirements for timber during both the First and Second World Wars considerably affected levels of broadleaved tree cover. One significant development during the second half of the 20th century saw the replanting of ancient woodlands with conifers. This has had a radical effect upon the native flora and consequently fauna of those areas which changes to accommodate the new conditions. This is a practice which has in recent years been halted with recent initiatives aimed at encouraging woodland regeneration with native broad leaved species. The establishment of the National Forest has also been a significant development which has dramatically increased levels of woodland cover in areas of north-west Leicestershire.

Improvements to the transportation network have included the building of major roads and motorways such as the M1 and M69 across the project area. Improved transport infrastructure has facilitated the growth of industries providing a stimulus to urban expansion. The road network itself can also be seen as a significant landscape element influencing greatly the character of an area.

Over the course of the 20th century the urban centres, most notably Leicester and the towns in western Leicestershire, have expanded considerably and it is recognised that the mineral resource, including fossil fuels and aggregates, present in this part of the county have contributed significantly to the local economy. This sits in contrast with the eastern parts of the project area where beyond the larger market towns, which have experienced some growth, population densities remain much lower. Eastern Leicestershire and Rutland remains characterised, to a large extent, by nucleated villages which have experienced relatively little growth during the 20th century.

7 Cropmark Evidence

7.1 Overview

The creation of the GIS Cropmark Layer in MapInfo essentially involved the consolidation of five separate data sets comprising Lincolnshire, Nottinghamshire, Northamptonshire and National Forest NMP information together with air photo interpretation work carried out by Pickering and Hartley (1985). English Heritage supplied NMP information for Lincolnshire Nottinghamshire and The National Forest in the form of a series of black and white scanned .TIFF files. The survey for Lincolnshire was carried out between 1992 and 1997, Nottinghamshire Between 1991 and 1999 and the National Forest during 1993. The Northamptonshire study carried out between 1994 and 2001 was one of the first to be carried our solely using digital resources. Air photo plots from the Northamptonshire study are available as a GIS output and can be downloaded from ADS at:

- http://archaeologydataservice.ac.uk/archives/view/nnmp_eh_2003/

Cropmarks photographed and transcribed by Pickering and Hartley were published in *Past Worlds in a Landscape Archaeological Crop Marks in Leicestershire* (1985). Original transcriptions were held within the HER as paper documents which needed to be scanned as .TIFF files before they could be georeferenced and plotted within MapInfo.

This work resulted in the transcription of a total of 5,220 individual plots; of these 4,015 plots could be related to 480 sites which had been recorded on the HER. The remaining 1,205 plots, which could not readily be associated with an existing HER reference, could potentially represent up to 560 sites. Further analysis of these plots will be required to consider whether some features should be grouped to represent a single monument and to verify that that are in fact new sites.

7.2 Fluvial Sands and Gravels

Permeable geologies such as the river terrace deposits of the Fluvial Sands and Gravels ACA have provide favourable conditions for the production of cropmarks. Within the Fluvial Sands and Gravels 2,271 individual plots are recorded, which across the ACA as a whole, provides a density figure of 7 plots per km^2.

Within the Trent Valley sub area in the north-west of the ACA the greatest density of cropmark features are located in Lockington-Hemington parish to the east of M1 motorway. Here a complex of monuments appearing as cropmarks, almost entirely on the Holme Pierrepont Sands and Gravel but extending onto Hemington Terrace Deposits, have been identified and mapped (**Error! Reference source not found.**). This extensive set of cropmarks includes a set of enclosures and small circular (MLE4675) features interpreted as the closes and round houses of an Iron Age or Romano-British settlement. The settlement appears to be dissected by a double ditched feature (MLE4670), probably a trackway, which also has a pit alignment running along it; however, these two features are unlikely to be contemporary.

A further set of large irregular enclosures containing several small enclosures including a rectangular feature with internal partitions (MLE4676) are likely to represent a continuation of the Iron Age settlement to the south. To the east of the Iron Age settlement a small Romano-British villa surrounded by rectilinear enclosures including a possible aisled barn has been identified (MLE4659), all of the buildings appear to be within a large trapezoidal enclosure. Another small rectangular enclosure with a possible entrance lies to the east of the main complex and a pit alignment (MLE4664) has been identified to the north-east. Just to the east of the villa a group of two, or possibly three, small enclosures (MLE4665), seemingly isolated from the main Iron Age/Roman site, are visible as cropmarks on aerial photographs.

To the west of the Iron Age or Romano-British settlement (MLE4675) a further set of cropmarks were also identified from aerial photography (MLE4666). In advance of proposals for gravel extraction a series of evaluations which included geophysical survey and trial trenching confirmed the presence of Iron Age ditches some of which may have represented drainage gullies surrounding roundhouses (Ripper, S. 1998). Following this, excavation of the site was carried out between 2006 and 2008. At the time of writing the HER was still awaiting submission of the final report, however, a well preserved Iron Age and Roman agricultural landscape was recorded with a complex of closes opening onto a trackway apparently linking the site to the settlement to the east; to the rear, boundary ditches ran beyond the area of excavation suggesting an extended field system. Further detail awaits completion of the post-excavation analysis and report submission. The site itself is currently a gravel quarry.

Aerial photography has played a crucial role in the identification of sites on the sand and gravel river terrace deposits of each of the main river systems. Sites identified on deposits associated with the River Soar include a possible ring ditch and several linear features (MLE462) east of Pillings Lock Marina, Barrow Upon Soar (Figure 9).

West of the marina a ring ditch (MLE825) was identified from an aerial photograph taken by J K St Joseph and is also shown on the 2006 vertical aerial photography held as a GIS data set by the County Council; this evidence provided the basis for a programme of archaeological work. Permission was granted in 2003 for the extraction of sand and gravel prior to the marina's construction in advance of which an archaeological evaluation was required; this was followed up with a programme of archaeological attendance during groundworks. These investigations identified the presence of a ring ditch, a large linear boundary containing Iron Age pottery and bone, together with several pits of probable prehistoric origin (Marshall, D. 2002).

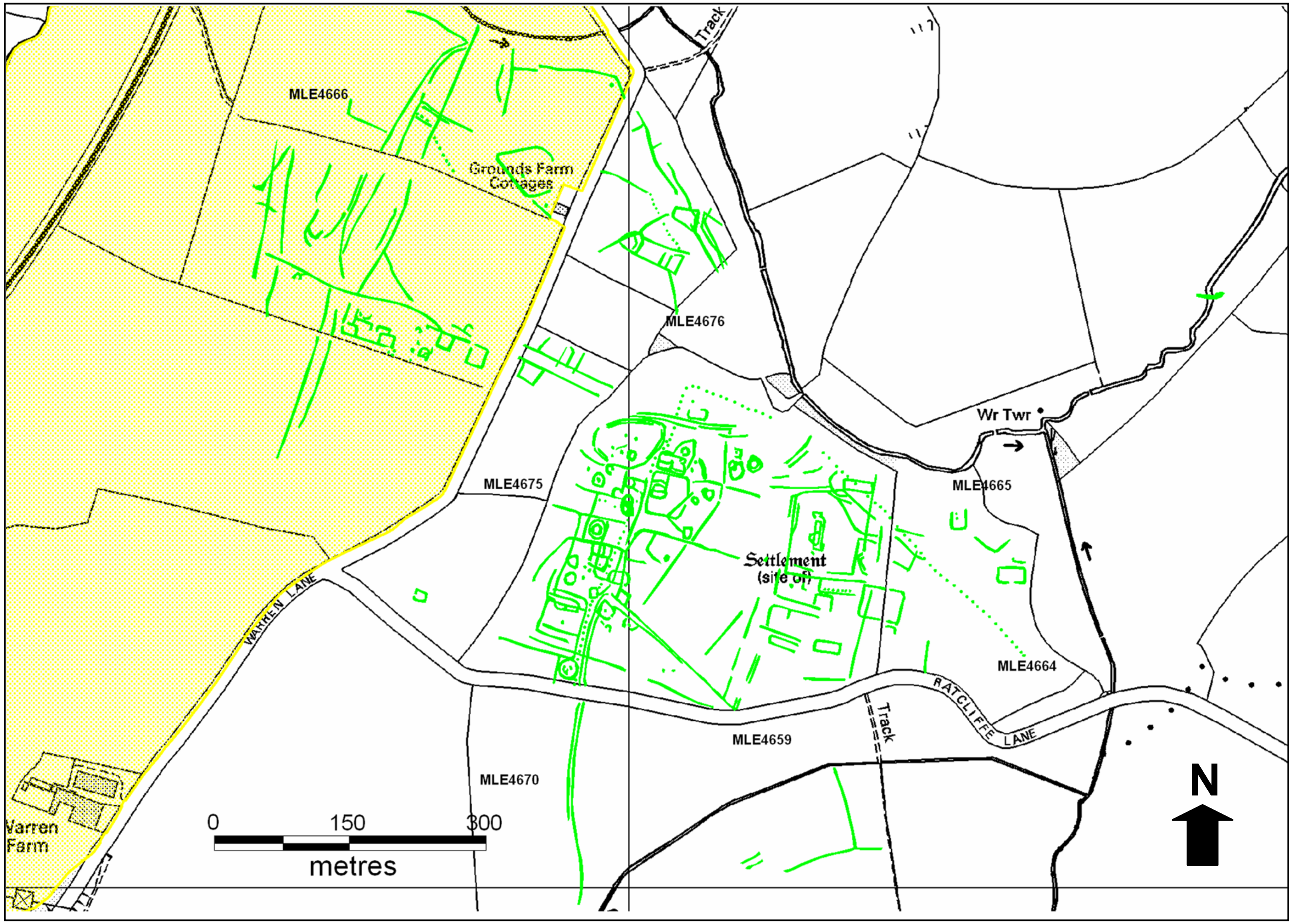

Figure 8 Cropmark Complex at Lockington

The area shaded yellow identifies the extent of quarrying

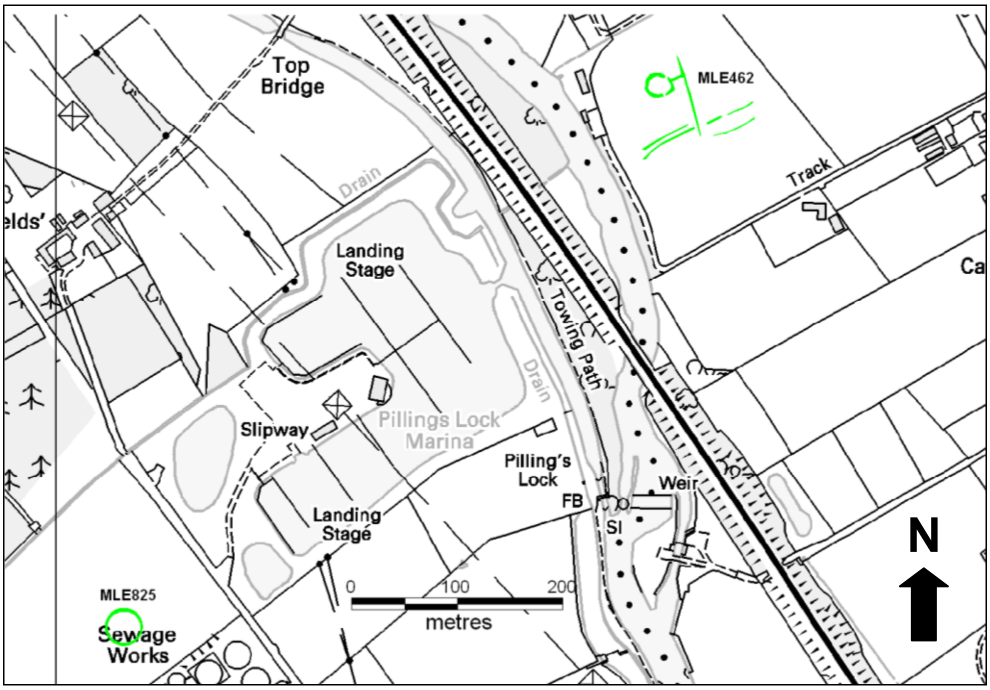

Figure 9 Cropmarks Near Pillings Lock Marina

During the programme of archaeological attendance an ancient course of the River Soar was revealed as a palaeochannel and an environmental sample taken from one of the sections provided a pollen sequence showing the channel to have its origins in the Mesolithic and ending in the Bronze Age. The pollen sequence showed that the flow of the river had been subject to periodic change and the ecology of the area was transformed from woodland scrub to more open pasture with land management and burning occurring across the wider area (Snee, J. 2008).

South of the River Wreake in the Queniborough area conditions have also proved favourable for cropmarks (Figure 10). Here a large sub-rectangular enclosure with rounded corners was identified (MLE770); this was flanked on the western side by a droveway and at least three further possible small rectangular enclosures and various linear features. To the west of this site another set of cropmarks (MLE774) seem to show an overlapping series three sub-rectangular enclosures, a square enclosure and tree ring ditches. To the north on the opposite bank of the River Wreake cropmarks of three possible enclosures were again identified from aerial photographs.

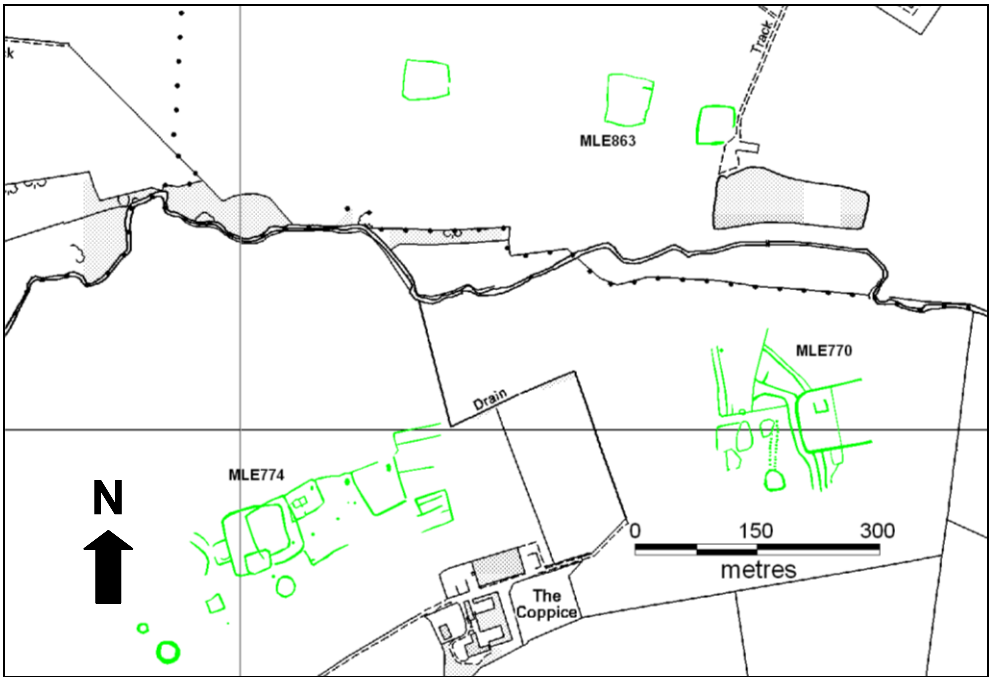

Figure 10 Cropmark Complex at Queniborough

This pattern of river terrace deposits being conducive to the production of cropmarks is repeated along the course of the Rivers Gwash, Mease, eastern Sence, Soar, Swift, Welland and Wreake. Undoubtedly the river valleys have proved to be a focus for activity during all periods; not only do they provide a ready water resource, they form communication routes, territorial boundaries, strategic crossing points and readily defendable locations. River terrace sands and gravels will often form free draining fertile soils suited to arable agriculture whilst on the floodplains lush grassland can provide excellent grazing opportunities for sheep and cattle. Whilst apparent high densities of cropmarks located on the fluvial sands and gravels may, to some extent, provide some indication of areas in which activity may have been concentrated, the data set in inherently biased. The pattern of cropmark discovery has tended to favour those geological areas where the evidence is most readily identified, and where landuse, chiefly cereal cultivation, along with some arable alternatives, is most dominant (Pickering and Hartley, 1985). It is suggested, therefore, that whilst the available data suggests activity and settlement favouring the free draining soils of the gravel terraces, the cropmark density over emphasises this preference.

7.3 Glaciofluvial Sands and Gravels

Cropmarks are reasonably well represented within the Glaciofluvial Sands and Gravels ACA achieving a density of just under 3 cropmak plots per km^2; this figure is, however, significantly less than the 7 plots per km^2 mapped within the Fluvial Sands and Gravels ACA. The lower density of cropmarks recognised on the Glaciofluvial Sands and Gravels is probably the consequence of a combination of factors including the suggestion that areas away from the river terrace sand and gravel deposits have not received the same level of attention (Pickering and Hartley, 1985) and that the glaciofluvial sands and gravels may not have the same capacity to produce the same level of results as fluvial sands and gravels. A critical factor, however, and one that infact argues for a preference for these geologies, is the presence of modern settlements situated on the glaciofluvial sands and gravels. It is likely that these deposits have experienced a higher level of continuity of settlement than is the case for the fluvial geologies which are more prone to flooding, erosion and competition for other uses.

Several clusters of cropmarks have been identified to the west of Heather (Figure 11) including several enclosures (MLE 4581, MLE4582, MLE4589) and possible enclosure fragments (MLE4580), a series of ditches or trackways (MLE4590) and ring ditches, possibly barrows (MLE4586, MLE4588, MLE10121) all seemingly indicating Bronze Age or Iron Age activity.

A dense pattern of cropmarks has also been recognised to the north-west of Heather (Figure 12) where identified features include at least nine enclosures of Late Bronze Age or Iron Age date (MLE4593, MLE4900, MLE4904, MLE4910, MLE4918) pit alignments (MLE4905) and ditches (MLE4920); these along with yet further sets of cropmarks directly north and to the east of Heather indicate that this area experienced relatively high levels of activity certainly during later pre-history.

Over south-western and eastern parts of the Glaciofluvial Sands and Gravels ACA the cropmark density is much lower than around Heather particularly over High Leicestershire where only about ten sites have been recorded.

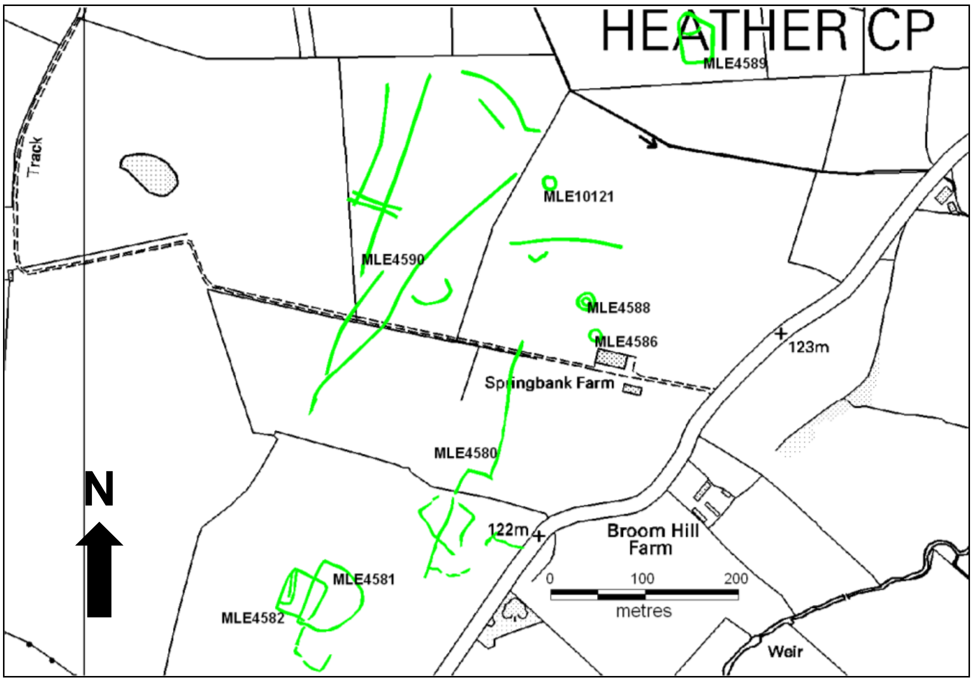

Figure 11 Cropmarks to the West of Heather

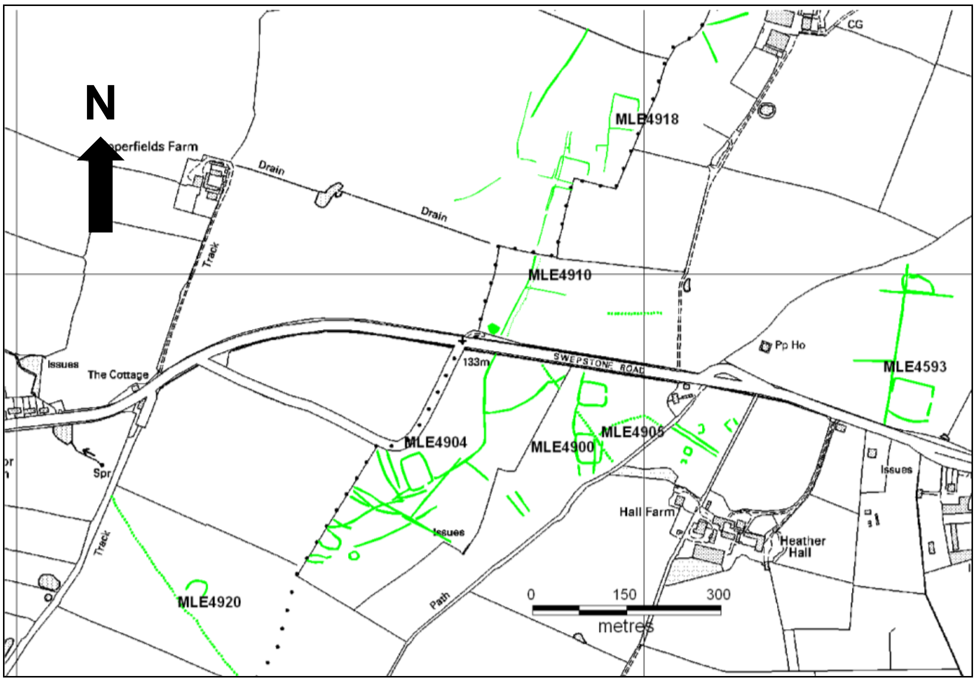

Figure 12 Cropmarks to the North-West of Heather

7.4 *Leicestershire and Rutland Limestone*

The Jurassic limestone found in the eastern parts of the project area has also proved to be conducive to the formation of cropmarks with just above 3 plots per km^2 being mapped across this geology. On the Carboniferous limestone only single linear cropmark feature has been identified (MLE17943); this seems to represent a former field boundary which formed a section of the Osgathorpe / Belton parish boundary.

A group of cropmarks to the east of Spoxton (Figure 13) suggest the presence of at least four enclosures (MLE4146 and MLE19739). Excavations in 1977 recorded a hearth and various finds including Iron Age and Roman pottery and slag. During fieldwalking in 1989 more than 51 sherds of Roman pottery, a quern fragment and animal bone were recovered. MLE19739 was identified during the Royal Commission on the Historical Monuments of England (RCHME) NMP for Lincolnshire, carried out between 1992 and 1997, but was only incorporated into the Leicestershire HER following the supply of NMP information for the purposes of this project.

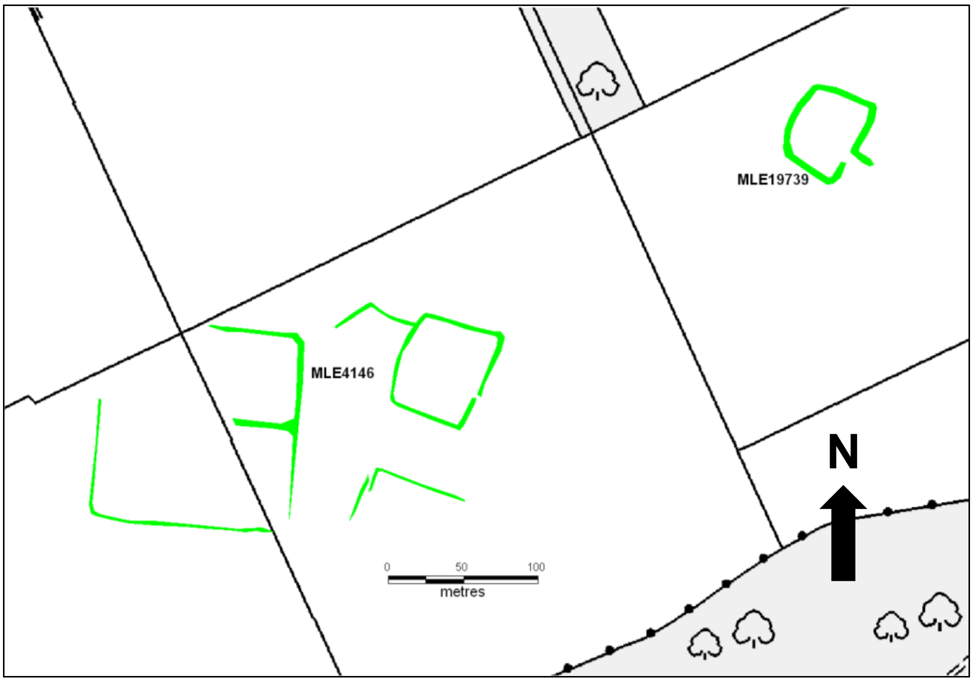

Figure 13 Cropmarks to the East of Sproxton

On the Rutland/Lincolnshire border to the south of Ryhall and less than a kilometre to the north of Stamford a set of cropmarks (Figure 14) were identified and plotted (Pickering and Hartley, 1985). These were interpreted as a pit alignment running east-west (MLE5672) and a complex (MLE5670) that includes a rectangular feature cut off on its western side by a field boundary and interpreted as a Roman building along with a series of ditches possible forming an enclosure. At the centre of MLE5670 a small ring ditch and a rectangular feature were added from the Lincolnshire NMP information.

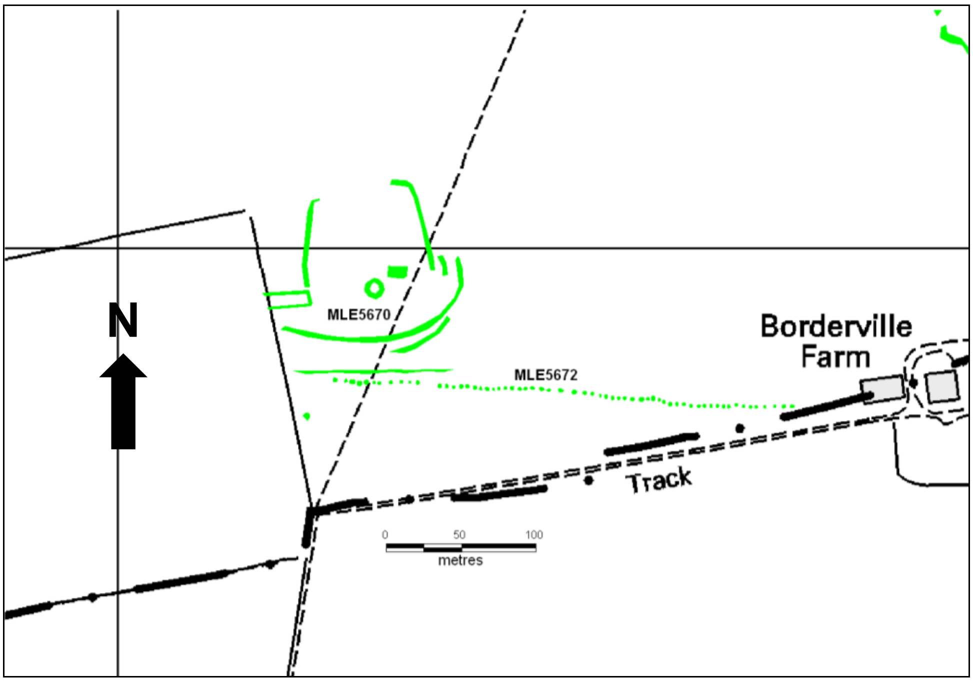

Figure 14 Cropmarks to the South of Ryhall

To the north-east of Belmesthorpe a large, double-ditched, sub-rectangular enclosure (MLE5679) was visible as a cropmark and has been identified as a defended Iron Age farmstead. Linear Feature to the east of the enclosure (MLE5675 and MLE17133) may represent elements of a related field system.

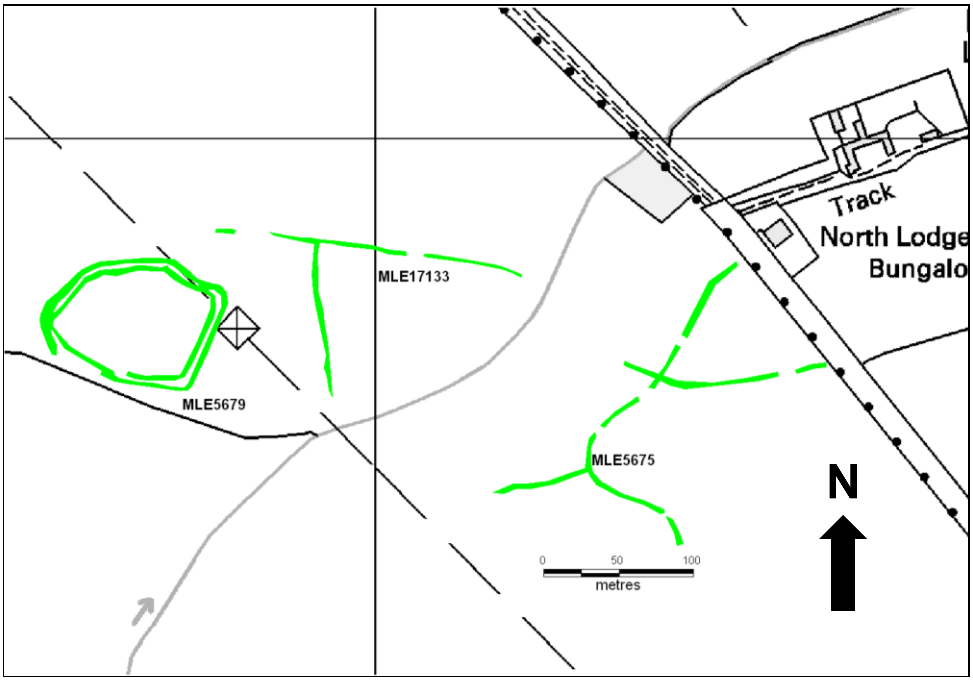

Figure 15 Cropmarks North-East of Belmesthorpe

Much of the cropmark evidence mapped within this ACA is located along the project area's borders with Lincolnshire and Rutland. This reflects the fact that much of the interpretation work was undertaken for NMP projects for those two counties and probably accounts, at least in part, for the fact that away from the borders, where there has been no overlap, on the same geological conditions the density of known cropmark sites is lower. More targeted aerial survey together with a detailed examination of existing photographic evidence for this ARA has the potential to produce positive results in the identification of sites that have not been recorded on the HER.

7.5 Charnwood and Upper Soar Igneous Rocks

The impermeable rocks underlying the thinner soils characterising much of the Charnwood and Upper Soar Igneous Rocks have not produced the same density of cropmark plots that can be observed within other ACAs and indeed for the igneous rocks of the Upper Soar no cropmarks were plotted. The less favourable geological conditions for the production of cropmarks, together with the probability that this area is agriculturally less productive and likely to have supported comparatively low levels of population, has contributed to density of cropmark pots of just 1.6 per km^2. Despite the lower density of cropmarks recorded within this ARA a systematic interpretation of the aerial photographic evidence carried out for the National Forest NMP demonstrated that there remains the potential for cropmark sites, indicating the presence of archaeological remains, to be present.

At Belton (Figure 16) aerial photography identified a triple-ditch with a single ditch joining at right angles (MLE4373), just west of these further ditch features (MLE4374) have also been recorded. To the south of Spring Borrow Lodge linear features were also identified for the National Forest NMP but hadn't been recorded on the HER. During the course of the ARA additional features, such as these, were brought to the attention of the Historic Environment Records Officer and will be added to the record in due course.

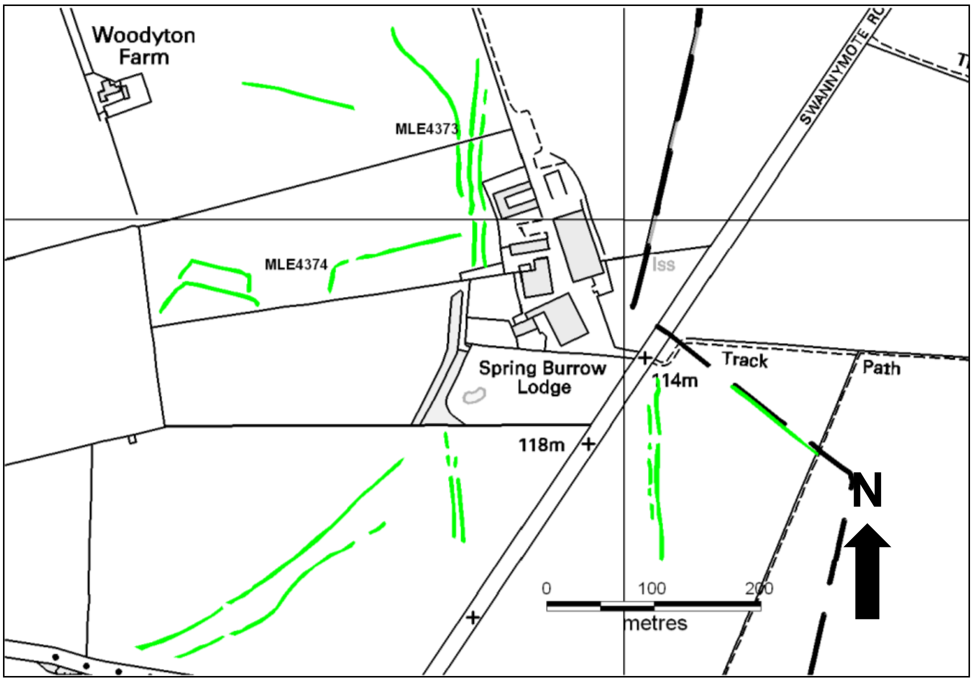

Figure 16 Linear Cropmarks at Belton

At Charley (Figure 17) a site identified as a modern military base, including features interpreted as hut bases, was mapped from air photographs and recorded on the National Monument Record (NMR) as part of the National Forest NMP project. This site had not been recorded on the HER when the NMP information was originally submitted; however following the ARA details were passed on to the HER and it is anticipated that these will be added within the very near future.

Figure 17 Possible Hut Platforms at Charley

There has been little targeting of this area specifically for cropmarks since underlying geological conditions have proved less favourable here than over other parts of the project area. However whilst the potential for cropmarks to be produced on the Charnwood and Upper Soar Igneous Rocks may appear comparatively low when viewed against the other ACAs there is still a good possibility that continued survey will aid in the identification of new sites. Revisiting the NMP data has shown that this ACA seems to contain a previously underappreciated archaeological resource relating to modern military remains and further investigation may help to characterise the nature of this resource.

7.6 Discussion

The archaeological aerial photo interpretation work that has to date been undertaken across the project area is by no means comprehensive and has been carried out in largely a piecemeal fashion. In addition the information currently available represents work carried out over a fairly long time span, for a range of projects and employing differing methodologies. Also to be considered when appraising the evidence to hand is the fact that the focus of study for most of this work has been outside the project area; that there has been a degree overlap with parts of Leicestershire and Rutland is, to some extent, merely fortuitous.

The aerial investigation and interpretation work carried out by Pickering and Hartley and published in *Past Worlds in the Landscape* (1985) whilst covering the whole of the project area could not be considered to be systematic. Unsurprisingly most of this work focuses upon the most productive river terrace sands and gravel areas with far less attention being given to the glaciofluvial deposits of West and High Leicestershire, the Igneous rocks of Charnwood and the Upper Soar and even for a much of the Jurassic Limestones in the eastern parts of the project area. In addition the Past Worlds work is based mostly on photographs taken by James Pickering and although other sources such as the Cambridge University Committee for Aerial Archaeology (CUCAP) were examined other important collections including the 1940s RAF vertical coverage do not appear to have been available for consultation.

The archaeological air photo interpretation work carried out for the National Forest area represents one of the earlier NMP projects running from October 1992 to July 1993 with transcriptions being carried out manually apart from in the Trent valley where the plane transformation software ARIAL was used as an aid to the sketch plotting process (MacLeod, D. 1995). The project report (MacLeod, D. 1995) notes that beyond the river valleys there was a general lack of specialist photography not just of cropmarks but for earthworks as well. Further specialist survey and appraisal of photographs taken since the completion of this project may well help in the identification of further sites. Much of the NMP transcription work of the National Forest area made available for this ARA did appear to be fairly schematic and since the plots were only provided as black and white .TIFF files it was often difficult to determine the nature of many of the features that had been mapped.

The archaeological transcriptions that form the results of the Lincolnshire and Nottinghamshire NMP projects were also only provided in black and white .TIFF file format. Whilst appearing to be less schematic than the National Forest NMP data it was again difficult to determine the exact nature of some of the plots. It is also the case that both of these studies had their focus outside the ARA project area and employed a methodology involving the transcription of archaeological information from aerial photographs to transparent overlays, which would be rectified and re-scaled using either the Bradford Aerial Photographic Rectification System (AERIAL 4) or manually using the Mobius network controlled transcription method (Deegan, A. 1999).

The Northamptonshire NMP project which was carried out between 1994 and 2001 was the first to be carried out employing solely digital methodologies; initially with features being traced onto acetate, rectified using AERIAL 4 and the data imported into a MapInfo table. From 1999 onwards AERIAL 5 was used which allowed scans of original photographs to be rectified and registered and interpretations digitised all within MapInfo (Deegan, A. and Foard, G. 2007). The resulting GIS information can be downloaded from the ADS website at:

- http://archaeologydataservice.ac.uk/

and may be easily interrogated within a GIS environment.

What becomes apparent, through a comparison of the available evidence, is the fact that the varying methodologies employed over different time frames have resulted in an inconsistent data set. In addition much of the aerial photography used for these studies appears to have been concentrated on the fluvially derived sands and gravels since these have proved to be the most productive areas for the identification of cropmark sites. Areas beyond the river valleys have traditionally been subject to less attention. This is, at least in part, a consequence of the fact that the archaeology of these areas, particularly where pasture is dominant, has proved far more difficult to identify.

There have, over recent years, been several air photo surveys commissioned by Leicestershire County Council providing total vertical air photo coverage for the project area. The information from surveys carried out in 1999/2000 and 2006 is available digitally and may be viewed through the GIS whilst sets of photos taken in 1969 and 1991 are currently only available only available in hard copy; in addition, a new survey was carried out in late summer 2011. These vertical surveys, especially the 2006 edition, although not specifically carried out for archaeological purposes have proved to be valuable in the identification of previously unknown sites and for adding further detail to known monuments. Whilst it was beyond the scope of this ARA to carry out new interpretation work on any meaningful scale it became apparent that a structured appraisal of this resource along with data sets currently being made available through the internet on sites such as Google Earth have the potential to help identify new sites and enhance our understanding of previously known monuments. The HER also holds a collection of more than 5,000 specialist aerial photographs. It is clear that there is a large and under exploited air photo resource available for the project area and a full survey to NMP standards has the potential to significantly enhance our knowledge and understanding of Leicestershire and Rutland's archaeological resource, especially within those ACAs where arable agriculture is dominant.

8 Archaeological Assessment of the Aggregate Character Areas

8.1 Charnwood & Upper Soar Igneous Rocks

8.1.1 Historic Landscape Character

Across the whole of Leicestershire Leicester and Rutland analysis of the HLC revealed that just over 76% of the project area had been characterised as belonging to the Fields and Enclosed Land Broad Character Type Grouping. When considering the Charnwood & Upper Soar Igneous Rocks ACA separately this figure is considerably less with only 46% or 29km^2 of the area falling into the this HLC Broad Type. The lower figure achieved for Fields and Enclosed Land within this ACA is largely a reflection of the fact that it takes in a significant proportion of the most densely wooded sections of Leicestershire since this area includes much of Charnwood Forest which also falls within the boundary of the National Forest. Within this ACA 20.5%, or 13 km^2, has been characterised through HLC as belonging to the Woodland Broad Type which compares to a 4% coverage figure for the project area as a whole.

Within the ACA the Fields and Enclosed Land HLC Type is dominated by Planned Enclosure at 17.9 km^2, this accounts for 61% of the land covered by this Broad Type and 28.5% of the ACA. The planned nature of much of the field pattern is also reflected by the next two largest HLC Field Types: Other Small Rectilinear Fields 7% (2 km^2) and Planned Woodland Clearance 6% (1.7 km^2). The dominance of Planned Enclosure and similar HLC Field Types here is, to a large extent, a consequence of the fact that this is an area which, during the medieval period, been a chase composed of the wastes of several surrounding manors. The land, although generally of poor quality, provided the local population with several valuable resources including pasture, rough grazing, stone, wood and timber Squires, A. and Jeeves, M. 1994) and whilst much of the surviving woodland was managed by private landowners for profit hundreds of oaks were removed from the 11th century onwards to accommodate the ever-increasing numbers of grazers. Inclosure by Act of Parliament, implemented in 1808, resulted in a transformation of the landscape to the basic framework visible on the ground today.

Whilst the dominant HLC field type is planned enclosure the ACA also takes in an area that could possibly represent some of Leicestershire's earliest enclosure around Charley Hall itself located on the site of what was formerly a small Augustinian Priory. This has been characterised as piecemeal enclosure and contains traces of ridge and furrow visible on the 2006 GIS air photo layer.

Importantly around Ulverscroft HLC has characterised a number of blocks of fields as Small Assarts. These represent areas subject to a process of woodland clearance which seems to have been underway from at least the 14th and 15th centuries in order to accommodate increasing numbers of grazing animals.

The planned character of much of this landscape, which largely represents a field pattern cut from woodland and heathland rather than common fields, forms just part of the picture. Other field types are also identified here through HLC and contribute to what is in fact a one of Leicestershire's most diverse and valuable landscapes. Woodland cover is of particular significance here with important blocks of Ancient Broadleaved Woodland located south of Newtown Linford (Lady Hay Wood, Lawn Wood, Old Wood and Sheet Hedges Wood) which have been significantly affected by Bradgate (now a waste disposal site) and Groby quarries. To the north of Bradgate park the ACA takes in the western side of Swithland Wood, important for a number of ancient woodland indicator species and extensive stands of mature woodland (Parry, J. 2006). Other features present at Swithland Wood include, at two sites, the remains of slate quarry workings and ridge and furrow earthwork remains. Ancient Broadleaved Woodland is also present at the north-western end of the ACA at Drybrook Wood and Grace Dieu Wood.

This ACA also includes a significant proportion (68%) of the unenclosed land indentified within the Project area. Whilst the rural landscape of both Leicestershire and Rutland is one dominated by a range of enclosure types it is the north-western part of Leicestershire with its generally poorer quality soils which in the past contained the most extensive areas of unenclosed land and although much of this was enclosed around the beginning of the 19th century valuable pockets of what have been Characterised as Heathland are located on Charnwood's igneous rocks. This includes the area covered by the Iron Age hillfort at Beacon Hill. Further west at Timberwood Hill, Warrren Hills and Ives Head the remaining pockets of the heathland which up until the beginning of the 19th century had covered much of the parish of Charley form significant and, for Leicestershire, unusual landscape components. Although given an HLC Type of Parks and Gardens Bradgate Park on the eastern edge of the ACA also has an open heath like quality to it.

The extraction of Charnwood's hard rocks has made its own significant impact upon the landscape of this area with operations at Bardon, Charnwood, Cliffe Hill, Groby, Mountsorrel and Whitwick all contributing to the makeup of what is an extremely complex and what may also be described as intimate landscape.

To the south the igneous rocks of the Upper Soar sit within a less complex landscape to the area considered in Charnwood. Here the ACA covers a relatively small area with the with granite quarrying at Calver Hill, Clint Hill, Croft, Narborough and Sapcote combining to form one of the largest, in terms of area covered, HLC Broad Types. The landscape in which these quarries is set is made up largely of Planned Enclosure, Re-organised Piecemeal Enclosure and Very Large Post-War Fields as well as taking in parts of Croft, Enderby and Stoney Stanton.

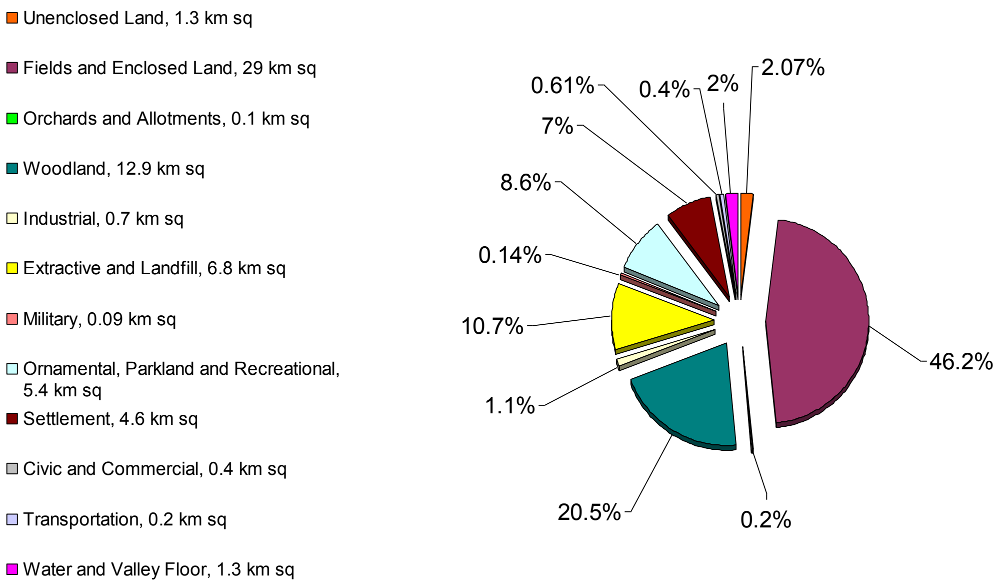

Figure 18 HLC Broad Types within the Charnwood and Upper Soar ACA

8.1.2 Historic Environment Record Data

A total of 449 sites or findspots were recorded on the HER for the Charnwood & Upper Soar Igneous Rocks ACA, this generates a density figure of 7.13 per km^2, which is slightly higher than the 6.24 per km^2 realised across the project area as a whole. Detailed summaries by period for each charcter area are provided in Section 6.0, Tables 6.2-6.9). Distribution maps, by period, of HER and PAS records are contained within Appendix A.

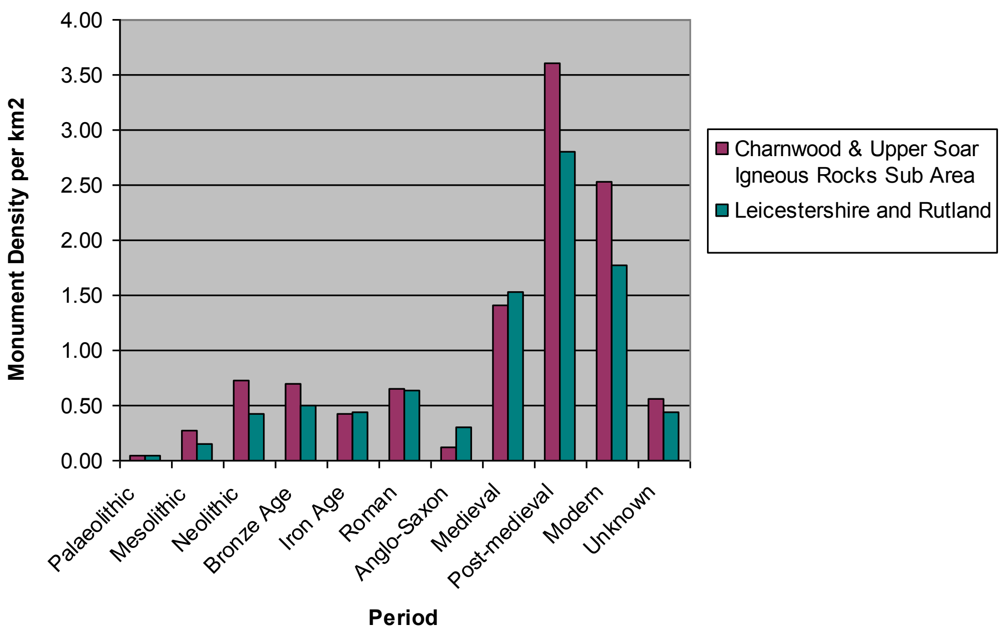

Figure 19 Density of monuments and find spots recorded on HER for the Charnwood & Upper Soar Igneous Rock ACA compared to the whole project area

8.1.3 PAS Data

Within the Charnwood & Upper Soar Igneous Rocks ACA the density of finds recorded on the PAS database is broadly similar to that recorded across the whole project area with the exception of material dated, most notably, to the Roman, but also, the medieval period. For both periods there appears to be significantly lower densities of finds than have been recorded for the project area as a whole. This is likely to be reflection of limited exploitation of the area during the respective periods. However, consideration also be given to the possibility that this apparent disparity is a consequence of the opportunities afforded to metal detectorists, since a sizable proportion of the land here is inaccessible or unsuitable for detecting. Most of the agricultural land here is under pasture with much of the remaining land either being quarry sites, woodland or parkland.

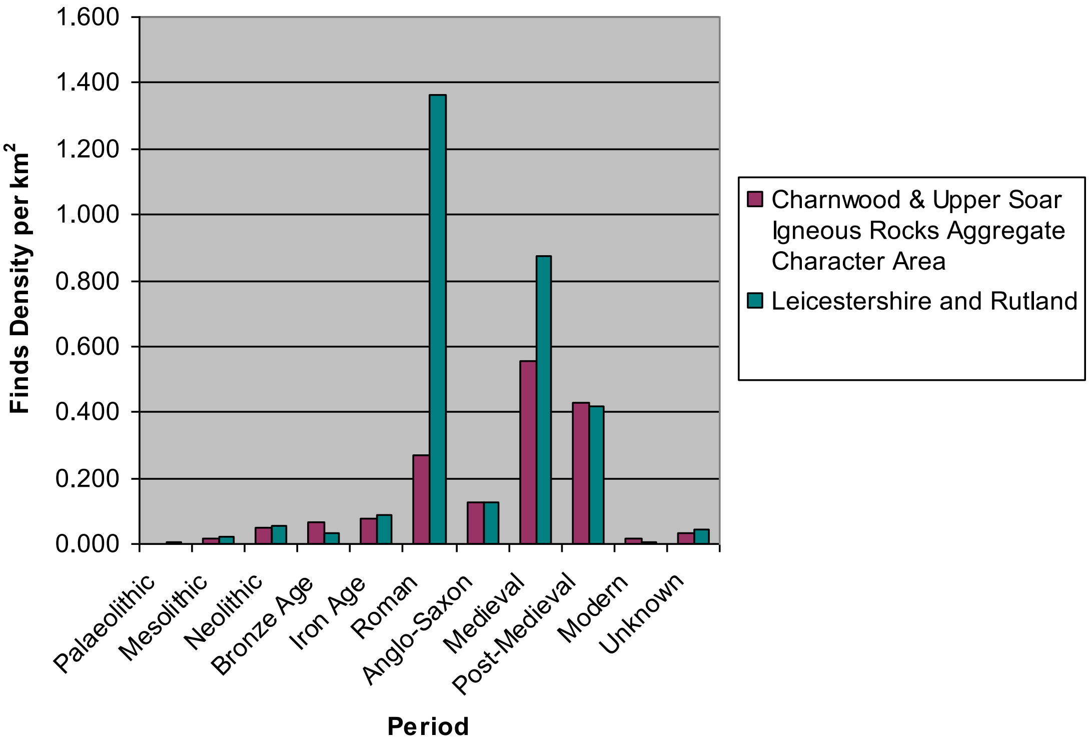

Figure 20 Density of find spots recorded through PAS for the Charnwood & Upper Soar ACA compared to the whole project area

8.2 Leicestershire and Rutland Limestone

8.2.1 Historic Landscape Character

This ACA may be split into three main areas: eastern Rutland, the eastern edge of the in the Leicestershire Wolds bordering Lincolnshire and the Carboniferous Limestone in south west Leicestershire.

The Jurassic Limestone of both Leicestershire and Rutland covers an area that has a generally sparse settlement pattern and with arable farming being the dominant form of agriculture. This is a landscape across which enclosure was relatively late much of it being enforced by Acts of Parliament from around 1750 to 1850 (Beresford, M. W. 1948, Ryder, I. E. 2006). Some areas of Pre-Parliamentary enclosure dating to the 17th century are found at Clipsham, Market Overton, Stretton, Thistleton and Whitwell parishes in Rutland and at Tixover, also in Rutland an enclosure date of 1723 is recorded. The dominance of arable and pattern of later enclosure is reflected through HLC with 51% of the Fields and Enclosed Land Characterised as Planned Enclosure and Very Large Post-War Fields representing 35% of the Broad Type within this ACA. Of the other HLC Types characterised as Fields and Enclosed Land only three account for more than 1%: Large Irregular Fields (3%), Piecemeal Enclosure (2%) and Re-organised Piecemeal Enclosure (4%).

About 4% of the project area as a whole has been characterised as Woodland; this is significantly below the figure of just under 7% achieved for the ARA. Much of this is Broadleaved Ancient Woodland and Replanted Ancient Woodland, often with a high ecological value. In addition there is also a spread of both broadleaved and coniferous plantation woodland. On Jurassic Limestones of Rutland Planned Woodland Clearance also features prominently at Empingham, Exton, Gretham and Pickworth providing an indicator that the extent of woodland cover even as recently as the late 19th century was significantly greater.

During the 20th century the influence of the military has also had a significant impact upon the landscape of this ACA with airfields being built during the Second World War at Cottesmore, North Luffenham and Woolfox in Rutland and at Saltby in Leicestershire.

When considering the HLC information for the Carboniferous Limestone sub area a different picture is presented than that gained from study of the larger sub areas. The HLC analysis for the whole of Leicestershire, Leicester and Rutland showed that just over 76% of the project area has been characterised as Fields and Enclosed Land, however a much lower figure of 38% is achieved for this broad type within the Carboniferous Limestone sub area.

The two most northerly of the inliers (Breedon Hill and Cloud Hill) are dominated by the Extractive and Landfill Broad Type and account for 29% of the sub area covering just 0.74 km^2. Woodland covering 0.42 km^2 is the next largest Broad Type taking in 16% of the sub area. At 22 km^2 (8.7%) the areas characterised as settlement essentially comprise most of Breedon on the Hill, Osgathorpe the north eastern tip of Thringstone and Grace Dieu Manor House and Farm.

The Carboniferous Limestone, which forms the smallest of the sub areas, represents just over 2.5 km^2. Whilst it is difficult to develop any meaningful analysis of the HLC information for an area this size some characteristic are apparent. The two most northerly of the inliers (Breedon Hill and Cloud Hill) are dominated by the Extractive and Landfill Broad Type and account for 29% of the sub area covering just 0.74 km^2. Woodland covering 0.42 km^2 is the next largest Broad Type taking in 16% of the sub area. At 0.22 km^2 (8.7%) those parts characterised as settlement essentially comprise most of Breedon on the Hill, Osgathorpe the north eastern tip of Thringstone and Grace Dieu Manor House and Farm.

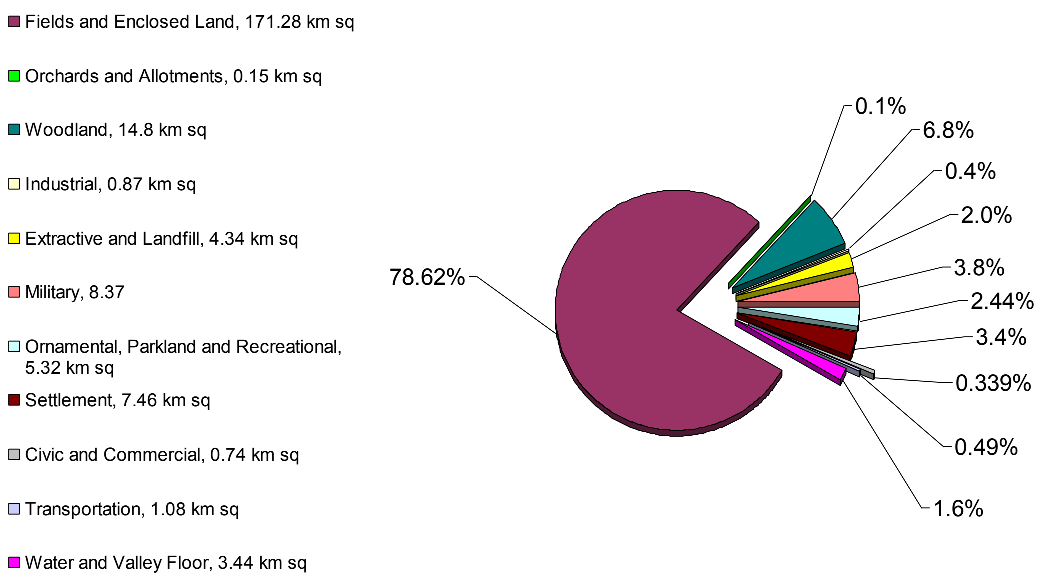

Figure 21 HLC Broad Types within the Leicestershire and Rutland Limestone ACA

8.2.2 Historic Environment Record Data

A total of 1582 sites or findspots were recorded on the HER for the Leicestershire and Rutland Limestones ACA generating a density figure of 4.8 per km^2 a little lower that the 6.2 sites and findspots per km^2 which has been realised across the project area as a whole. Detailed summaries by period for each charcter area are provided in Section 6.0, Tables 6.2-6.9).

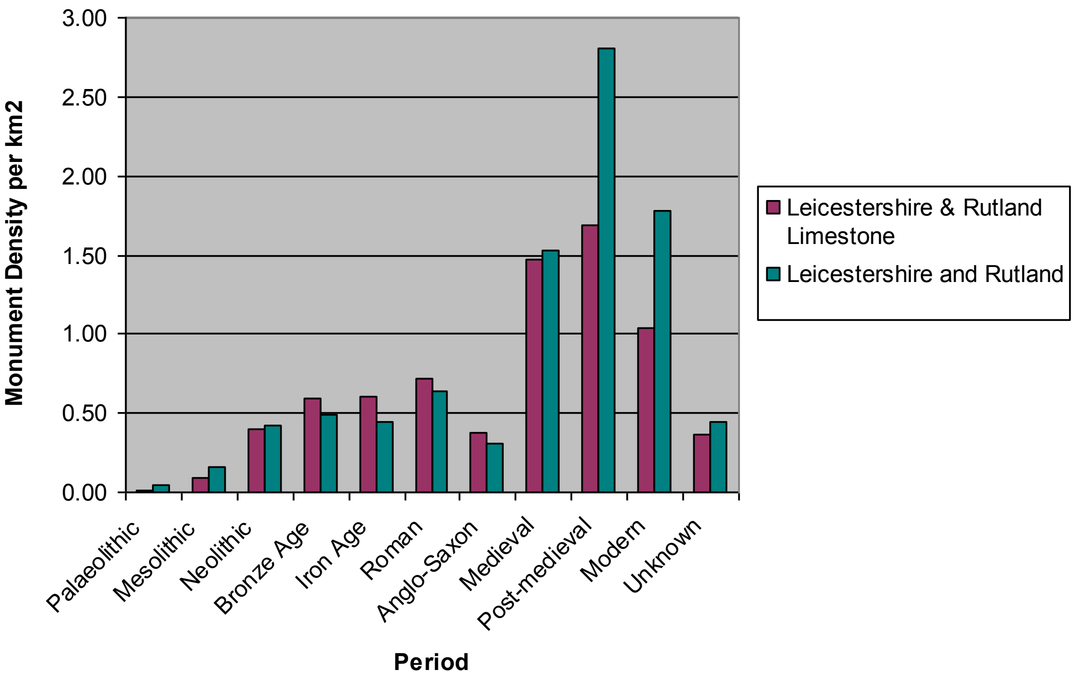

Figure 22 Density of monuments and find spots recorded on HER for the Leicestershire & Rutland Limestone ACA compared to the whole project area

8.2.3 PAS Data

Generally within the Leicestershire and Rutland Limestones ACA the density of finds recorded on the PAS database appears to be markedly lower than has been recorded across the project area as a whole. Only Iron Age finds with a density figure of 0.15 per km^2 compared to 0.09 per km2 occur more frequently in this area than across the project area as a whole; for all other periods the density of finds recorded through the PAS in this ACA is notably lower than is achieved across the project area as a whole. The lower density of recorded finds can probably be attributed to the fact that this area includes some of the most rurally isolated parts of the project area which appear to have been subject to relatively low levels of activity by metal detectorists.

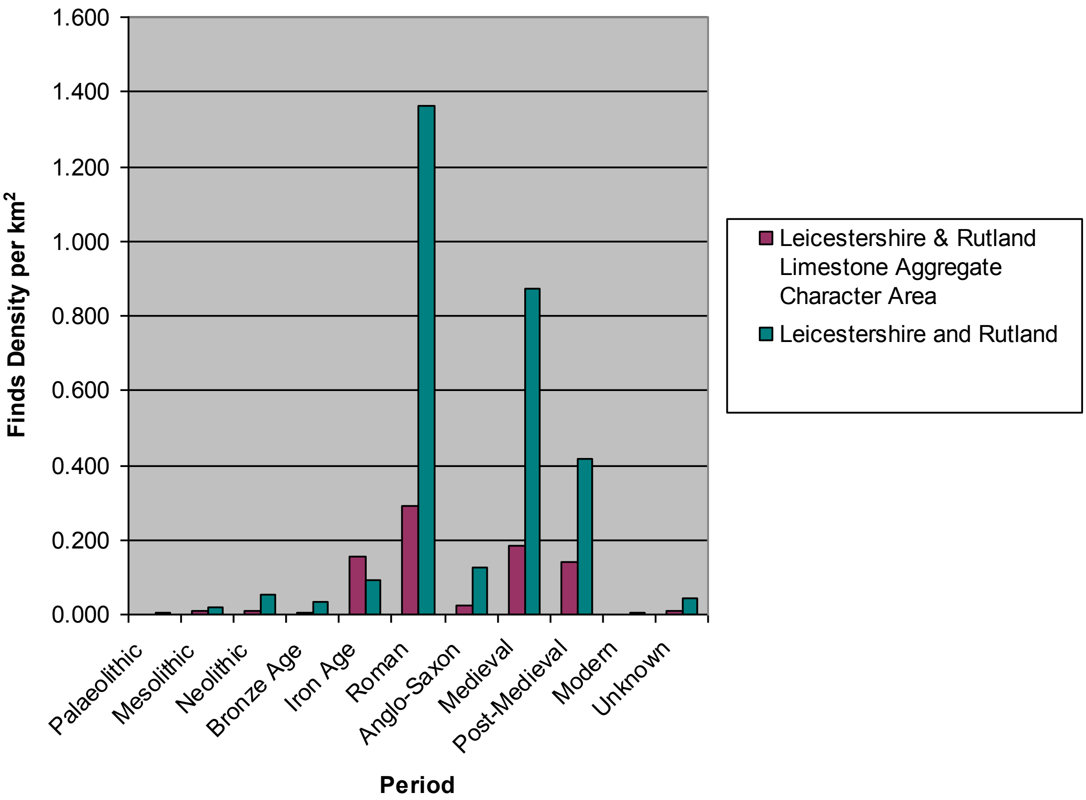

Figure 23 Density of find spots recorded through PAS for the Leicestershire and Rutland Limestone ACA compared to the whole project area

8.3 Fluvial Sands and Gravels

8.3.1 Historic Landscape Character

Across the Fluvial Sands and Gravels the influence of agriculture is apparent; Fields and Enclosed Land are dominant accounting for 225 km^2 or 73% of the ACA, only slightly below the 76% coverage achieved for the project area as a whole. Piecemeal Enclosure, Re-organised Piecemeal Enclosure and Planned Enclosure Containing Ridge and Furrow are well represented here as are Very Large Post-War Fields with a Previous Character of Piecemeal Enclosure. These character types provide good evidence that, during the medieval period, this landscape was supporting an agricultural economy dominated by open field (strip field) farming. Where fields have remained in permanent pasture for a significant period the potential for archaeological remains to be present is good with any surviving ridge and furrow possibly overlying earlier buried remains. However the fertile soils present across much of the ACA have resulted in a landscape that has been subject to fairly intensive arable cultivation which is likely to have had a damaging effect on any archaeological remains that are be present. Whilst agricultural practices are likely to have damaged archaeological remains, recently ploughed fields will provide opportunities for field walking.

Across the ACA the Water and Valley Floor HLC Broad Type is well represented. This is not surprising since the ACA is based upon the presence of fluvial sands and gravels deposited through river action. Miscellaneous Floodplain Fields, which fall within this Broad Type comprise areas of enclosure on river floodplain that do not fall into any of the Fields and Enclosed Land character types. Many of these fields will have traditionally been used as meadows and areas falling into this category have a potential for containing the preserved earthwork remains of water meadows.

The Settlement HLC Broad Type also figures significantly within the ACA and whilst the more urbanised areas are not likely to face any foreseeable threat from aggregate extraction it should be born in mind that their present location and development is intrinsically linked to the formation of the open-field farming system first appearing from around the mid 9th to the 11th centuries. It is often the case that during the course of their history villages will have shifted or shrunk and important archaeological remains may still be present in the surrounding vicinity of the current settlement.

Much of the Sand and Gravel extraction taking place within the project area is present here although this only represents about 2% of the Fluvial Sands & Gravels ACA. The impact that sand and gravel extraction has had upon the character of the landscape can be seen most dramatically within the Trent Valley sub area of the ACA where exploitation of the Hemington deposits has resulted in the large quarry sites at Lockington.

Running through the central part of the project area is the Soar Valley, made navigable towards the end of the 18th century, the influence of which has been considerable on the expansion of both industry and settlement. The Soar Valley passes through the central part of the project area and whilst agricultural use is dominant here the influence that the river has had on both settlement and industry is significant.

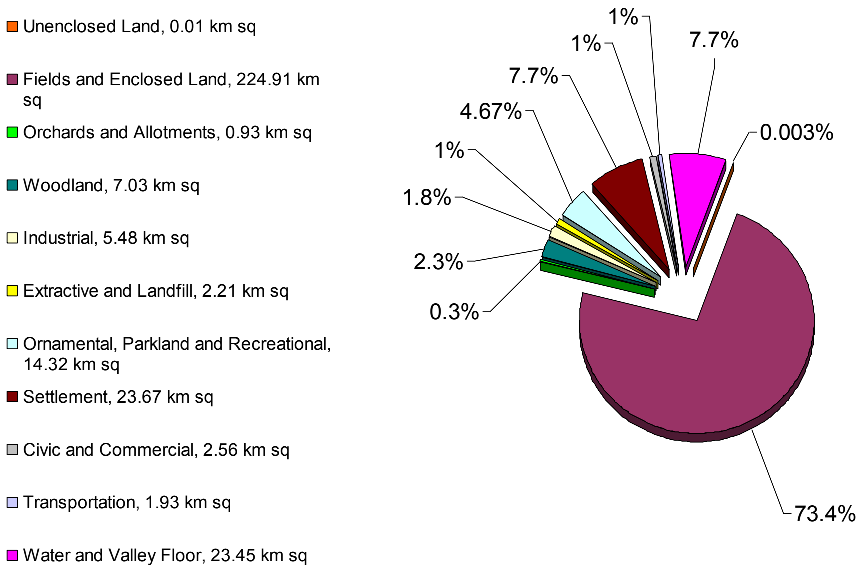

Figure 24 HLC Broad Types within the Fluvial Sands and Gravels ACA

8.3.2 Historic Environment Record Data

The HER information for this ACA (Figure 25) clearly illustrates a higher density of sites and find spots across all periods than has been recorded for the project area as a whole. The resources and topography associated with riverine locations have always represented a valuable asset for people being readily exploited for a range of reasons including communications, fishing, hunting, defence, agriculture and as a water resource.

A total of 3,606 sites or findspots were recorded on the HER within the Fluvial Sands & Gravels ACA generating a density figure of 11.78 per km^2, which is significantly higher than the figure of 6.24 per km^2 achieved across the project area as a whole. Detailed summaries by period for each charcter area are provided in Section 6.0, Tables 6.2-6.9).

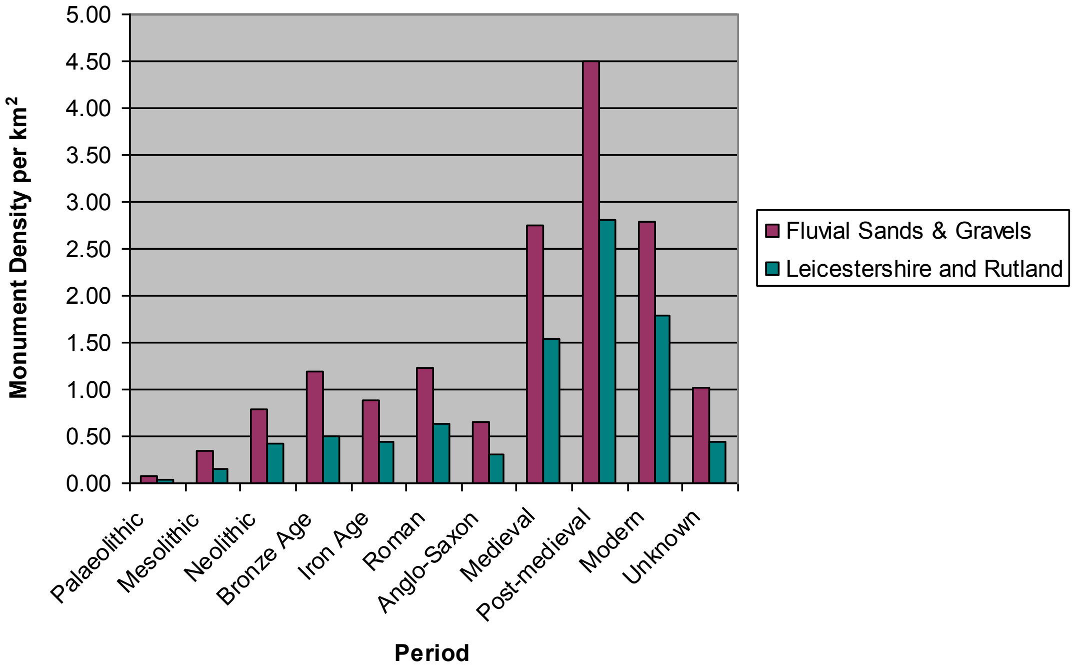

Figure 25 Density of monuments and find spots recorded on HER for the Fluvial Sands and Gravels ACA compared to the whole project area

8.3.3 PAS Data

In common with the HER the records held on the PAS database (Figure 26) provide a strong indication that much human activity, across all periods, is focused upon the sands and gravels of the river valleys. Within the Fluvial Sands and Gravels ACA the density of all finds recorded on the PAS database is 4.85 per km^2 which may be compared to 3 per km^2 for the whole of the project area; that this difference may not seem quite as pronounced as noted with the HER information could be accounted for by the fact that the greater focus of activity by metal detectorists does seem to be within the river valleys anyway.

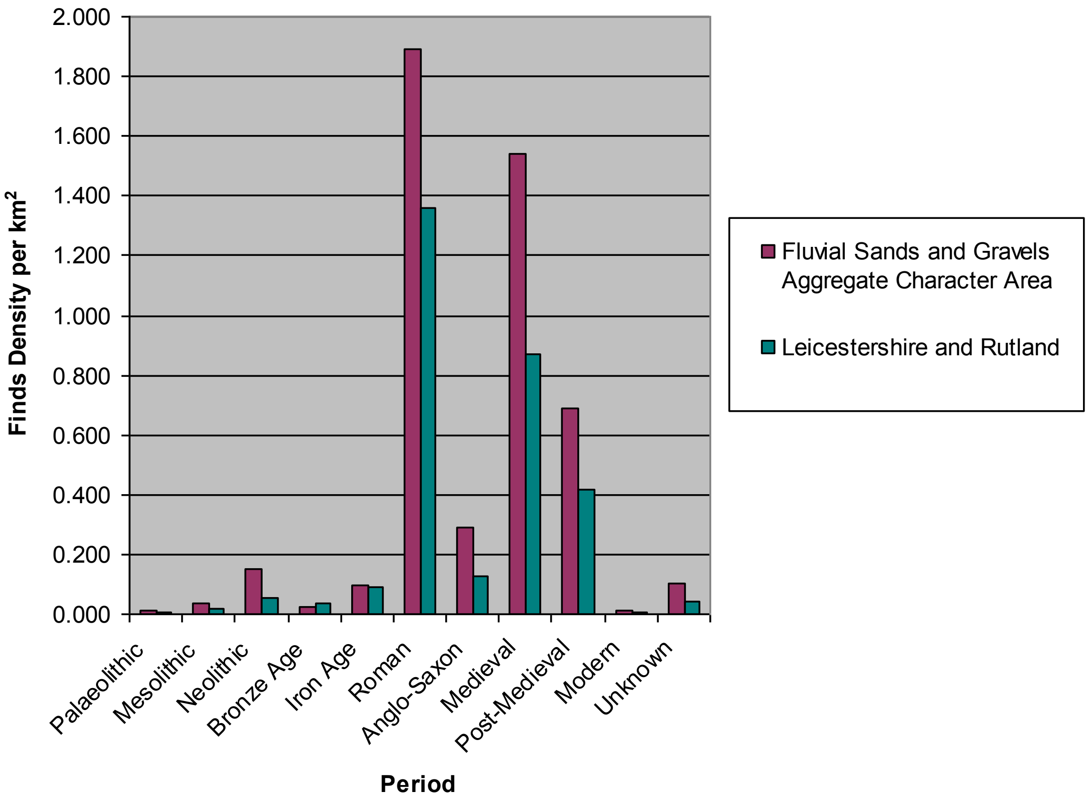

Figure 26 Density of find spots recorded through PAS for the Fluvial Sands and Gravels ACA compared to the whole project area

8.4 Glaciofluvial Sands and Gravels

8.4.1 Historic Landscape Character

The Glaciofluvial Sands and Gravels ACA comprises three sub areas: High Leicestershire, The Wolds and West Leicestershire which together represent some of Leicestershire's most rural areas perhaps best illustrated by the fact that Fields and Enclosed Land represent over 82% of the sub area which may be compared to a figure of 76% for the whole of Leicestershire and Rutland.

To the south-east of the ACA across High Leicestershire a pattern of larger enclosure predominates. Re-organised Piecemeal Enclosure represents the most common HLC Type just to the east of Leicester; this tends to give way to Very Large Post-War Fields when moving eastwards into Rutland. To the north the Wolds Glaciofluvial Sands and Gravels comprises a combination of field types dominated by Very Large Post-War Fields with some Re-organised Piecemeal Enclosure. Across both of these sub areas the sands and gravels that represent the superficial geology here has helped produce generally fertile soils on which arable farming is typical.

The settlement pattern of Leicestershire and Rutland is most often characterised as being one of nucleated villages set within a wider rural landscape. This generalisation holds true across the High Leicestershire Glaciofluvial Deposits with a good number of these settlements being located on these free draining sands and gravels including, Burrough on the Hill, Burton Overy, Carlton Curlieu, Gaulby, Great Glen, Hallaton, Illston on the Hill, King's Norton, Somerby and Stoke Dry. Whilst perhaps not the only determining factor there appears to be a strong correlation linking the presence of glaciofluvail sands and gravels with village settlements.

Woodland covers 4.27 km^2 of the High Leicestershire sub area and representing 3.83%. Most of the land characterised as woodland in the sub area lies to the east sand is likely to represent remnants of Leighfield Forest created by Henry I at the beginning of the 12th century. These blocks of woodland include areas of Ancient Broadleaved Woodland which will have a high potential for containing medieval, Roman and prehistoric remains. These remains are often in the form of earthworks such as woodbanks and ditches probably relating to previous woodland management regimes. Palaeoenvironmental material recovered from waterlogged deposits or covered soils can provide evidence of past forest clearances and woodland regeneration.

To the west of Leicester the picture is slightly different where, although still predominantly rural, the combination of field patterns is more varied. Much of western Leicestershire has soils that are of a poorer quality than those found across the eastern parts of the project area with lower densities of ridge and furrow providing an indicator to the fact that until the later part of the 19th century much of this area was uncultivated, unenclosed waste. Whilst these poorer quality soils are common in western Leicestershire the glaciofluvial deposits are of slightly higher agricultural quality. Piecemeal and Re-organised piecemeal enclosure is covers large parts of the landscape immediately surrounding Hinckley and Earl Shilton and further north around Barlestone, Barton in the Beans, Carlton and Nailstone. Although Planned Enclosure is well represented here Planned Enclosure Containing Ridge and Furrow is largely absent which again indicates the late date at which agriculture is introduced to the area.

The mineral wealth of Western Leicestershire, which includes both fossil fuels and aggregate minerals, is one factor to have had a direct influence upon the settlement pattern. This part of the project area is one of the more densely populated parts of the project with significant numbers of people having, in the past, been either directly or indirectly employed in mining and aggregate extraction industries. About 7% of the of the West Leicestershire Glaciofluvial Deposits sub area has been characterised as settlement; this figure would be significantly higher if Hinckley, Burbage and Barwell, were not beyond the scope of the project.

Apart from Settlement the only HLC Broad Types to represent more than 2% of the West Leicestershire Glaciofluvial Deposits sub area are Woodland (4.3%) and Ornamental, Parkland and Recreational (2.6%).

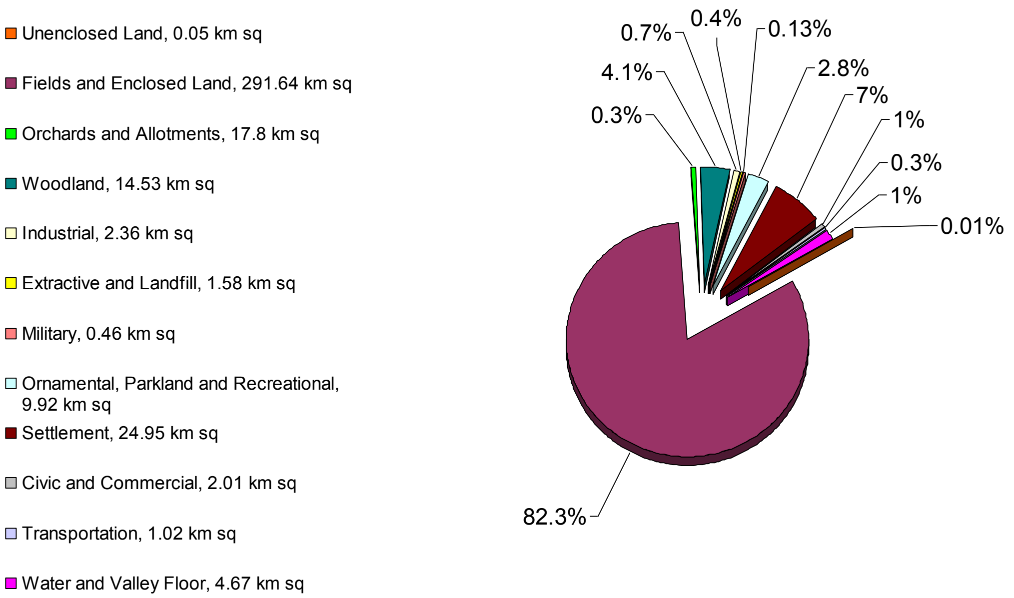

Figure 27 HLC Broad Types within the Glaciofluvial Sands and Gravels ACA

8.4.2 Historic Environment Record Data

A total of 3,150 sites or findspots were recorded on the HER within the Glaciofluviial Sands & Gravels ACA generating a density figure of 8.9 per km^2, which is s higher than the figure of 6.24 per km^2 achieved across the project area as a whole. Sites and findspots for all periods are recorded at a greater density within this ACA than across the whole of the project area (Figure 28) reflecting the fact that the free draining soils characterising much of this area provided favourable conditions for occupation sites. This can most obviously be seen to be the case in High Leicestershire where many of the villages are located on glaciofluvial sands and gravels. Detailed summaries by period for each charcter area are provided in Section 6.0, Tables 6.2-6.9).

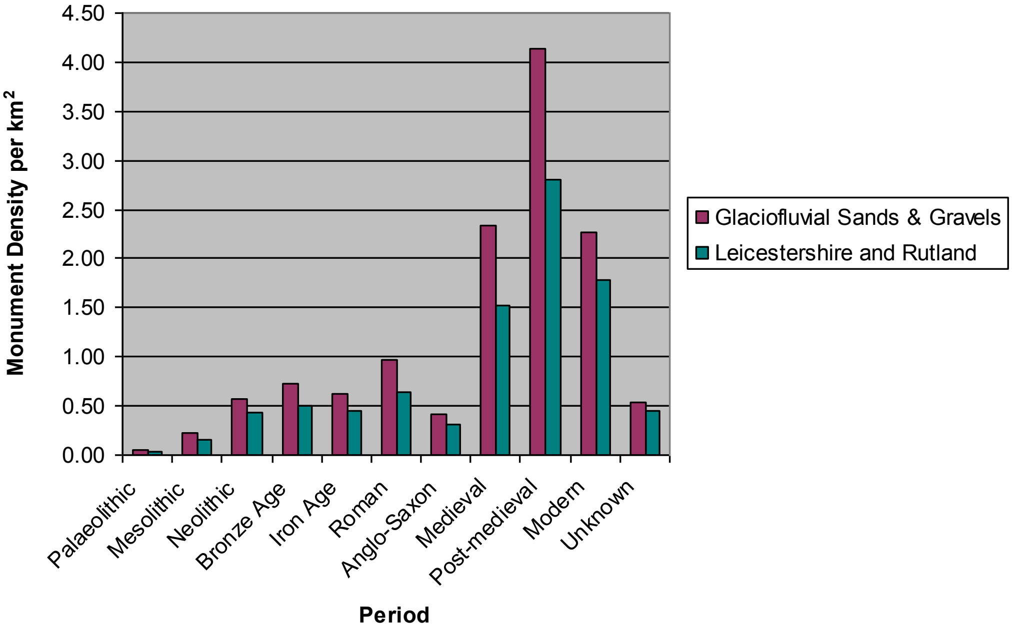

Figure 28 Density of monuments and find spots recorded on HER for the Glaciofluvial Sands and Gravels ACA compared to the whole project area

8.4.3 PAS Data

PAS information for the Glaciofluvial Sands and Gravels ACA (Figure 29) shows the density of findspots to be 4.6 per km^2 which may be compared to3 per km^2 for the project area as a whole. PAS finds for the Roman period are recorded at a significantly higher density level than for the project area as a whole, 2.4 per km^2 compared to 1.4 per km^2, which to a large extent may be attributed to the presence of the Roman small town of *Vernemetum* which form a hotspot for activity from metal detectorists.

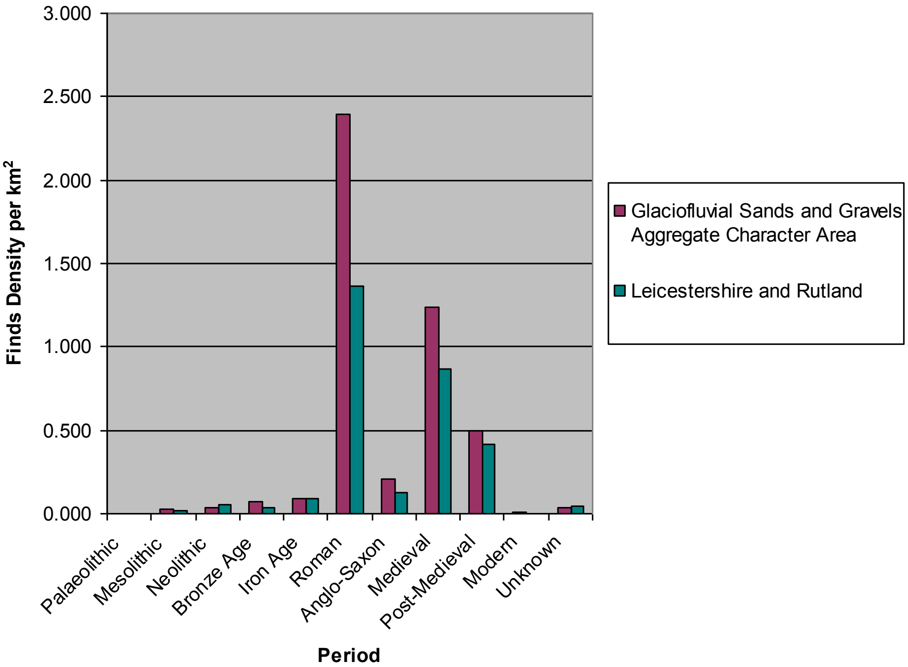

Figure 29 Density of find spots recorded through PAS for the Glaciofluvial Sands and Gravels ACA compared to the whole project area

9 Research Agenda and Strategy

9.1 Introduction

A Research Agenda and Strategy has been developed for each archaeological period, with the aim of creating a format that will permit easy comparison between each of the Aggregate Character Areas. Agenda priorities have been defined by reference to the regional research priorities outlined in *East Midlands Heritage: A Research Agenda and Strategy for the Historic Environment of the East Midlands* (Knight, Vyner and Allen, forthcoming), but with due regard also to issues which are of particular relevance to Leicestershire and Rutland. In this latter identification of domestic settlement site and the transition from a dispersed pattern of hamlets and farmsteads, to one focused on the nucleated settlement. Correlations have been noted with the Agenda priorities identified in the East Midlands *Research Agenda and Strategy* (abbreviated EMRS). It is hoped that this will expedite correlation with English Heritage research priorities (SHAPE 2008) and with other period and subject research strategies.

Strategy and Agenda priorities for each archaeological period are summarised on a single table, permitting easy correlation between Agenda priorities and proposed Strategies (denoted by a filled circle symbol). A distinction has been drawn between Strategies that may be applied broadly and those that are specific to a particular Character Area.

9.2 PALAEOLITHIC (c. 950KYA - c. 9701 BP)

AGENDA PRIORITIES / **STRATEGIES**	**9.1.1: Evidence base:** Identify and characterise evidence of Lower Palaeolithic, Mousterian and Upper Palaeolithic occupation and utilisation of the project area.	**9.1.2: Shelter from the storm**: Seek evidence for cave, rock shelters and open sites – compare and contrast, prioritising potential for *in situ*, sealed deposits.	**9.1.3: Environments:** Developer our understanding of contemporary Palaeolithic physical and natural environments	**9.1.4: Changing communities**: Investigate evidence for Upper Palaeolithic to Mesolithic transition
	EMRS: 1.1.1-4, 1.2.1-4, 1.4.1-2, 1.5.1, 1.5.2	EMRS: 1.3.1, 1.3.2, 1.4.3	EMRS: 1.5.1-3	EMRS: 1.4.1-2, 1.4.4, 1.4.8
ALL AGGREGATE CHARACTER AREAS				
A. Ensure appropriate assessment of Palaeolithic potential, including consideration of deposit geomorphology as well as available archaeological and palaeoecological data.	●	●	●	●
B. Assess potential for preservation of organic and palaeoenvironmental remains and implement appropriate targeted mitigation	●	●	●	●
C. Locate and investigate finds scatters indicative of open-air sites by fieldwalking, test-pitting and detailed investigation prior to quarrying	●	●		●
D. Conduct typological and trace element analyses of lithic artefacts	●	●		●
FLUVIAL SANDS AND GRAVELS				
E. Identify and establish the character and potential of pre-Anglian Bytham river deposits (e.g. Brooksby deposits), undertake appropriate targeted monitoring during extraction of Brooksby and related sediments	●	●	●	
F. Assess potential for palaeochannels and sites/remains sealed by alluvial cover	●	●	●	
GLACIOFLUVIAL SANDS AND GRAVELS				
G. Prioritise prospection for buried sites beneath and adjacent to Lake Harrison and sealed by glacial Oadby tills, colluvial and alluvium in valley bottoms and investigate buried deposits	●	●	●	
LEICESTERSHIRE AND RUTLAND LIMESTONE				
H. Investigate potential for preservation of open site and environmental deposits trapped by faulting, gulling or fracturing of slope edges, e.g. 'sackung' process	●	●	●	●
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS				
J. Prospect of cave and rock shelters, and buried sites sealed by talus deposits around the upland outcrops of Charnwood and the Upper Soar.	●	●		●
K. Investigate topographical prominent locations for open sites, etc.	●	●		●

9.3 MESOLITHIC (c. 9700 BP - c. 4001 cal. BC)

AGENDA PRIORITIES / STRATEGIES	**9.2.1: Chronology and change:** Investigate evidence for intra and extra Mesolithic transition	**9.2.2:** Characterise at a regional and local –scale, the distribution, morphology, functions, density and topographic location of occupationand activity sites over time.	**9.2.3: Artefact typologies:** Review and refine lithic artefact typologies and chronology. Consider relationships with environment and resources	**9.2.4: Environments:** Identify and target potential for environmental preservation, consider both direct evidence of human exploitation and impact of/on changing environments.
	EMRS: 2.1.1-3	EMRS: 2.2.2-3, 2.3.2-5	EMRS: 2.4.1-4, 2.5.2-3	EMRS: 2.6.1-3
ALL AGGREGATE CHARACTER AREAS				
A. Establish the topographic and environmental potential for the presence of deposits with an enhanced likelihood of preserving Mesolithic remains, e.g. areas of colluvial or alluvial cover, etc.	●	●	●	●
B. Ensure use of appropriately design fieldwork strategies (e.g. strip, map and sample) to identify and characterise discrete and ephemoral archaeological evidence, with dating by finds associations, radiocarbon (organics) and OSL (sediments).	●	●	●	●
C. Study existing lithic collections and encourage collection of additional material with specifically designed systematic fieldwalking and test-pitting.	●	●	●	●
D. Prioritise isotope analyses of human bone.	●	●		●
FLUVIAL SANDS AND GRAVELS				
E. Prioritise fieldwalking of gravel terraces overlooking the river	●	●		
F. Analyse organic deposits from palaeochannels and buried land surfaces yielding environmental remains.	●	●		●
GLACIOFLUVIAL SANDS AND GRAVELS				
G. Prioritise fieldwalking of gravel deposits, especially where capping ridge, top or promontory locations	●	●		
LEICESTERSHIRE AND RUTLAND LIMESTONE				
H. (as G above) Evaluate the potential for the presence of fissures, sinkholes and caves, with the possibility of containing or trapping artefact assemblages, etc.	●	●		●
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS				
J. Colluviated slopes, 'ancient' woodlands and heath, protected from ploughing, may preserve well preserved sites, such location should be prioritised during assessment and evaluation.	●	●		
K. Elevated locations may have been preferentially utilised as vantage points to overlook the surrounding landscape; such locations should be during assessment and evaluation.	●	●		

9.4 NEOLITHIC TO MIDDLE BRONZE AGE RESEARCH AGENDA AND STRATEGY (c. 4000-cal. BC – 1151 cal. BC)

AGENDA PRIORITIES / **STRATEGIES**	**9.3.1: Chronology:** develop existing chronological frameworks, examining transitions both within and between periods.	**9.3.2: Agriculture and landscape exploitation:** Establish the framework for the introduction and development of agriculture, assess evidence of regional patterns of exploitation	**9.3.3: Monuments and funerary practice**: elucidate further the development of monumental landscapes and the County's evolving funerary and ceremonial traditions	**9.3.4: Settlement pattern:** identify and characterise settlement, form, function, etc., including consideration of change of time and regional variation.
	EMRS: 3.1.1-4, 3.2.1-2	EMRS: 3.3.1-4, 3.4.1-3, 3.9.1-2	EMRS: 3.6.1-4, 3.7.1-3, 3.8.2, 3.9.3	EMRS: 3.5.1-4, 3.8.1
ALL AGGREGATE CHARACTER AREAS				
A. Utilise effect prospection strategies, e.g. air photographic analysis, utilisation and commissioning of LiDAR data, dedicated fieldwalking and test pitting programmes		●	●	●
B. Develop and apply considered strategies for the location, investigation and recording of archaeological evidence, e.g. archaeological control and supervision of soil stripping.		●	●	●
C. Target flint scatters to elucidate their character and date, reviewing existing lithic collections	●	●		●
D. Undertake isotope analyses of human bone and selected animal bone.	●	●	●	●
E. Undertake scientific dating, especially of otherwise undated features, and Bayesian modelling of radiocarbon dating.	●	●	●	●
F. Maximise retrieval of metalwork by application of metal detectors to conveyor belts	●		●	
FLUVIAL SANDS AND GRAVELS				
G. Target, investigate and analyse organic deposits from palaeochannels and other wetland contexts	●	●		
H. Undertake targeted fieldwalking of gravel terraces and valley edge sites	●	●		●
GLACIOFLUVIAL SANDS AND GRAVELS				
I. Ensure fieldwalking and aerial photograph analysis are undertaken as a matter of routine.	●	●	●	●
LEICESTERSHIRE AND RUTLAND LIMESTONE				
J. Target areas of sinkholes, fissures to evaluate potential for holding trapped or deliberately deposited remains	●	●	●	●
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS				
K. Encourage the use LiDAR survey and analysis, particularly over wooded and uncultivated areas to aid in the identification of earthwork remains. Consider use of test-ptting as mechanism for testing pasture/grassland.	●	●	●	●
L. In Charnwood Forest investigate areas of rock outcrop for evidence of axe industry, burial, or buried landsurfaces	●	●	●	●

9.5 LATE BRONZE AGE AND IRON AGE RESEARCH AGENDA AND STRATEGY (c.1150-cal BC - AD42)

STRATEGIES / AGENDA PRIORITIES	**9.4.1: Settlement:** .can we improve upon our understanding of the character of settlements from this period; most specifically their form, functions and spatial interrelationships of unenclosed settlements. Why were settlements increasingly enclosed during this period and can we understand further the progress towards nucleation?	**9.4.2: Fields and boundaries:** when and how may field and boundary systems have developed and what were the processes underlying this development? Can we understand the economic, social or political functions of pit alignments and linear systems?	**9.4.3: Environmental and agrarian change:** is it possible to improve on our understanding of the processes of woodland clearance and agricultural intensification? Can analyses of palaeochannel and other organic deposits contribute to studies of the developing agrarian economy and its impact upon the landscape?	**9.4.4: Ritual and Ceremony:** can we shed further light upon developing funerary and ritual traditions? How may studies of boundaries within, around and between settlements contribute to our understanding of votive and structured deposits?
	EMRS: 4.2-4.5, 4.10	EMRS: 4.6	EMRS: 4.8	EMRS: 4.7
ALL AGGREGATE CHARACTER AREAS				
A. Identify, date and characterise fields and linear boundaries by strip, map and sample.	●	●	●	●
B. Maximise opportunities for location and analysis of waterlogged and other organic deposits, with adherence to current guidelines.	●	●	●	●
C. Promote routine scientific dating especially Bayesian modelling of radiocarbon dates.	●	●	●	●
D. Ensure effective characterisation of the Late Bronze Age to Early Iron Age settlement resource through the routine use of strip, map and sample methodologies.	●	●	●	
E. Promote the study of artefact production and distribution.				
FLUVIAL SANDS AND GRAVELS				
F. Prioritise identification, sampling and dating of palaeochannels and sub-alluvial land surfaces yielding environmental data.			●	
G. Promote excavation of areas that have the potential to elucidate the development and function of secondary urban centres.	●			●
H. Prioritise large-scale excavations of nucleated settlements and field systems	●	●		
GLACIOFLUVIAL SANDS AND GRAVELS				
H. Ensure fieldwalking, aerial photograph analysis and woodland surveys are undertaken as a matter of routine.	●	●	●	●
LEICESTERSHIRE AND RUTLAND LIMESTONE				
I. Enhance the relatively poor settlement data for this ACA through the promotion of further aerial survey, air photograph study, and woodland surveys, and by close monitoring of all topsoil/subsoil strips.	●	●	●	●
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS				
J. Promote further earthwork surveys across Charnwood Forest particularly in woodland and areas that have avoided arable cultivation.	●	●	●	●
K. Encourage the use LiDAR survey and analysis, particularly over wooded and uncultivated areas to aid in the identification of earthwork remains.	●	●	●	●

9.6 ROMANO-BRITISH RESEARCH AGENDA AND STRATEGY (AD43-c. 410)

AGENDA PRIORITIES / STRATEGIES	**9.5.1: Settlement:** .can we discover more about the foundation of extramural settlements adjacent to early forts? What were the effects of the Conquest upon rural settlement and the landscape? Can we elucidate upon the nature of settlement hierarchy and developed our understanding of the relationship between farmsteads, rural settlements, villas, estates and towns?	**9.5.2: Fields and boundaries:** how did field boundary systems relate to earlier systems of land allotment; is it possible to identify continuity or dislocation of boundary networks over time?	**9.5.3:. Environmental and agrarian change:** is it possible to improve our understanding as to how integration into the Roman Empire affected the agrarian economy, including the introduction of new crops, herbs and fruits? Can analyses of palaeochannel, and other organic deposits, contribute to studies relating to the changing agricultural economy and the landscape impact of agrarian and climate change?	**9.5.4: Industry, trade and communications:** is it possible to gain a clearer understanding of Leicestershire and Rutland's industrial economy and its standing within a wider regional context? Can we develop a robust chronology of road construction and form a better understand as to how rivers and waterways integrated with the new road network?
	EMRS: 5.3, 5.4	EMRS: 5.4.4	EMRS: 5.5	EMRS: 5.6, 5.7
ALL AGGREGATE CHARACTER AREAS				
A. Focus resources upon identification of Roman field systems and targeted excavation to establish their character and development.	●	●	●	
B. Focus upon the locating of structural remains and finds that will inform understanding of industrial developments and undertake appropriate specialist analysis.	●			●
C. Promote routine scientific dating especially Bayesian modelling of radiocarbon dates.	●	●	●	●
D. Prioritise location of organic sample in waterlogged contexts and contexts beneath alluvium, colluvium and coversands, and ensure systematic sampling and analysis.	●	●	●	
FLUVIAL SANDS AND GRAVELS				
E. Prioritise identification, sampling and dating of palaeochannels in major river valleys.			●	
F. Prioritise excavation of areas that have the potential to elucidate the development and function of secondary urban centres.	●			●
G. Prioritise large-scale excavations of nucleated settlements and field systems	●	●		●
GLACIOFLUVIAL SANDS AND GRAVELS				
H. Ensure fieldwalking, aerial photograph analysis and woodland surveys are undertaken as a matter of routine.	●	●	●	●
LEICESTERSHIRE AND RUTLAND LIMESTONE				
I. Enhance the relatively poor settlement data for this ACA through the promotion of further aerial survey, air photograph study, and woodland surveys, and by close monitoring of all topsoil/subsoil strips.	●	●	●	●
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS				
J. Promote further earthwork surveys across Charnwood Forest particularly in woodland and areas that have avoided arable cultivation.	●	●	●	●
K. Encourage the use Lidar survey and analysis, particularly over wooded and uncultivated areas to aid in the identification of earthwork remains.	●	●	●	●

9.7 EARLY MEDIEVAL RESEARCH AGENDA AND STRATEGY (AD411-c. 1066)

AGENDA PRIORITIES / STRATEGIES	**9.6.1: Settlement patterns:** .can we discover more about the foundation of extramural settlements adjacent to early forts? What were the effects of the Conquest upon rural settlement and the landscape? Can we elucidate upon the nature of settlement hierarchy and developed our understanding of the relationship between farmsteads, rural settlements, villas, estates and towns?	**9.6.2: Ritual and belief:** Can we shed light on developing burial traditions and enhance our understanding of the changing demography and developing pagan and Christian rituals and belief?	**9.6.3**: **Agricultural landscape and economy:** can we trace the later history of the rectilinear field systems that developed during the Roman period and the growth of the open field system, and how may agricultural practices havechanged over time?	**9.6.4: Industry, trade and communications:** can we provide further information on the development of trade and industry, and in particular the role of the Trent as a communications route and socio-economic divide?
	EMRS: 6.4	EMRS: 6.1 and 6.2	EMRS: 6.7	EMRS: 6.3, 6.6
ALL AGGREGATE CHARACTER AREAS				
A. Undertake systematic fieldwalking, metal detecting and test-pitting to locate activity foci.	●			
B. Routinely undertake strip, map and sample to locate settlements, fields and funerary sites.	●	●	●	●
C. Survey ridge and furrow prior to extraction and ensure retrieval of finds from furrow fill during excavation.	●		●	
D. Focus upon identification and analysis of structural remains and finds elucidating cultural links, industrial development and trading networks.	●			●
E. Ensure routine scientific dating, particularly of excavated material spanning the poorly understood sub-Roman period.	●	●	●	●
F. Collect organics from appropriate contexts; ensure systematic sampling, dating and analysis.			●	
G. Ensure excavation of parish boundaries and linear earthworks possibly dating from this period.	●		●	
FLUVIAL SANDS AND GRAVELS				
E. Prioritise identification, sampling and dating of palaeochannels in major river valleys.			●	
F. Target assessment and evaluation of river valley terraces, edges and associated tributaries.	●			●
GLACIOFLUVIAL SANDS AND GRAVELS				
H. Ensure fieldwalking, aerial photograph analysis and woodland surveys are undertaken as a matter of routine.	●		●	●
LEICESTERSHIRE AND RUTLAND LIMESTONE				
I. Enhance the relatively poor settlement data for this ACA through the promotion of further aerial survey, air photograph study, and woodland surveys, and by close monitoring of all topsoil/subsoil strips.	●		●	●
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS				
J. Promote further earthwork surveys across Charnwood Forest particularly in woodland and areas that have avoided arable cultivation.	●		●	●

9.8 MEDIEVAL RESEARCH AGENDA AND STRATEGY (1067 – 1539)

AGENDA PRIORITIES / **STRATEGIES**	**9.7.1: Settlement:** .can we improve further on our understanding of the processes contributing to the growth of nucleated villages and parishes, moated and other manorial sites, dispersed hamlets and farms. We also need to improve our knowledge in relation to the form evolution and functions of associated buildings, and the processes of desertion and shrinkage.	**9.7.2: Agrarian landscape and economy:** can we elucidate further upon the origins and development of the open field systems and its impact upon the agrarian economy and its effects in relation to the management and extent of woodland. How did trends and practices differ within the project area across varying, geologies, soils and topographies?	**9.7.3: Ecclesiastical estates:** can we elucidate further the development of later monastic settlements and their hinterlands? What impact and influence did monastic sites have upon the economy and landscape of the surrounding area and did this impact vary between the various monastic orders? Can analysis of cemetery populations shed light on any variations in diet, mortality and other demographic variables both with the region and between social groups?	**9.7.4: Industry, trade and communications:** can we improve upon our understanding of the production and distribution of pottery and other industrial or agricultural products and how this related to the developing communications network.
	EMRS: 7.2.1-4, 7.3.1-5	EMRS: 7.7.1-6	EMRS: 7.5.1-2, 7.5.6	EMRS: 7.6.1-4
ALL AGGREGATE CHARACTER AREAS				
A. Carry out desk-base assessments of documentary, cartographic, aerial photography and Lidar information to identify surviving ridge and furrow and the extents of medieval settlements and their field systems.	●	●	●	
B. Conduct systematic surveys of ridge and furrow and ensure retrieval of finds from furrow fill during excavation to clarify dating	●	●	●	
C. Carry out systematic fieldwalking to improve our understanding of spatial variations in settlement patterns and land-use.	●	●	●	
D. Identification and analysis of structural remains and finds should be made a priority so as to facilitate a clearer understanding of industry and trade.	●		●	●
E. The collection of environmental data and the provision of resources for dating and analysis should be ensured and facilitated as a matter of routine.	●	●	●	
F. Carry out targeted excavations of linear earthworks and cropmarks marking parish, county or other medieval boundaries.	●			
FLUVIAL SANDS AND GRAVELS				
G. Monitor extraction of river gravels for buried fishweirs, bridges, bankside revetments watermills *etc*.		●		●
GLACIOFLUVIAL SANDS AND GRAVELS				
H. Ensure fieldwalking, aerial photograph analysis and woodland surveys are undertaken as a matter of routine.	●	●	●	●
LEICESTERSHIRE AND RUTLAND LIMESTONE				
I. Ensure fieldwalking, aerial photograph analysis and woodland surveys are undertaken as a matter of routine.	●	●	●	●
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS				
J. Carry out earthwork surveys across the Charnwood Forest area	●	●	●	●

9.9 POST-MEDIEVAL AND MODERN RESEARCH AGENDA AND STRATEGY (1540 TO PRESENT)

STRATEGIES / AGENDA PRIORITIES	**9.8.1: Settlement:** .can we enhance our understanding of settlement patterns associated with the rural poor, for example evidence for squatter settlement on common land. How did agricultural improvements influence the pattern of settlement beyond the village cores and is it possible to identify variations in the pattern of rural vernacular architecture?	**9.8.2: Agrarian landscape and economy:** can we improve upon our understanding of the early landscapes of enclosure. How did Parliamentary enclosure and other agricultural improvements such as water management and drainage schemes impact upon the rural landscape.	**9.8.3: Parks & gardens:** can we elucidate further our understanding of the use of social space across the landscape, the manipulation of vistas and the integration of gardens within the wider landscape? How have recreational activities including gentry pursuits, such as fox hunting and games shooting, impacted upon the landscape?	**9.8.4: Industry, trade and communications:** what were the affects of industrialisation upon the rural landscape? Can we enhance our knowledge of the extractive industries; can we identify surviving surface features and what relationship do these sites have to markets, settlements and transport?	**9.8.5: Military Sites:** How can we refine our knowledge of Civil War defences and siege works? How are military sites distributed across Leicestershire and Rutland and what has been their impact upon settlement development, landscape, industry and transport?	**9.8.6 Ecclesiastical and burials:** what impact did the Reformation have upon ecclesiastical buildings and monastic estates? Where extraction threatens chapels, graveyards and other burial sites can we ensure adequate recording?
	EMRS: 8.4.1-5, 9.1.1, 9.6.3	EMRS: 8.3.1-2, 9.6.2	EMRS: 7.5.1-2, 7.5.6	EMRS: 8.4.4-5, 9.1.1, 9.4.1-3, 9.7.2-5	EMRS: 8.7.1-2, 9.3.2-4	EMRS: 8.6.1-3, 9.3.2-4
ALL AGGREGATE CHARACTER AREAS						
A. Identify features in the landscape relating to agrarian improvements and the industrialisation of agriculture such as ridge and furrow earthworks formed by steam ploughing or water meadows.		●		●		
B. Identify surface features associated with the early extraction of rock and aggregate.				●		
C. Ensure survey and excavation of deserted or shrunken villages affected by extraction.	●	●				●
D. Record archaeological remains of industrial and other buildings outside villages						
E. Identify structural remains associated with the landless rural poor; for example in small irregular enclosures on the edges of common land, pastures and roads,	●					
F. Investigate how the use of enclosures varies both spatially and over time and identify areas of activity through systematic fieldwalking.	●	●		●		
FLUVIAL SANDS AND GRAVELS						
G. Monitor riverine areas for transport and industrial features including barges, wharves, weirs and mill or bridge foundations.				●		
GLACIOFLUVIAL SANDS AND GRAVELS						
H. Prioritise fieldwalking, aerial photograph analysis and woodland surveys.	●	●	●	●		
LEICESTERSHIRE AND RUTLAND LIMESTONE						
I. Prioritise survey of 20th century military sites and identify archaeological remains relating to Second World War airfields including footings for huts and hangers and runway dispersals.					●	
CHARNWOOD & UPPER SOAR IGNEOUS ROCKS						
J. Prioritise survey and recording of archaeological remains associated with extractive industries (e.g. what is the extent of mineral railways and how do they relate to the main public rail network?).				●		

10 Development Control Methodologies and Archaeological Mitigation Strategies

10.1 Introduction

The following section provides an overview of the archaeological development management strategies currently employed in Leicestershire and Rutland as they relate to minerals planning applications and the historic environment. The intention is to inform the relevant local planning authorities, minerals planners, operators, archaeologists and consultants, as to the likely archaeological approaches to the impact of extraction upon Leicestershire and Rutland's heritage assets and wider historic landscapes. It will also present an appraisal of particular assessment, evaluation and mitigation strategies applicable to specific aggregate minerals extraction contexts, including the acquisition of crushed hard rock aggregate (e.g. igneous granodiorites and sedimentary limestones), together with deeply and more shallowly buried sand and gravel aggregate resources. The information present will support the provision of a consistent, proportionate and evidence-based approach to archaeological investigation and facilitate both informed dialogue between the various stakeholders and support the decision-making process.

Both Leicestershire and Rutland's Minerals Planning Authorities take archaeological advice from the Principal Planning Archaeologist working within the Planning, Historic and Natural Environment Team, Leicestershire County Council. Advice offered is based upon relevant legislation, national, regional and local planning policy, as summarised above (*Minerals Planning in Leicestershire and Rutland*), together with professional best practice (Minerals and Historic Environment Forum, 2008), developing research agendas and local experience. In particular, current research agendas for the project area and the East Midlands are in preparation (Knight, Vyner, & Allen, in preparation) and will form the research context for the current document.

Despite the definition of specific assessment and evaluative techniques, in addition to mitigation responses, approaches to the archaeological management of minerals applications are not inflexible, particular approaches will be more or less suitable subject to local conditions, archaeological objectives and the development and application of new investigative techniques.

10.1.1 Background

In line with national planning policy and guidance, including PPS5 and its associated Practice Guide (English Heritage 2010), local minerals policy and specific minerals guidance (English Heritage 2008b, Knight & Vyner 2006), early consultation to assist in the definition and timely consideration of the archaeological implications of potential extraction is strongly advocated. It is highly likely that local planning authorities will require the submission of sufficient archaeological information to support the registration of minerals applications, (PPS5, HE6.1). In addition, planning authorities can expect to receive, or may request sufficient information in support of an application to inform their understanding of the implications of the scheme and to assist determination of the application. The assessment process is equally of central value in determining the developer's management of their archaeological risks and likely obligations.

The scope and character of the necessary assessment and evaluation of the application area should be discussed with the local authorities' archaeological curator, currently Leicestershire County Council's Principal Planning Archaeologist. In response a brief will be developed for the pre-determination archaeological investigation by the archaeological curator in discussion with the developer's archaeological representative and the planning authority. The minerals operator may employ either an archaeological consultant to draw up a detailed Written Scheme of Investigation (WSI) and tender documentation (to be sent to one or more archaeological contractors) or an archaeological contactor may be approached directly to draw up a detailed WSI. In either case the resultant documentation has to meet the requirements of the Brief and to be approved by the local planning authority as advised by their archaeological curator.

All archaeological work should be completed in accordance with the current edition of the *Guidelines and Procedures for Archaeological Work in Leicestershire & Rutland*, a document produced by the Historic & Natural Environment Team, Leicestershire County Council and in accordance with relevant Institute for Archaeology (IfA) Standards and Guidance (http://www.archaeologists.net/codes/ifa).

The completion of the assessment and evaluation allows archaeological matters to be taken into account when the application is subsequently determined. Although refusal on archaeological grounds is possible, it is more likely that any permission granted is likely to be subject to conditions designed to protect, manage and/or record the affected heritage assets. As at the pre-determination stage, the likely process will be for a Brief to be issued by the Principal Planning Archaeologist outlining the methods, approaches and sampling levels considered appropriate for mitigation of the development impact on archaeological remains, followed by the submission by the developer's archaeological practitioner of a detailed WSI. As mentioned above, all archaeological work will be expected to meet the provisions of the approved WSI, appropriate professional standards and the current requirements of the designated archive repository (e.g. The Transfer of Archaeological Archives to Leicestershire Museums, Arts and Records Service).

10.1.2 Assessment and Evaluation Strategies

Prior to the determination of a planning application information on the potential archaeological impact of the proposed work must be provided. This is in accordance with PPS5, the Leicestershire Minerals Development Framework, Rutland County Council’s Minerals Core Strategy and local development framework policies prepared or in preparation by the local planning authorities. The primary objective for this programme of work will be to provide an informed answer to several questions; whether there is an archaeological dimension to be considered in the determination of an application, what the scale and nature of that archaeological dimension is likely to be and whether this will need to be clarified and characterised through a process of further investigation.

Whilst it is acknowledged that such work will place a financial burden upon the developer before consent has been granted evaluation brings with it the advantage of reducing the level of uncertainty and risk once consent has been granted and consequently can help reduce costs at a later stage in the development process. The characterisation of the archaeological resource will normally be a staged process which will involve desk-based assessment, founded on data held within the Leicestershire & Rutland Historic Environment Record (HER), no-intrusive survey such as fieldwalking or geophysical survey and intrusive evaluation (auger or borehole survey, test pitting and/or trial trenching). The results gained from each stage will inform any subsequent work and will be included into the Environmental Impact Assessment (EIA) prepared in support of the minerals application. Detailed summaries of the various techniques available are presented in English Heritage’s published Practice Guide (English Heritage 2008b, p17-28) and are also outlined in (Knight and Vyner 2006) and include: aerial photography and LiDAR survey, desk-based assessment, fieldwalking, geophysical survey, geomorphological mapping, evaluation trenching and test pitting.

Broadly, the staged approach will typically comprise the following elements:

- A desk-based assessment (DBA) will be used to collate the already known information on the site and determine the most appropriate fieldwork approaches. Interpretation and consideration of the data should be informed by consultation with the Regional Research Agenda (Cooper 2006) and Research Strategy (Knight et al, 2012). See also above, Section 9, Tabls 9.2-9.9). The assessment will draw upon a range of sources including, as a minimum, the County Historic Environment Record (HER), Portable Antiquities Scheme (PAS) data, records held by the Leicestershire, Leicester & Rutland Record Office, relevant geological (British Geological Survey) and soils data, the results of a site visit/walkover survey, cartographic analysis and, on occasion, review and reappraisal of aerial photographic coverage.

- Upon completion of the DBA, non-intrusive field techniques are normally applied. Commonly applied approaches include walkover survey/site inspection, geophysical survey, fieldwalking and metal detecting.

Earthwork survey and building recording may also form part of the evaluation process or may be identified at a later stage within any mitigation strategy developed.

- These are followed by the use of intrusive field techniques; most commonly machine trenching but also potentially including use of test pitting and borehole/auger survey. It is critical at this early stage to consider and evaluate the palaeoenvironmental potential of the application area.

Throughout the process a series of reports should be produced gradually refining the understanding of the archaeological resource and the approaches to be taken in the next stage.

A final report should be produced to draw all of the information together from all stages of work undertaken. This should provide an assessment of the date, range, extents, character, survival and significance of archaeological deposits which might be present. Often the report will also identify some areas as having higher potential than others. This report should be capable of supporting production of any Environmental Impact Assessment/Environmental Statement which may be required for the site.

Based upon information contained in the final report it should be possible to determine an appropriate mitigation strategy for any archaeological remains which are likely to be present within any given proposed extraction area.

10.1.3 Mitigation Strategies

A range of mitigation strategies or outcomes may be recommended by the local authorities' archaeological advisor, from *in situ* preservation of remains of exceptional archaeological significance, through methods of archaeological mitigation by appropriate investigation and recording, to, in rare instances, no obligation where assessment has shown the proposal to have little or no archaeological implication. In the former case, it is possible that the requirement to protect and preserve significant archaeological remains may lead to a recommended that planning permission be refused. More commonly it might be recommended that an area of significant deposits is taken out of the application area or, some form of mitigation strategy to record archaeological deposits prior to extraction will be recommended. The proper fulfilment of the recommended mitigation strategy will then form a planning condition placed upon the application.

A broad range of mitigation strategies have been defined in the Practice Guide (English Heritage 2008b) including various levels and types of archaeological monitoring or attendance (a watching brief, archaeologically controlled overburden stripping), targeted archaeological investigation (area excavation), survey of earthworks, buildings or up-standing remains, palaeoenvironmental analysis, or programmes of *in situ* management of archaeological remains. Often a combination of these approaches will be identified as appropriate, depending upon the different archaeological requirements or the impacts of the mineral extraction. Contingency provisions are also commonly recommended as a matter of good practice and should be defined within the approved WSI; the requirement for such, reflecting the variable and often unpredictable nature of the archaeological resource. A further Brief will be issued detailing these requirements and again methods and sampling levels considered appropriate will be outlined. As during the evaluation, the minerals operator may use either an Archaeological Consultant or go directly to an Archaeological Contactor. In either case, once again the resultant documentation has to meet the requirements of the Brief and to be approved by the planning authority. Mitigation measures will also include provision for appropriate levels of post-excavation assessment and analysis of the fieldwork results, preparation of specialist and publication reports and the deposition of the project archive.

Predominantly, the archaeological methods and approaches employed in relation to minerals planning follow those currently in use for all types of intrusive development. It should, however, be noted that the particular character of the archaeological resource encountered in the context of minerals applications, notably glaciofluvial sands and gravels, but also river terrace deposits and fissured limestone landscapes, offer rare archaeological opportunities and pose particular challenges to the identification and management of the resource. Furthermore the potential scale of minerals extraction and necessarily wholly destructive nature of the operation to archaeological deposits single them out from many other development types. A range of methods may be considered and these are outlined below for crushed hard rock aggregates and sand and gravel, including both shallow and deeply buried deposits.

10.1.4 Archaeological Methodologies

In the majority of circumstances significant archaeological deposits can be expected to occur within the overburden deposits sealing workable aggregate minerals. Methodologies for assessment and evaluation of such deposits, whether associated with sand and gravel deposits, or hard rock aggregate, are well established and routinely deployed in a wide range of development management contexts. Given the particular characteristics of minerals extraction, chiefly the extensive area of impact and the largely comprehensive removal of affected archaeological remains, mitigation strategies, however, may differ in extent, duration and objective.

As discussed above, techniques of assessment and evaluation encompass a staged programme of works, broadly iterative in their character, refining an appreciation of the likely archaeological implication of a specific development proposal and honing the scope and character of any necessary archaeological mitigation. The starting point will routinely be the desk-based assessment, drawing upon available data including: consideration of the results of the present study, details of the proposed minerals scheme, available and/or commissioned aerial photography (AP) and other remote sensing techniques such as LiIDAR data. Early consideration of geotechnical data is considered essential to understand the physical characteristics of the chosen extraction area. Where the extraction of fluvial sands and gravels is proposed, AP, LiDAR and geotechnical data may prove especially valuable in assessing the archaeological and palaeoenvironmental potential of the site and targeting further stages of intrusive evaluation. Given the landscape scale of many aggregate minerals applications and their impact, consideration should be given to available Historic Landscape Character analysis to facilitate the contextual framing of the scheme and, especially, to inform the development of site restoration proposals. At this early stage, it may also be relevant to consider gathering hydrological and soil chemistry data to support the *in situ* management of archaeological remains.

The employment of non-intrusive and intrusive evaluation techniques will be informed by consideration of the results of the desk-based assessment. Recent assessment of evaluation techniques (Hay & Lacey 2001), whilst emphasising the particular effectiveness of trail trenching, underlined the value of applying multiple techniques to the assessment of archaeological potential and responding flexibly to the nature of development impact (ibid. p61-63). Experience in Leicestershire and Rutland, in line with national guidance (English Heritage 2008a), broadly indicates the value of geophysical survey, particularly comprehensive detailed gradiometry. However, other techniques including earth resistance and ground-penetrating radar are applicable. Fieldwalking represents the second most common approach to non-intrusive survey and is particular valuable as a means of recovering evidence for earlier prehistoric (Palaeolithic, Mesolithic, Neolithic and Early Bronze Age) activity and occupation; again field methodologies (e.g. transect separation) should be designed to address the anticipated archaeological results, for example, by including capacity to intensify sample density to respond to field results. Other non-intrusive survey techniques may include metal detecting and walkover survey.

Intrusive investigation should be informed by the preceding phase of archaeological investigation. Techniques applicable include trial trenching, test pitting, auger and borehole survey, objectives should including both buried archaeological and palaeoenvironmental remains. Analysis of trenching strategies suggests that sample percentages should be chosen to reflect the nature of the anticipated archaeological resource and the questions posed by the planning process. Consequently, if earlier prehistoric or Anglo-Saxon archaeological remains are anticipated, sample percentage and intensity should be increased to reflect the dispersed and artefactually poor character of the resource. Similarly in relation to the planning process, the planning authority should be able to demonstrate that all reasonable steps have been taken to establish that no archaeological remains worthy of preservation *in situ* will be, or are likely to be, affected by the proposed extraction (English Heritage 2008b, para. 62). Hay and Lacey note that conventional trenching strategies representing less than 4% of the total development area run the risk of failing to adequately establish the archaeological significance of the project area. However, evaluation methodologies combining a range of evaluative techniques, programmes with allowance made for contingent trenching and/or two-stage programmes may be more effective (Hay & Lacey 2001, p62).

Other intrusive techniques include test-pitting (sieved), auger and borehole sampling. All may be employed for a variety of reasons, including artefact presence and density (where fieldwalking cannot be undertaken), palaeoenvironmental assessment, sediment analysis and geomorphological modelling. In each instance the requirement for and the character of such surveys will be informed by the initial desk-based assessment and subsequent analysis, particularly of AP and LIDAR data (English Heritage 2008b, para. 100-103).

Following completion of an evaluation, a range of mitigation strategies may be recommended depending upon the potential significance and extent of the archaeological resource predicted through the evaluative process. These may include the following: excavation, strip map and sample excavation, contingent recording, archaeological attendance (a watching brief); earthwork survey and building survey. In the light of the recognised unpredictability of the archaeological resource, contingencies (both time and resources) are also commonly required to enable unexpected discoveries to be adequately recorded.

In Section 9 above an outline has been provided of the range of assessment, evaluation and mitigation techniques that should be considered for a variety of the monument types found to occur within the Aggregate Character Areas; this section aims to consider the range of techniques available when formulating Assessment, Evaluation and Mitigation strategies across different landforms and the most appropriate stage in the development process for their use. A tabular format has been used and adopts the methodologies used in Derbyshire and the Peak District (Brightman, J. and Waddington, C. 2011) and in Nottinghamshire (Knight, D. et al, 2011).

The documents *Mineral Extraction and Archaeology: A Practice Guide* produced by the Minerals and Historic Environment Forum (2008) and *Making Archaeology Matter* (Knight, D. and Vyner, B. 2007) both contain summaries of the techniques referred to in Table 19 below.

Table 19 distinguishes between five groups of technique:

1. Non-intrusive and intrusive techniques should always be considered at the Pre-Determination assessment and evaluation stages (e.g. documentary research fieldwalking and augering).
2. Techniques, such as earthwork survey, that may be recommended not only during Pre-Determination assessment and evaluation but also Post-Determination mitigation (e.g. earthwork surveys).
3. Techniques restricted to Post-Determination mitigation (e.g. full excavation of strip map and sample.
4. Preservation *in situ*, which may be recommended at any stage of the development process, and in cases of sites of undoubted national importance, may be recommended without a requirement for assessment.
5. Post-fieldwork techniques, which depending upon their character can occur at a variety of stages in the development process.

The unique set of circumstances relating to individual sites require that each should be treated on its own merits and consequently there are no hard and fast rules as to when particular techniques are employed since such a choice relates directly to prevailing ground conditions, setting and the details of the proposal. Use of a simple staged approach has been avoided in favour of providing a clear definition of the techniques to be considered and the various stages when they might be employed. It should be emphasised that many of the assessment and evaluation techniques outlined in Table 19 may also be recommended during mitigation, depending upon the character of the site (e.g. further geophysical or earthwork surveys), and a simple distinction between assessment, evaluation and mitigation methodologies cannot be made.

Table 19 Suitability of archaeological assessment, evaluation and mitigation techniques in relation to different landform elements

Appropriate Techniques	Pre-Determ-ination	Post-Determ-ination	Archive & analysis	Fluvial & Glaciofluvial Sands & Gravels	Leics. & Rutland Limestone	Charnwood & Upper Soar Igneous Rocks	Till	Alluvium	Palaeo-Channel
1. Assessment, Evaluation and Mitigation									
a. Non-intrusive:									
Desk-based assessment, comprising (but not limited to) the following:									
Air photograph coversearch	●		●						
Air photograph transcriptions	●		●						
Cartographic search (including historic and geological mapping)	●		●						
Documentary search (including Leicestershire and Rutland HER)	●		●						
LiDAR search and mapping	●		●						
Palaeochannel plotting	●		●						
Place-name study	●		●						
Portable Antiquities Scheme data	●		●						
Walkover survey	●		●						
Airborne remote sensing	●		●						
Earthwork survey	●	●	●						
Ground based geophysical survey	●	●	●						
b. Intrusive									
Augering	●	●	●						
Fieldwalking	●	●	●						
Geomorphological mapping from augering etc	●	●	●						
Palaeoenvironmental sampling and analysis	●	●	●						
Test-pitting	●	●	●						
Trial trenching	●	●	●						

Appropriate Techniques	Pre-Determ-ination	Post-Determ-ination	Archive & analysis	Fluvial & Glaciofluvial Sands & Gravels	Leics. & Rutland Limestone	Charnwood & Upper Soar Igneous Rocks	Till	Alluvium	Palaeo-Channel
2. Mitigation									
Any combination of the above, plus:									
Preservation *in situ*	●	●	●						
Full (100%) excavation		●	●						
Sample excavation(defined sampling strategy)		●	●						
Strip, Map and Sample (defined sampling strategy)		●	●						
Continuous programme of archaeological attendance for inspection and recording		●	●						
Intermittent programme of archaeological attendance for inspection and recording		●	●						
3. Post-Fieldwork:									
Assessment of finds, environmental remains, etc.	●	●	●						
Updated Project Design		●	●						
Finds analysis		●	●						
Palaeoenvironmental analysis		●	●						
Illustrations		●	●						
Report	●	●	●						
Archive preparation	●	●	●						
Archive deposition	●	●	●						

Very Useful   Moderately useful   Limited use   Not appropriate

List of Abbreviations

ADS	Archaeology Data Service
ARA	Archaeological Resource Assessment
ALSF	Aggregates Levy Sustainability Fund
BGS	British Geological Survey
DCMS	Department for Culture Media and Sport
DEFRA	Department for Environment Food and Rural Affairs
DPD	Development Plan Document
EA	Environment Agency
EIA	Environmental Impact Assessment
FLO	Finds Liaison Officer
GIS	Geographical Information System
HBSMR	Historic Buildings, Sites and Monuments Record
HER	Historic Environment Record
HLC	Historic Landscape Characterisation
IDO	Interim Development Order
LCA	Landscape Character Area
LDF	Local Development Framework
LMDF	Leicestershire Minerals Development Framework
MCA	Minerals Consultation Area
MDF	Minerals Development Framework
MPA	Mineral Planning Authority
MPS1	Minerals Policy Statement 1
NMP	National Mapping Programme
NMR	National Monuments Record

ONS	Office for National Statistics
PAS	Portable Antiquities Scheme
RCHME	Royal Commission on the Historical Monuments of England
SMR	Sites and Monuments Record

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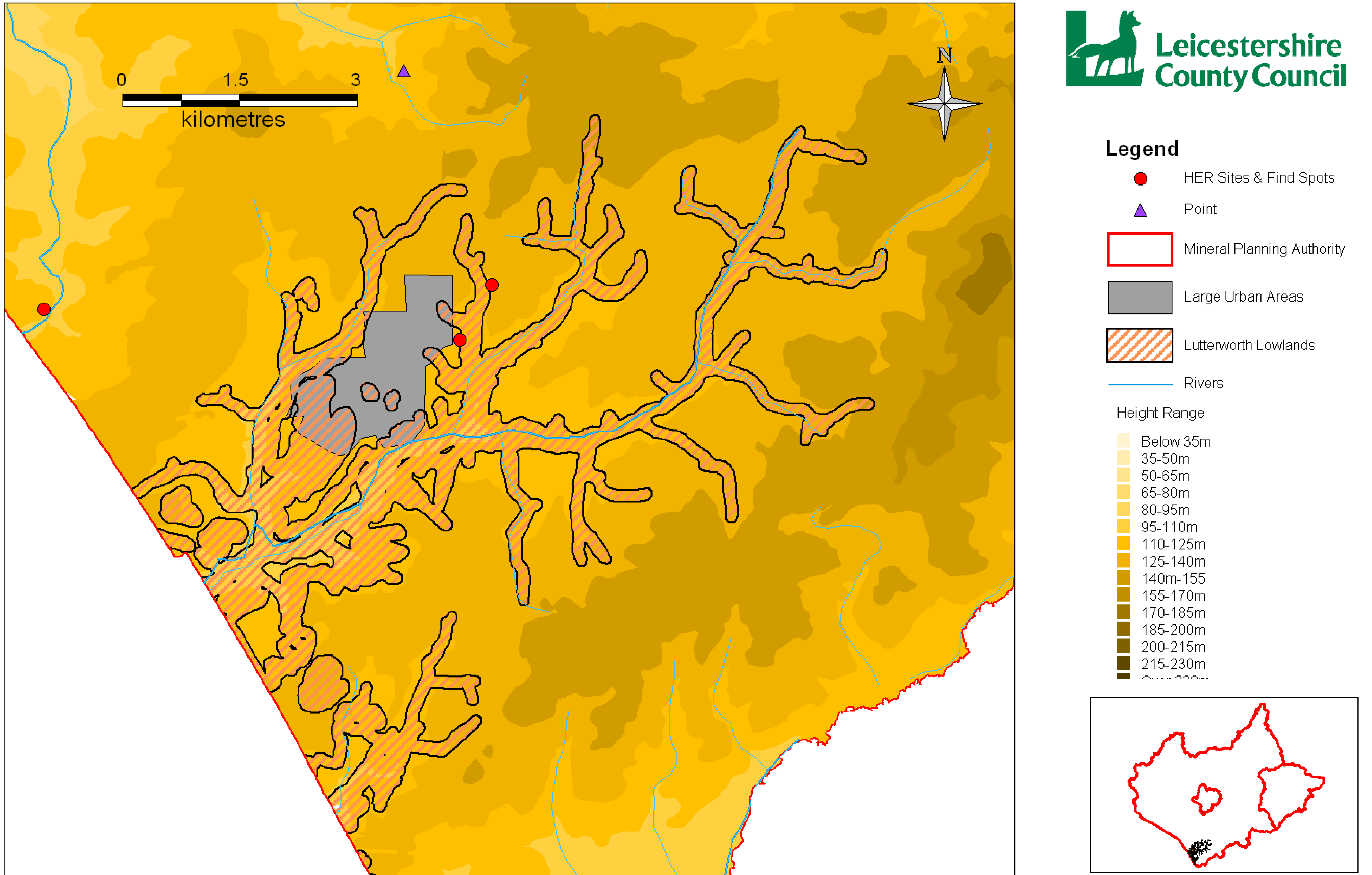
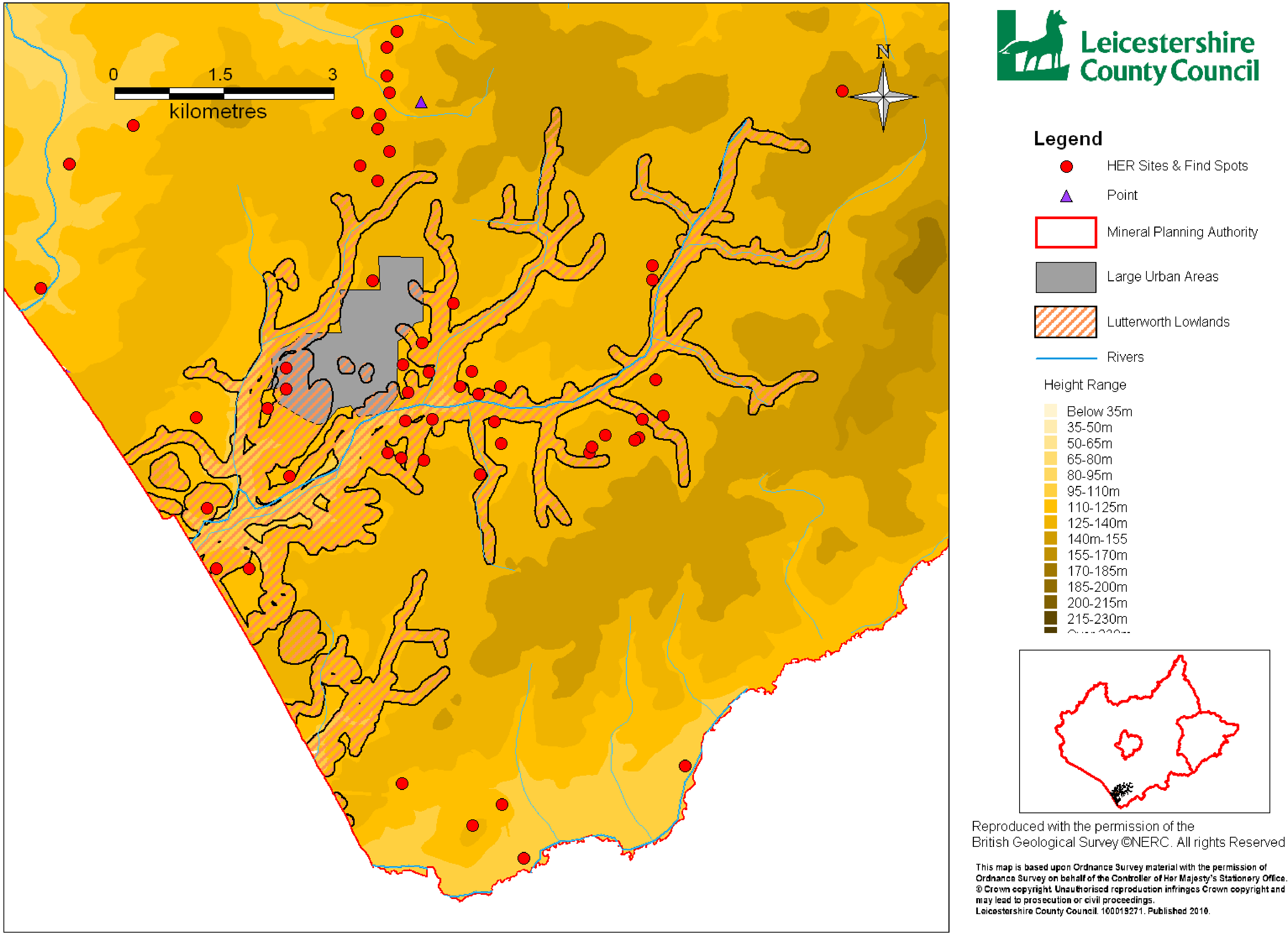
Appendix 1: Distribution Maps by Period of HER and PAS Records for the Fluvial Sands and Gravels Sub Areas



Lowlands ARA Sub Area Palaeolithic Sites and Findspots



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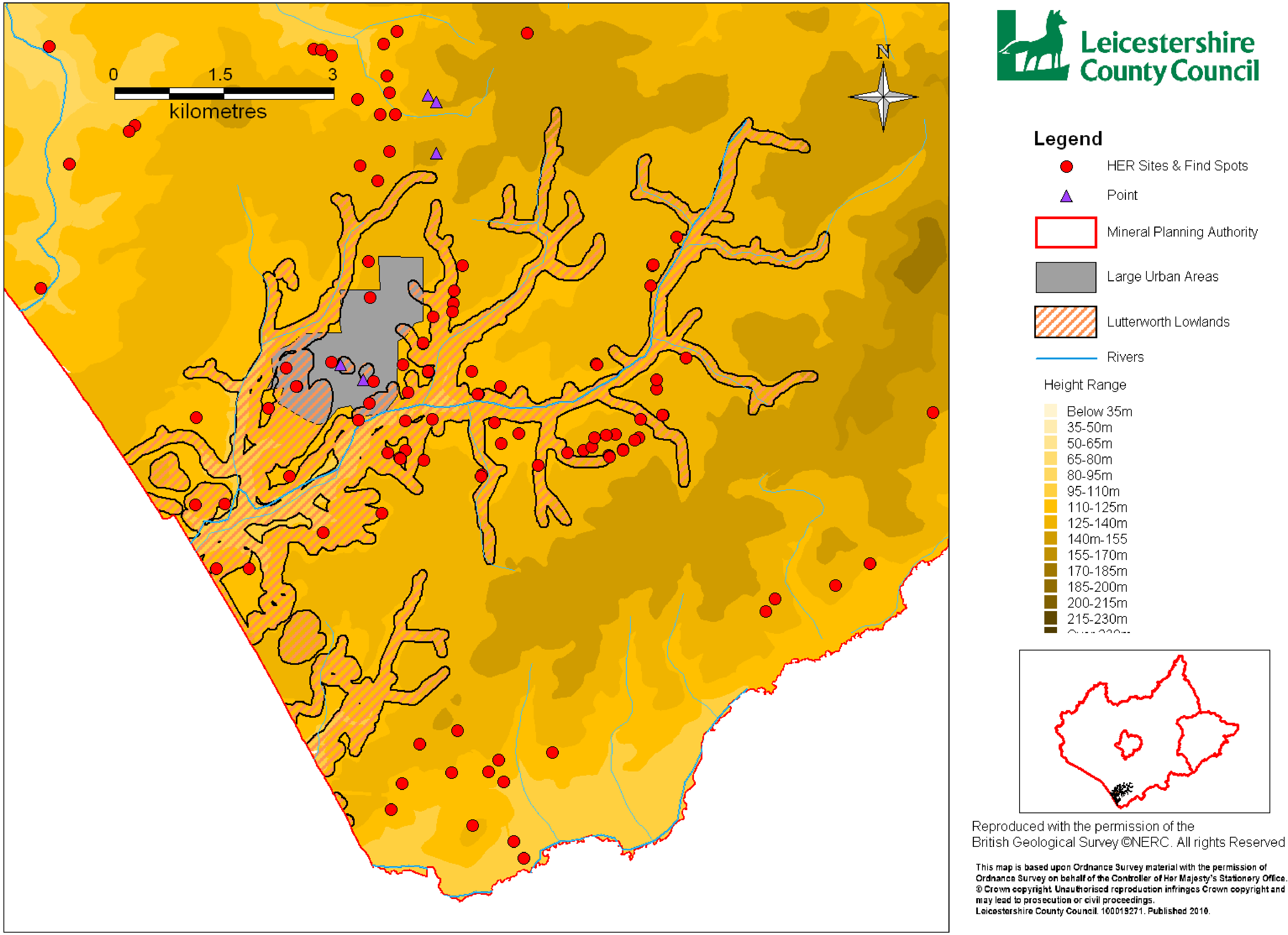
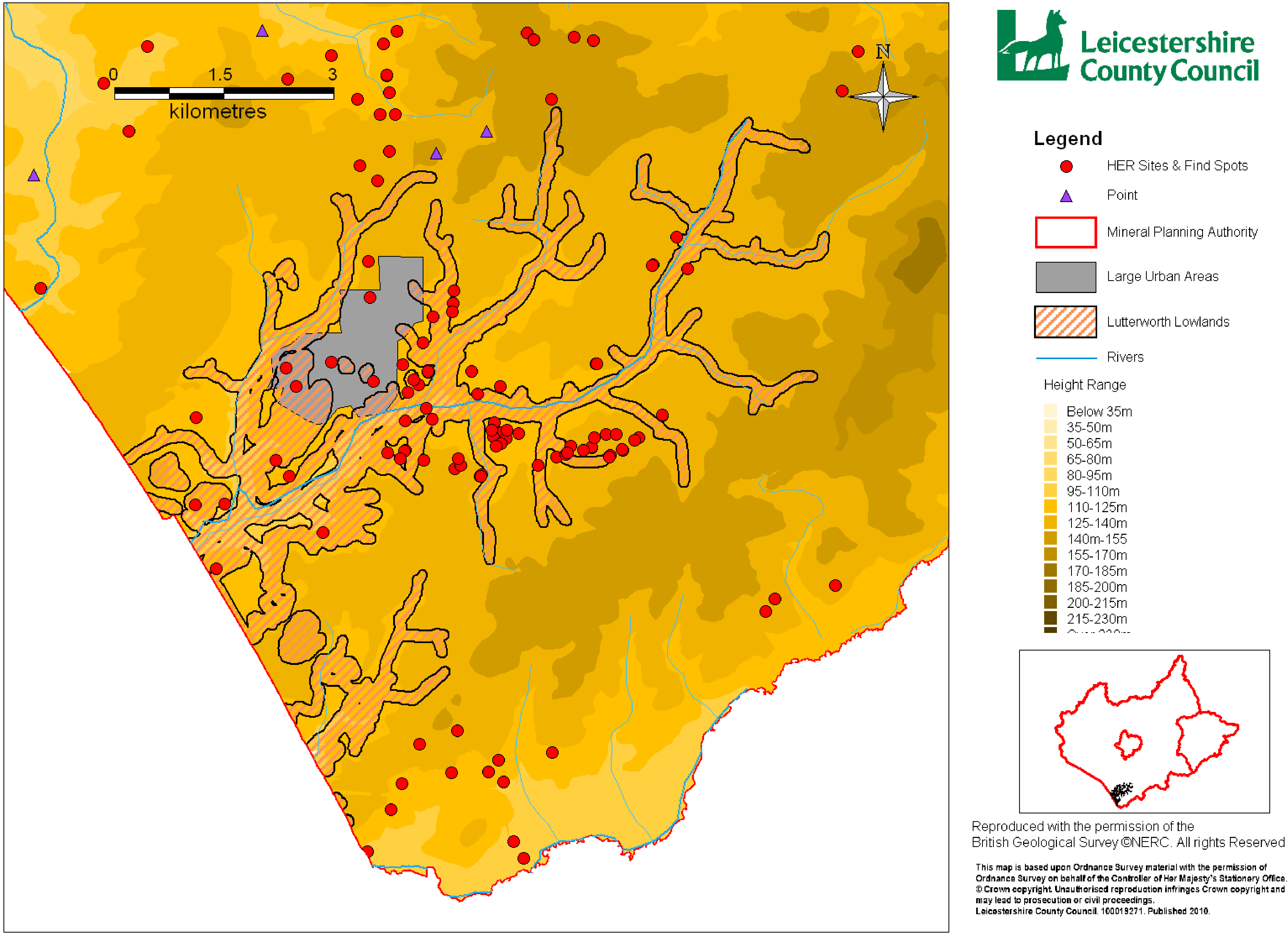


Lutterworth Lowlands ARA Sub Area Neolithic Sites and Find Spots



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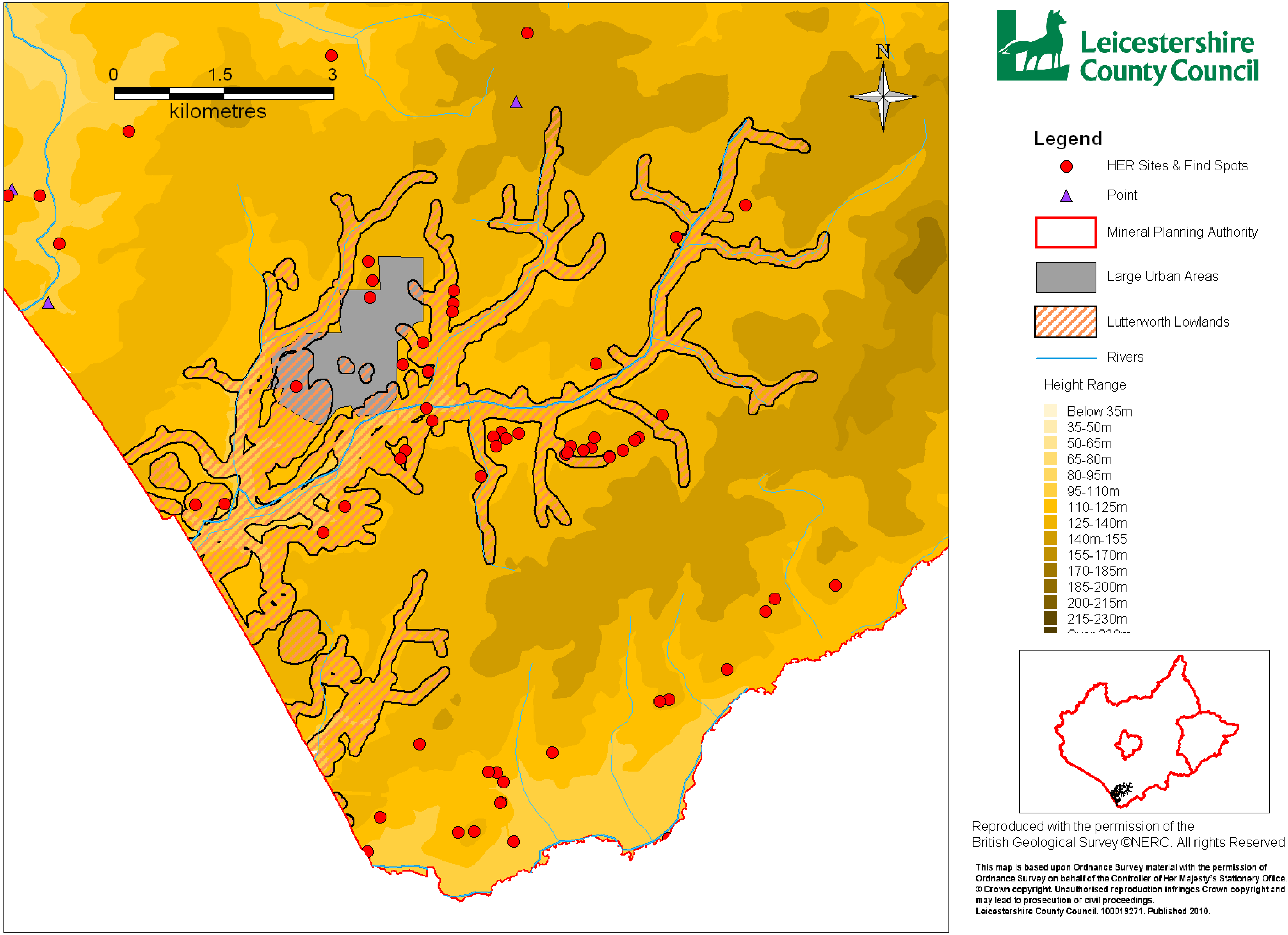

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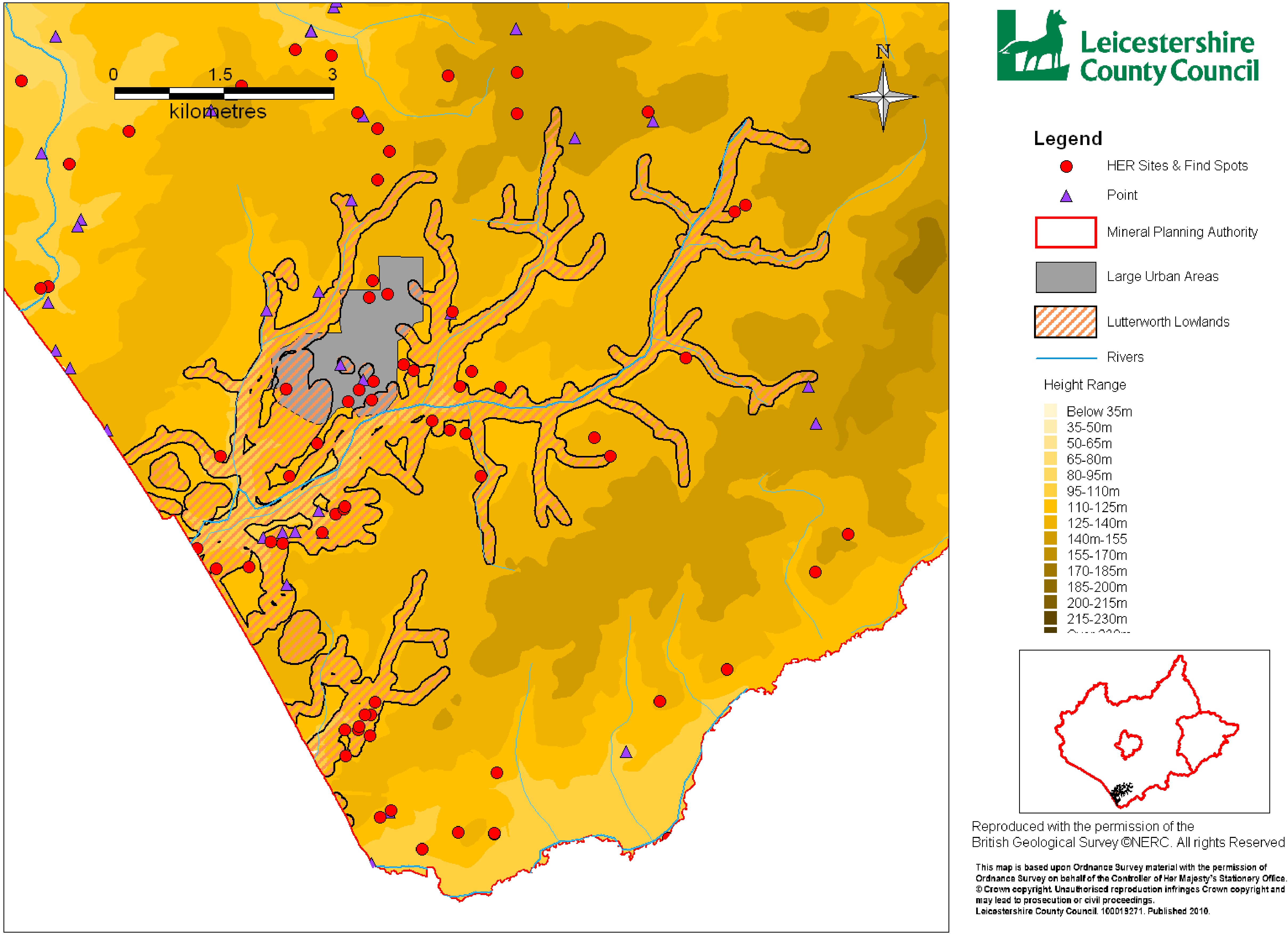
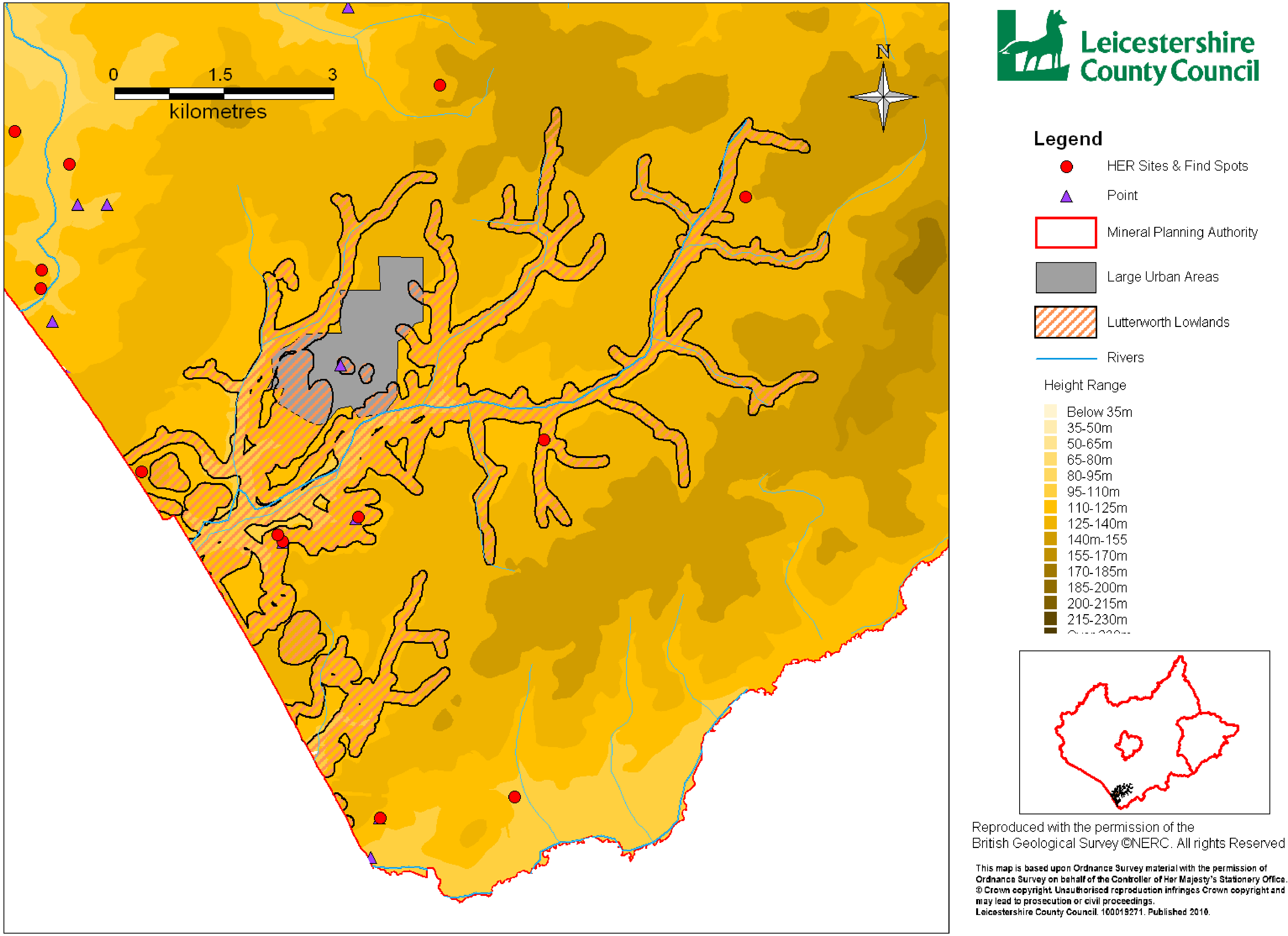
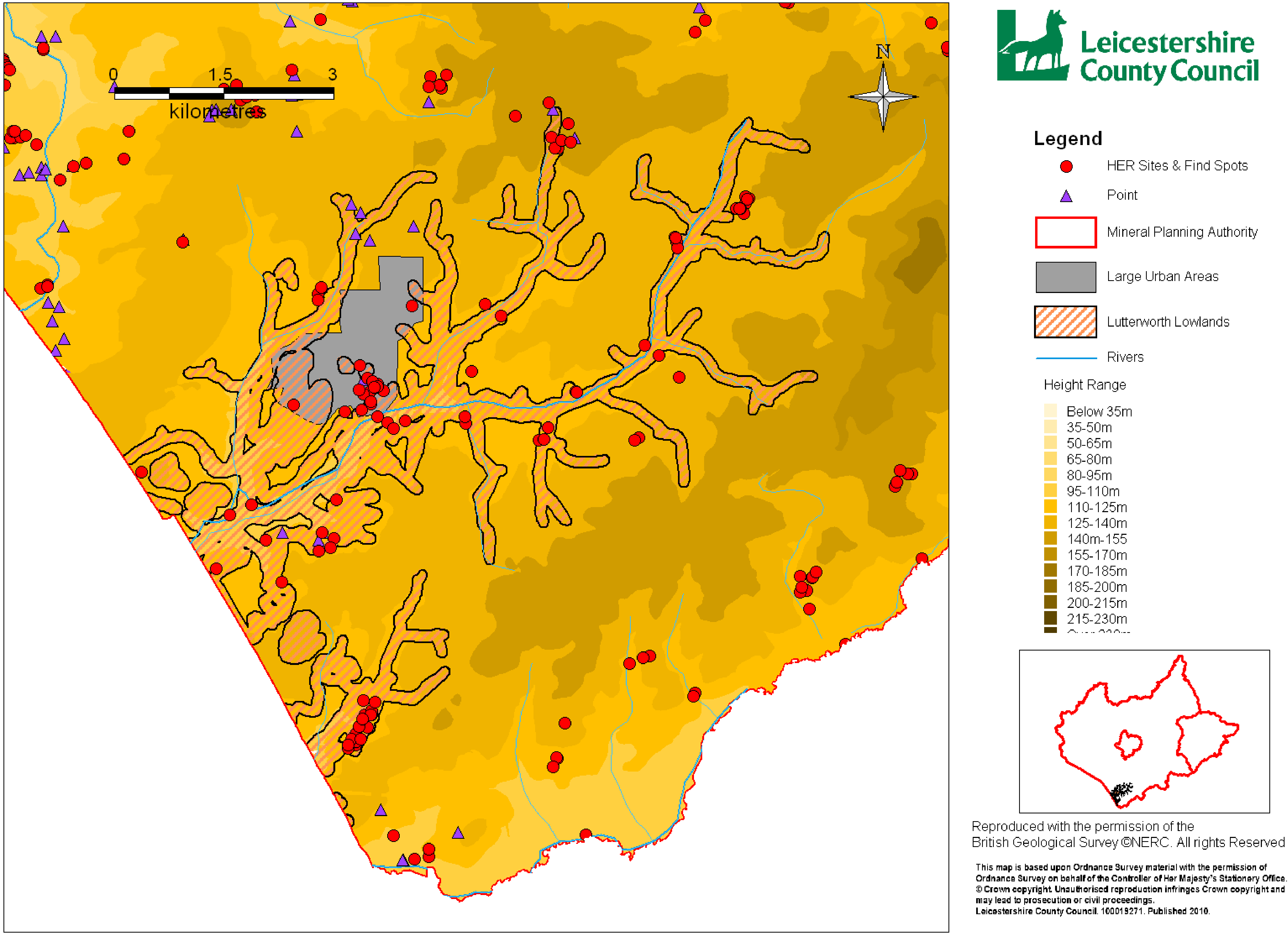


Lutterworth Lowlands ARA Sub Area Roman Sites and Findspots



Lutterworth Lowlands ARA Sub Area Anglo-Saxon Sites and Findspots



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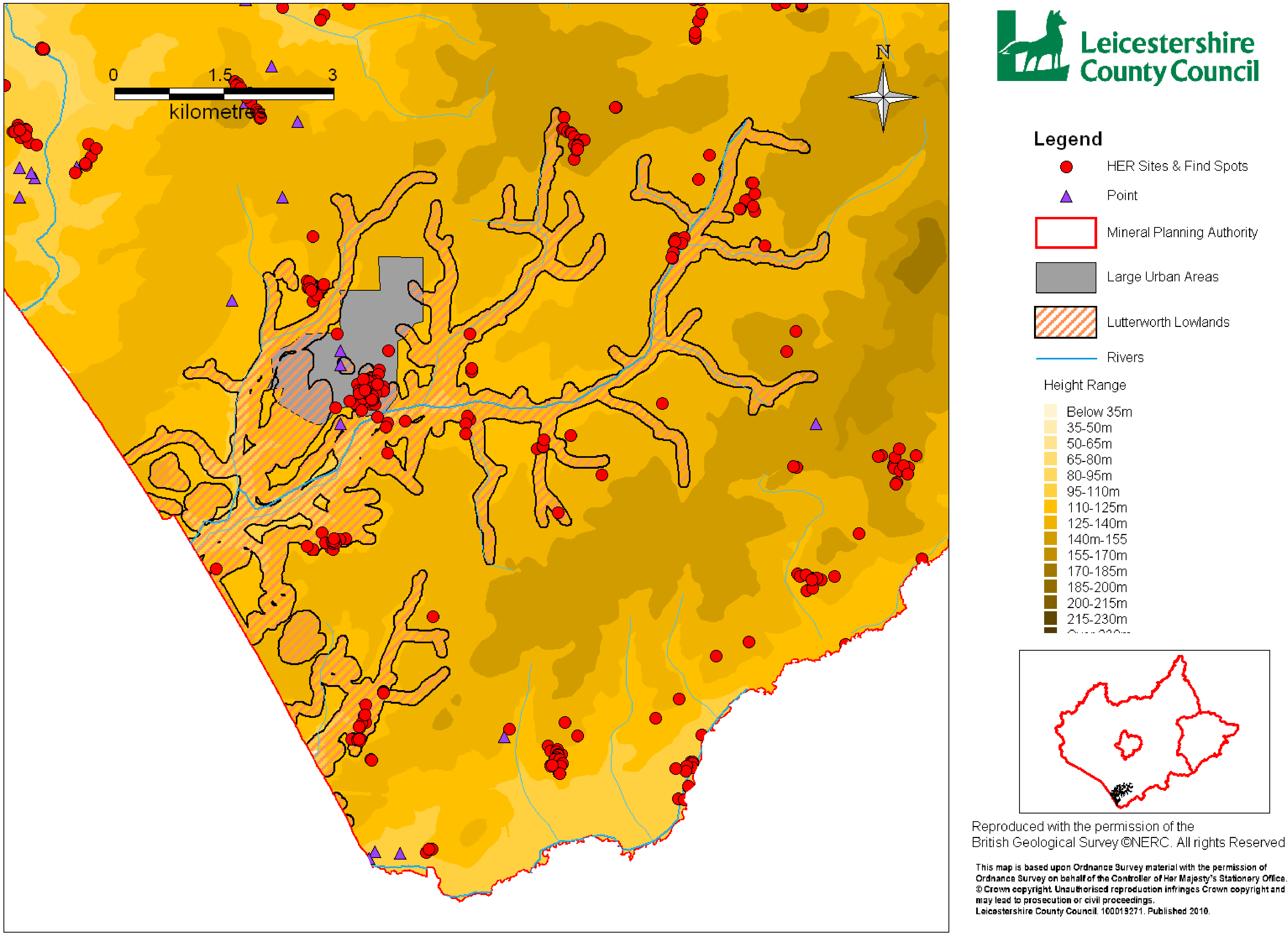
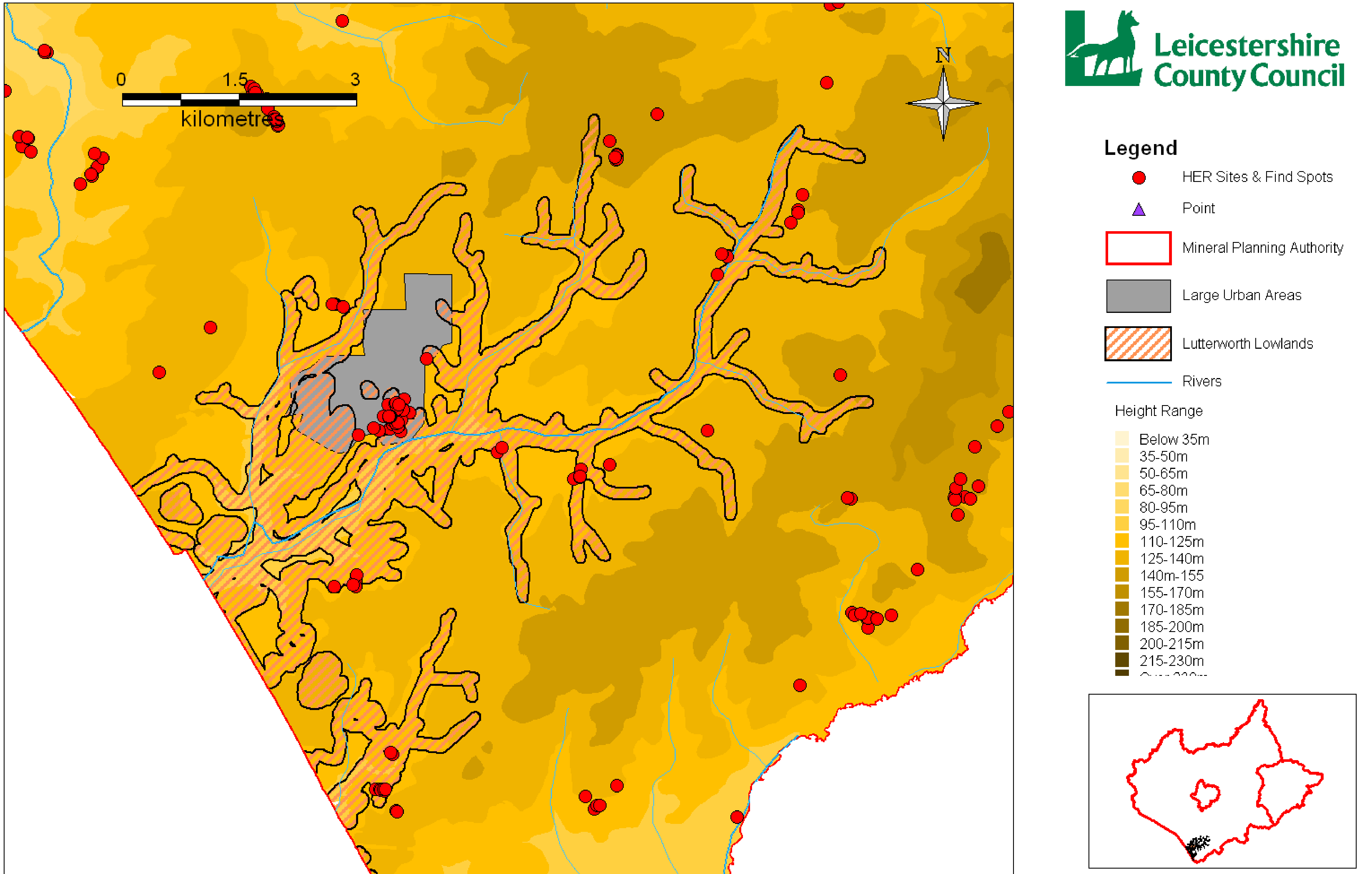
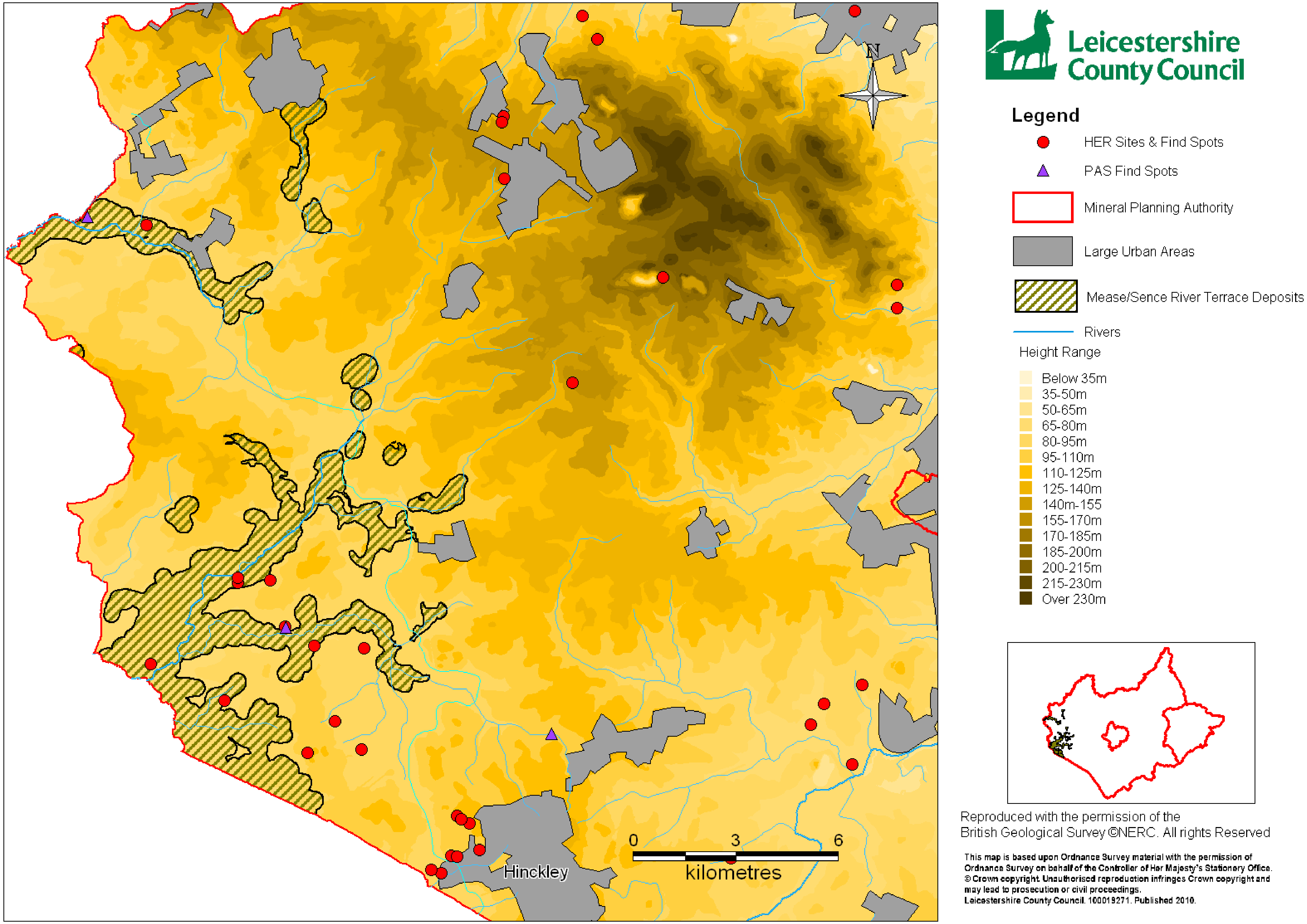


Lutterworth Lowlands ARA Sub Area Post-Medieval Sites and Findspots



Lutterworth Lowlands ARA Sub Area Modern Sites and Findspots



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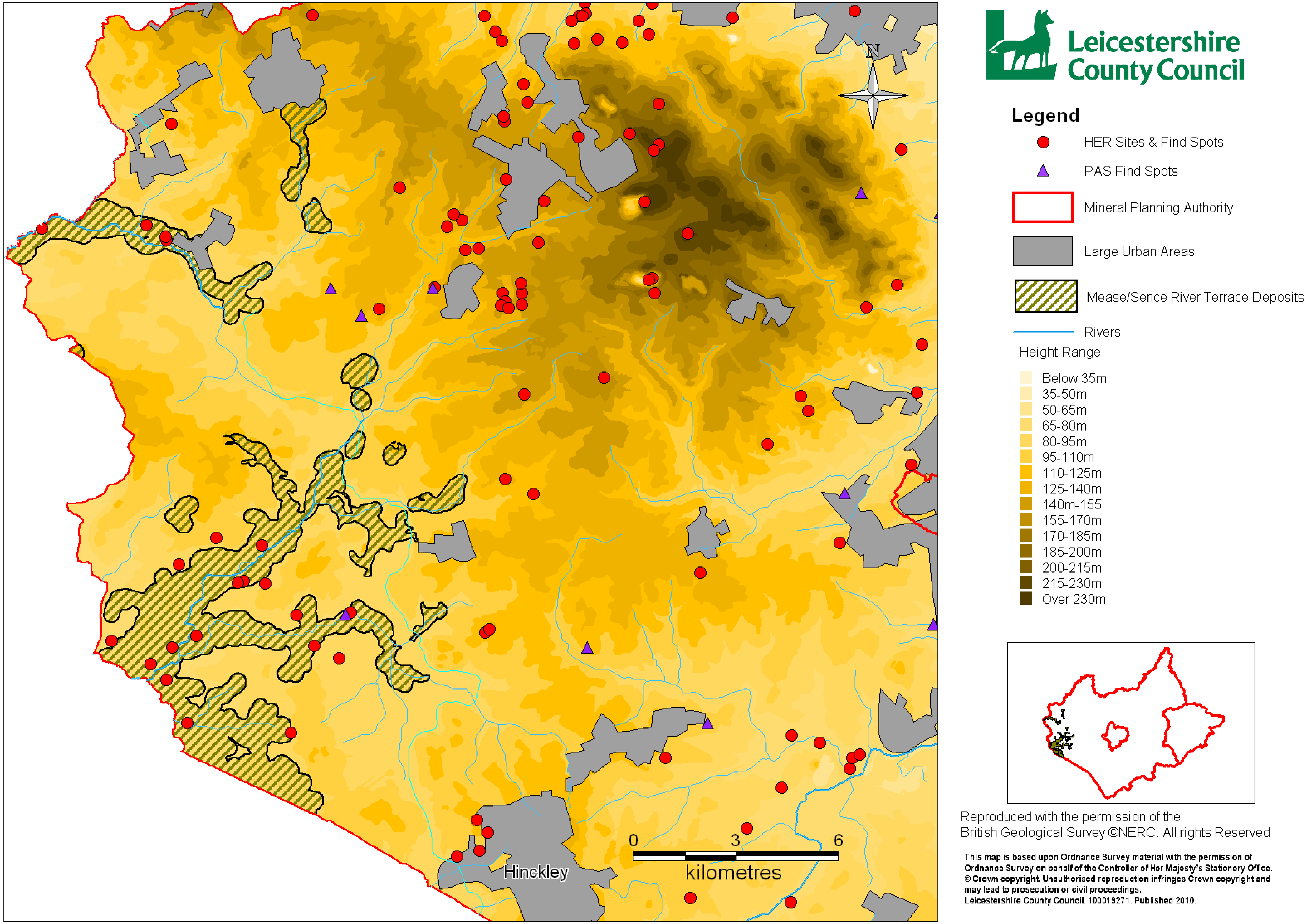

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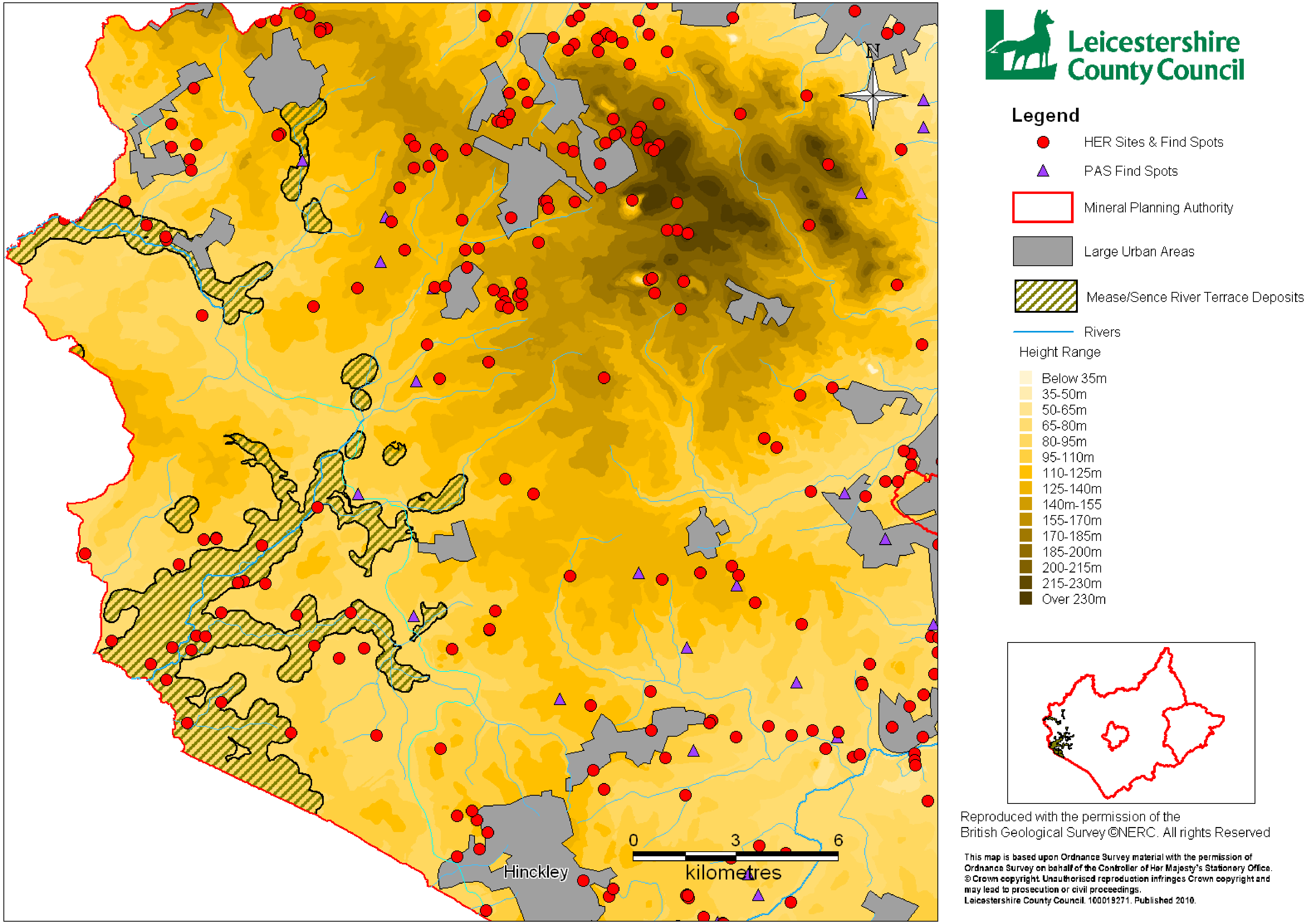

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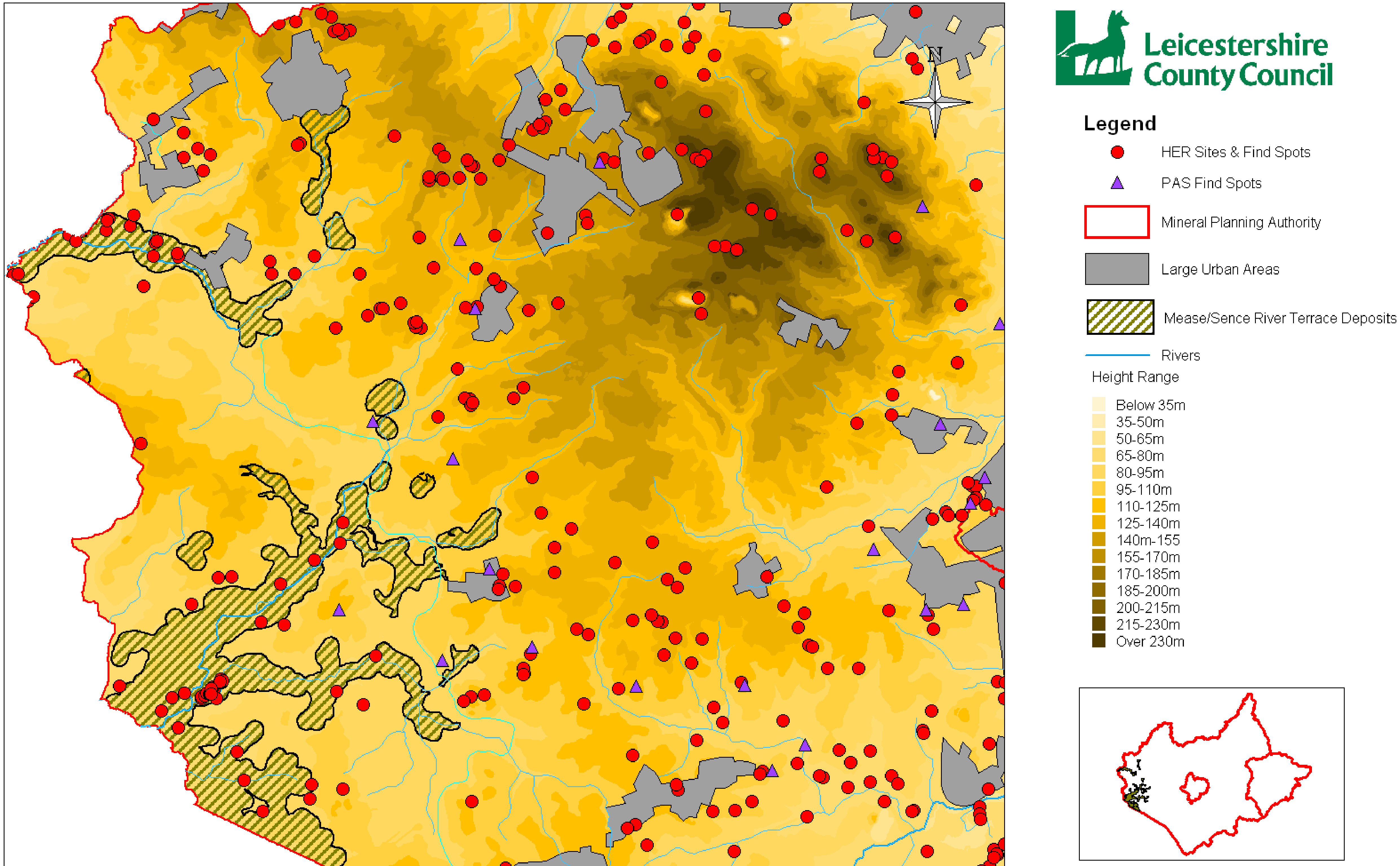

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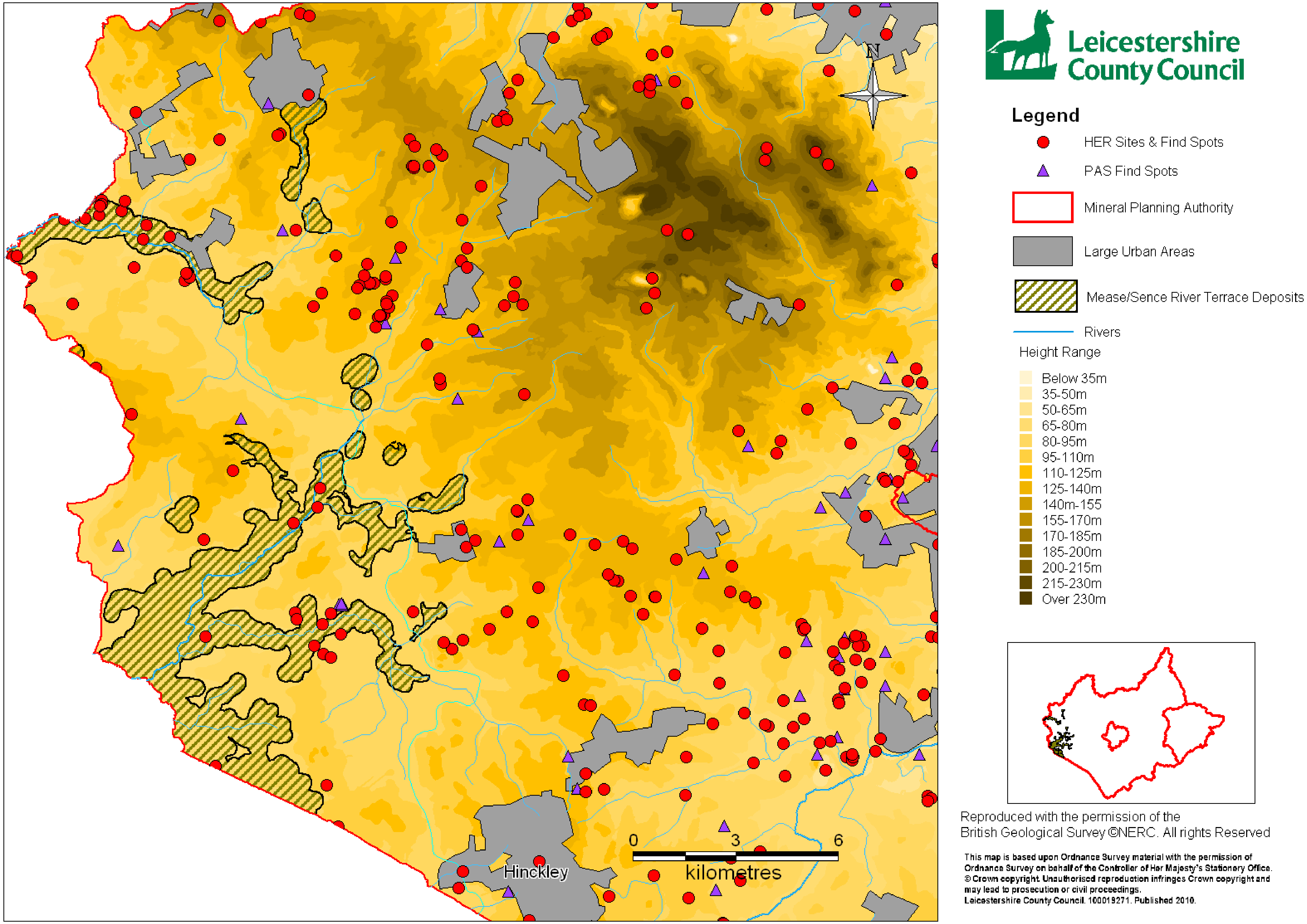

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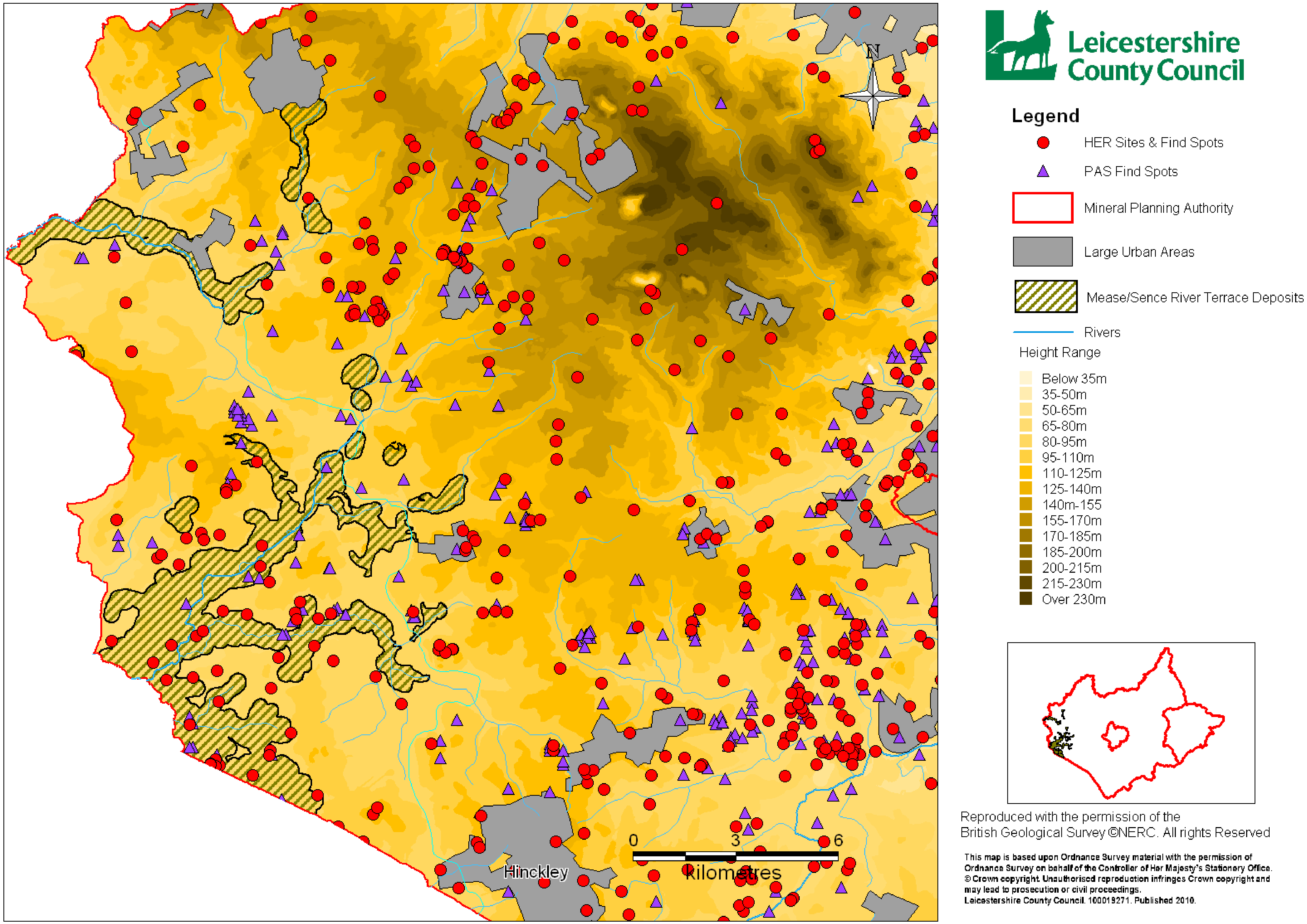

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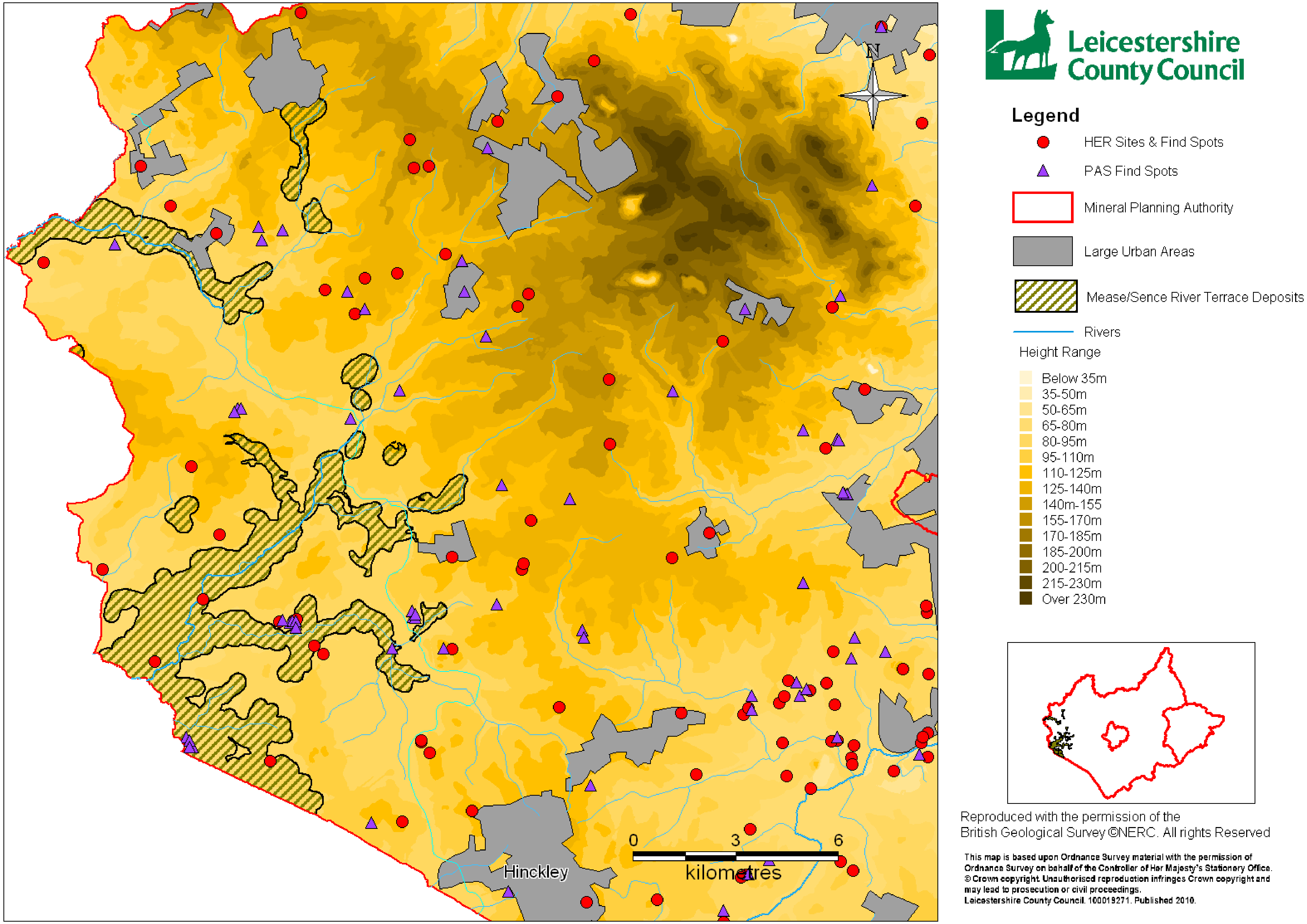

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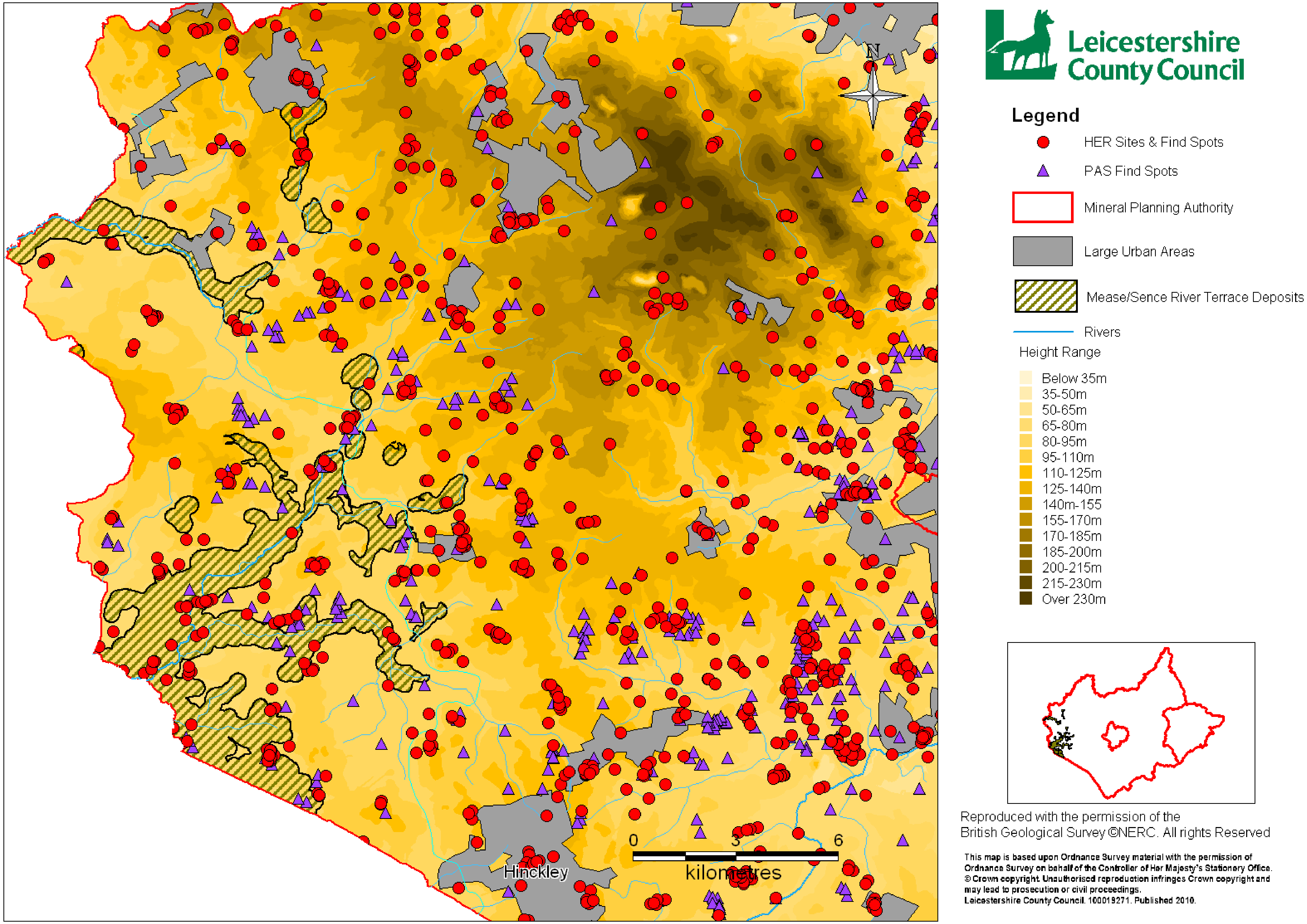

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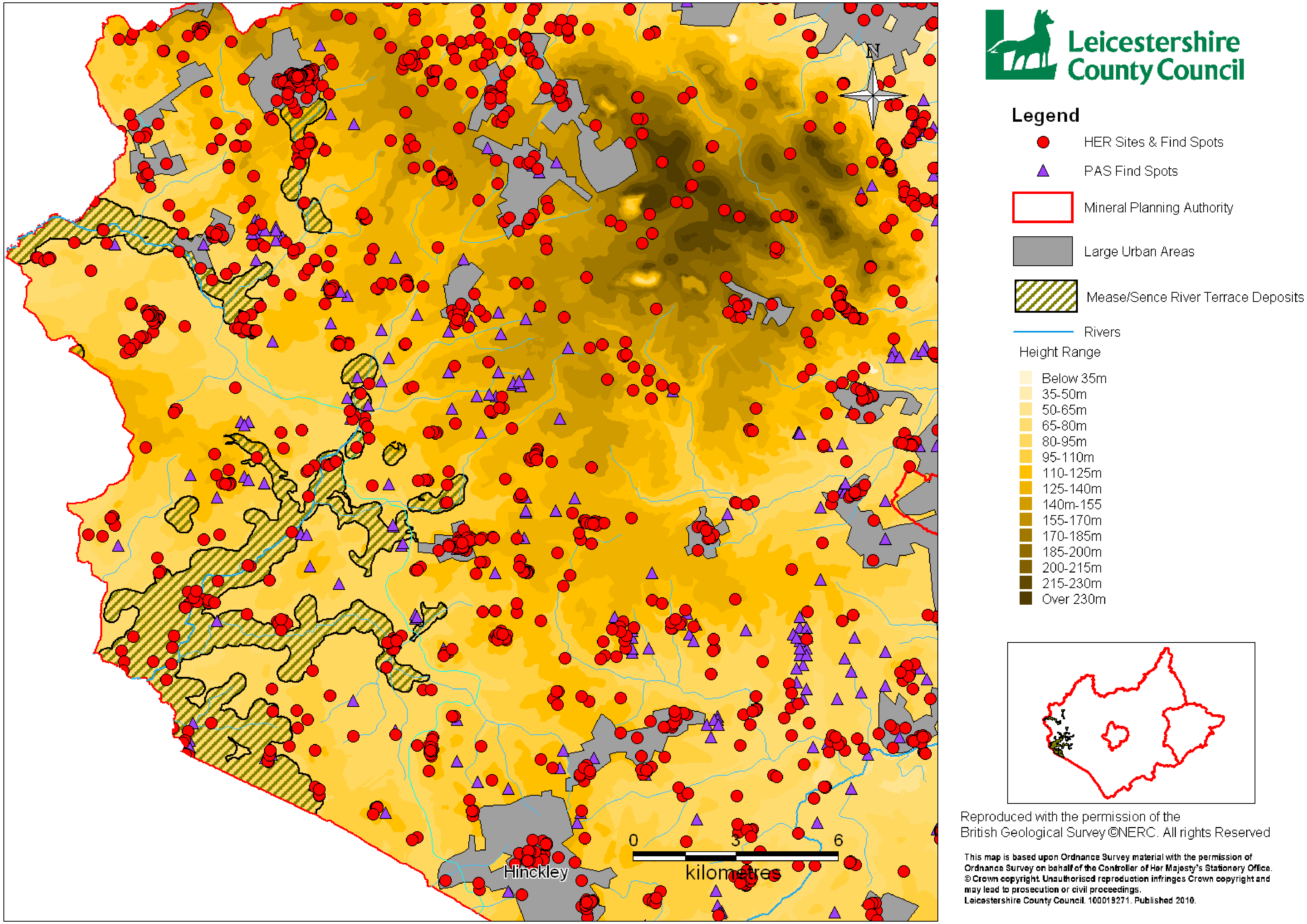

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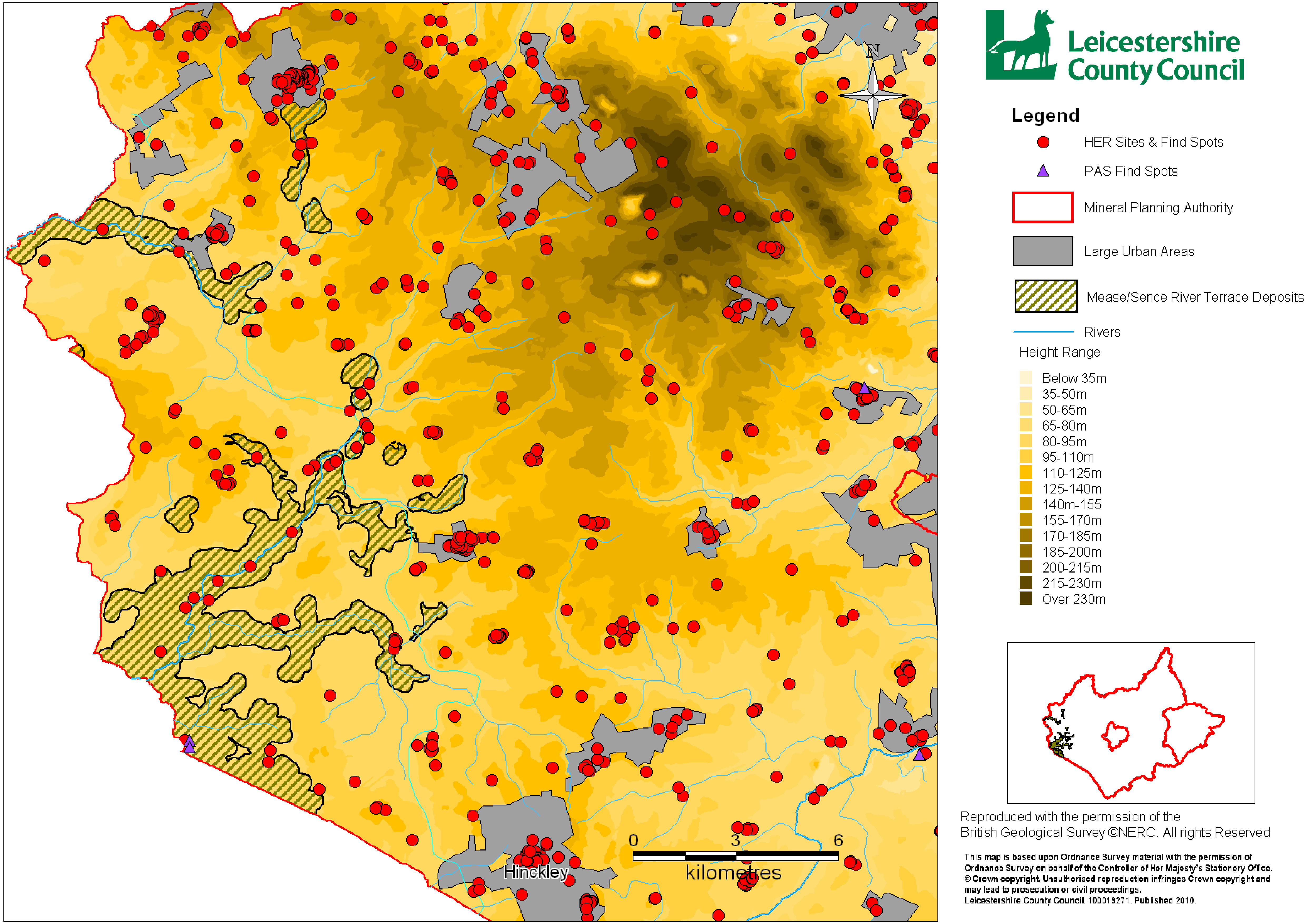

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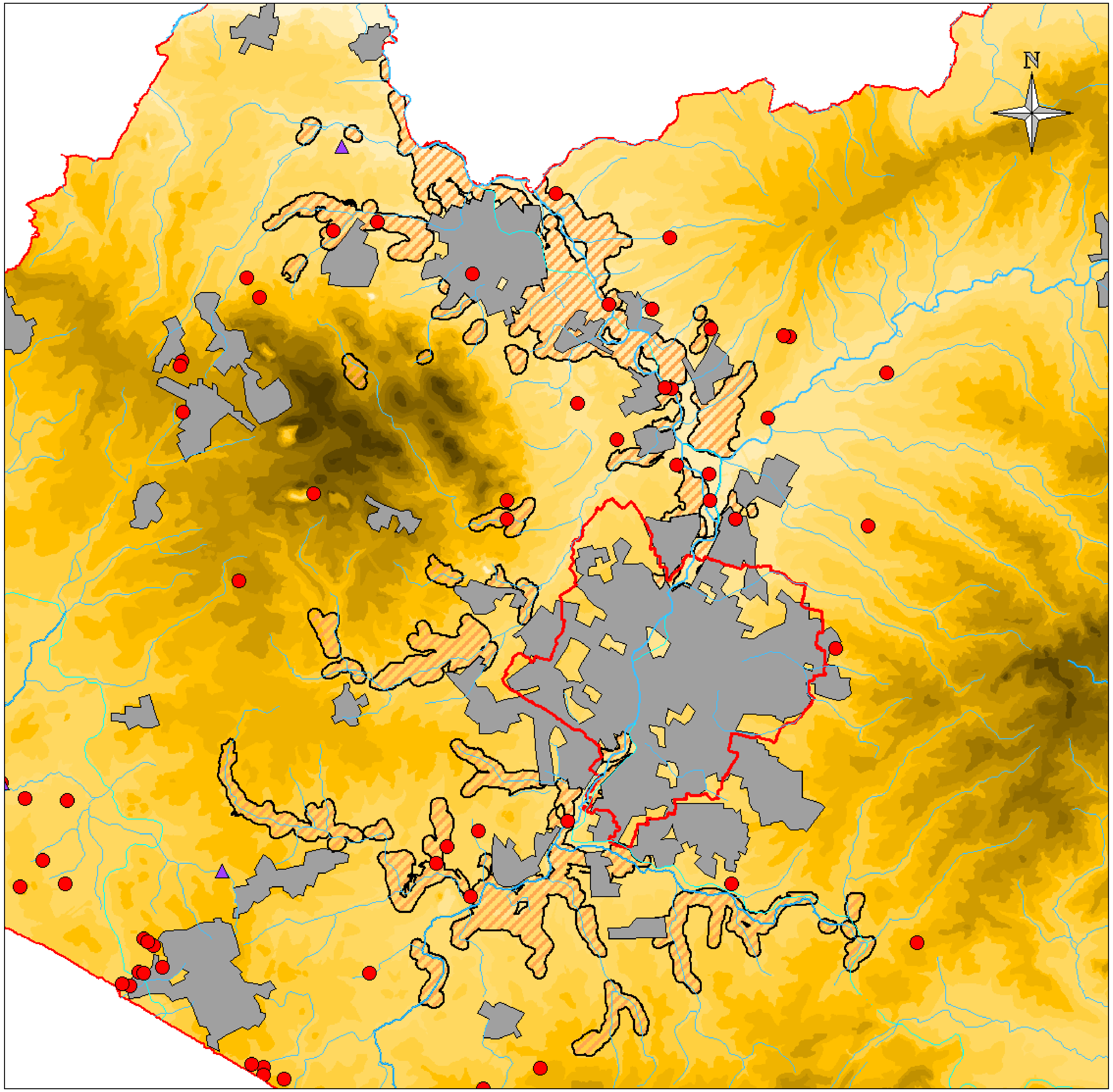


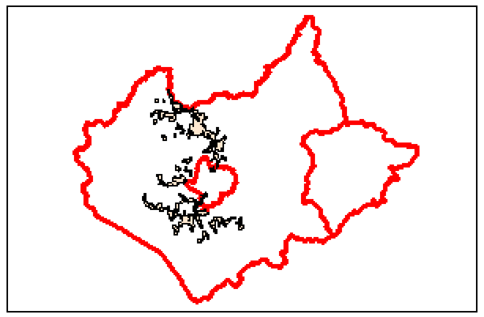
Leicestershire County Council

Legend

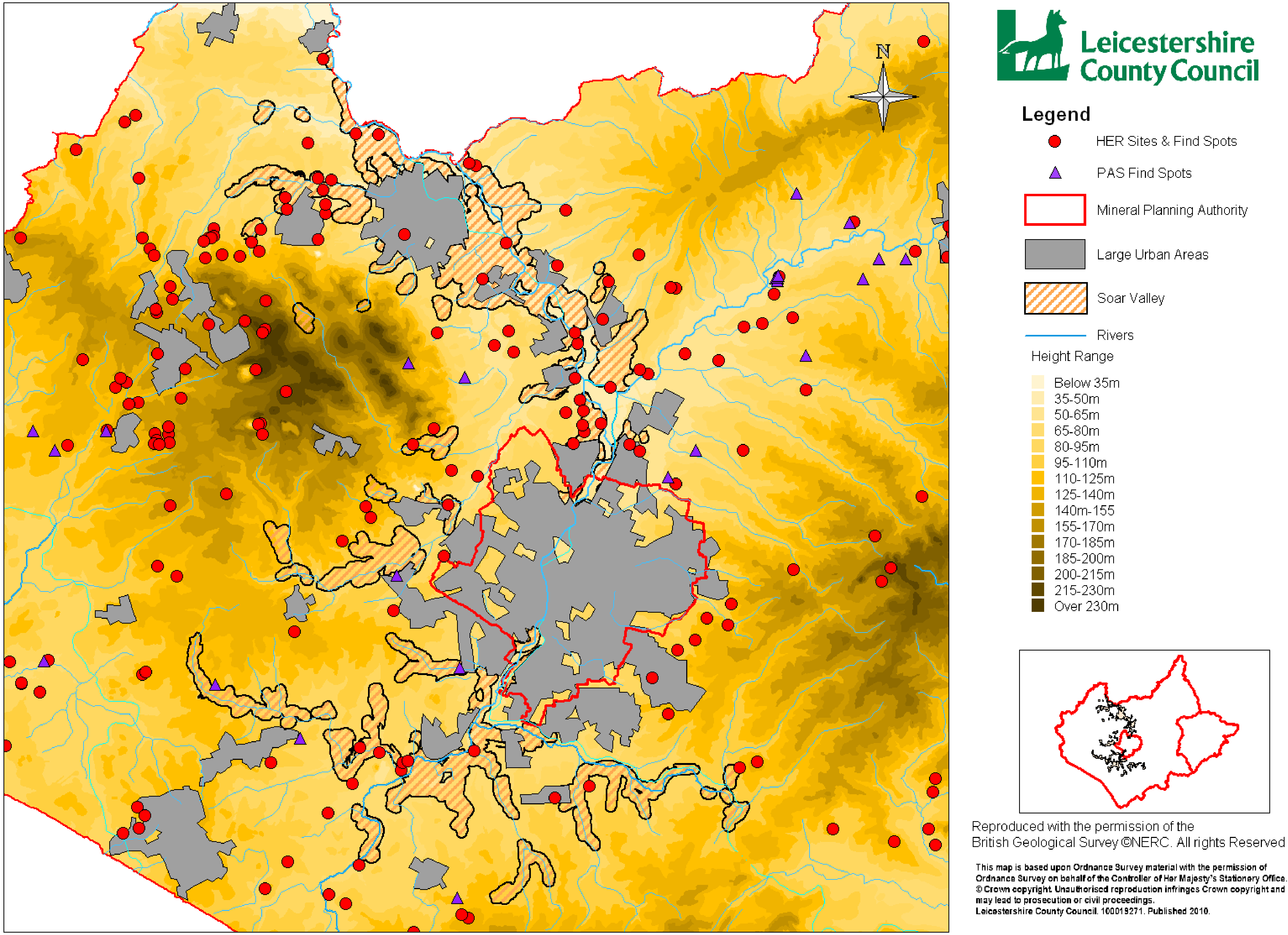
HER Sites & Find Spots
PAS Find Spots
Mineral Planning Authority
Large Urban Areas
Soar Valley
Rivers

Height Range

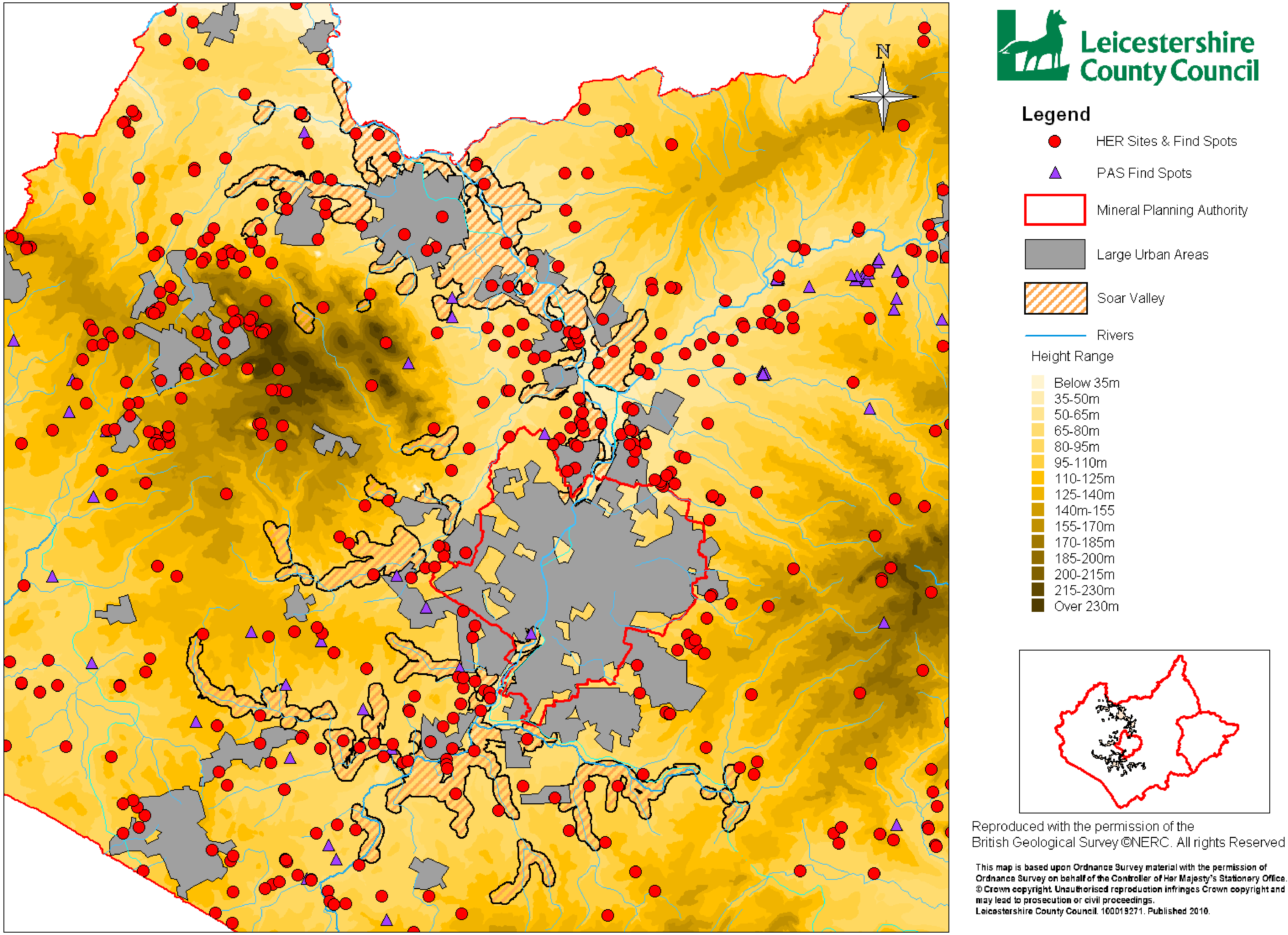
Below 35m
35-50m
50-65m
65-80m
80-95m
95-110m
110-125m
125-140m
140m-155
155-170m
170-185m
185-200m
200-215m
215-230m
Over 230m



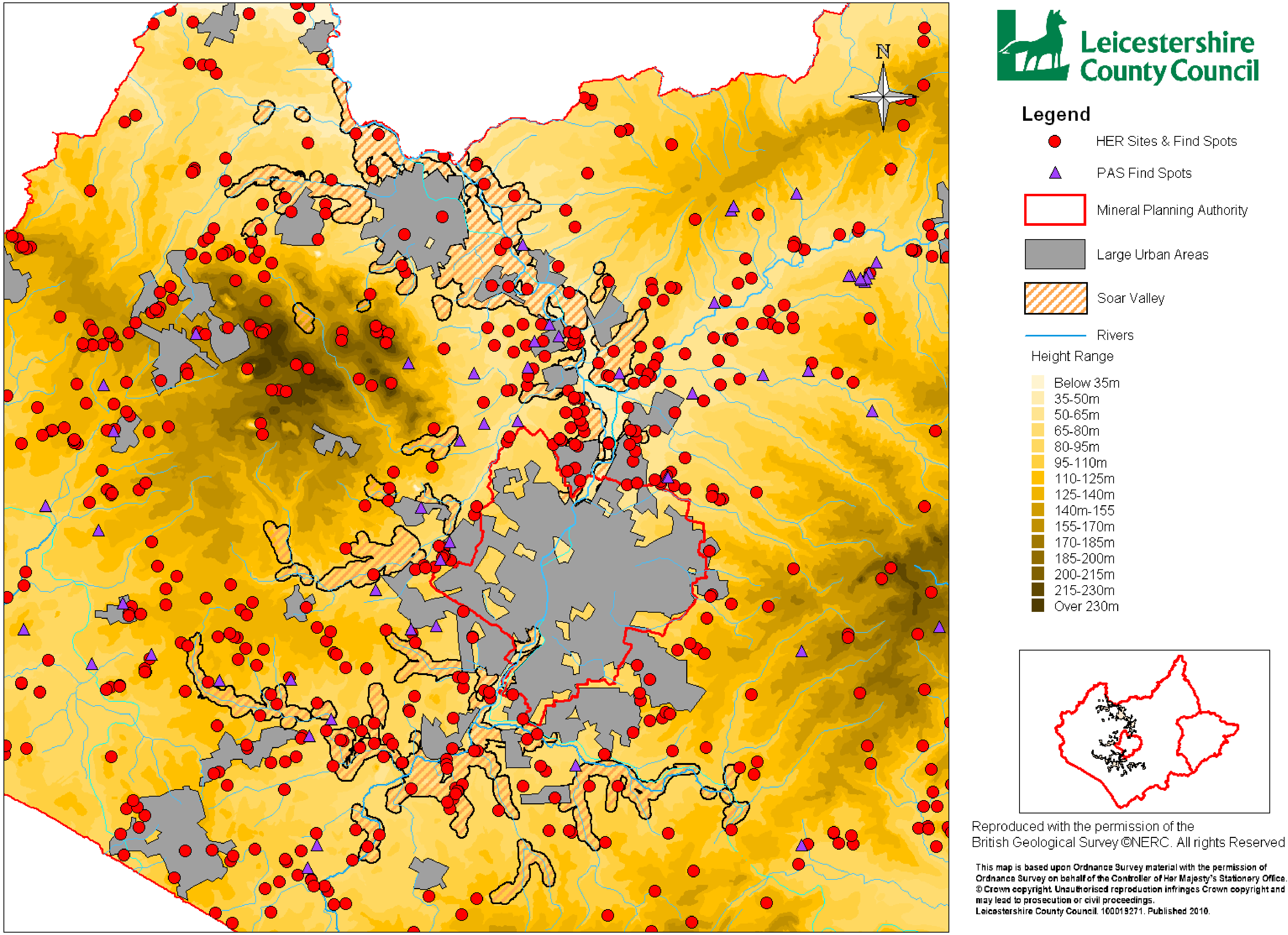
Soar Valley ARA Sub Area Palaeolithic Sites and Findspots



Soar Valley ARA Sub Area Mesolithic Sites and Findspots



Soar Valley ARA Sub Area Neolithic Sites and Findspots



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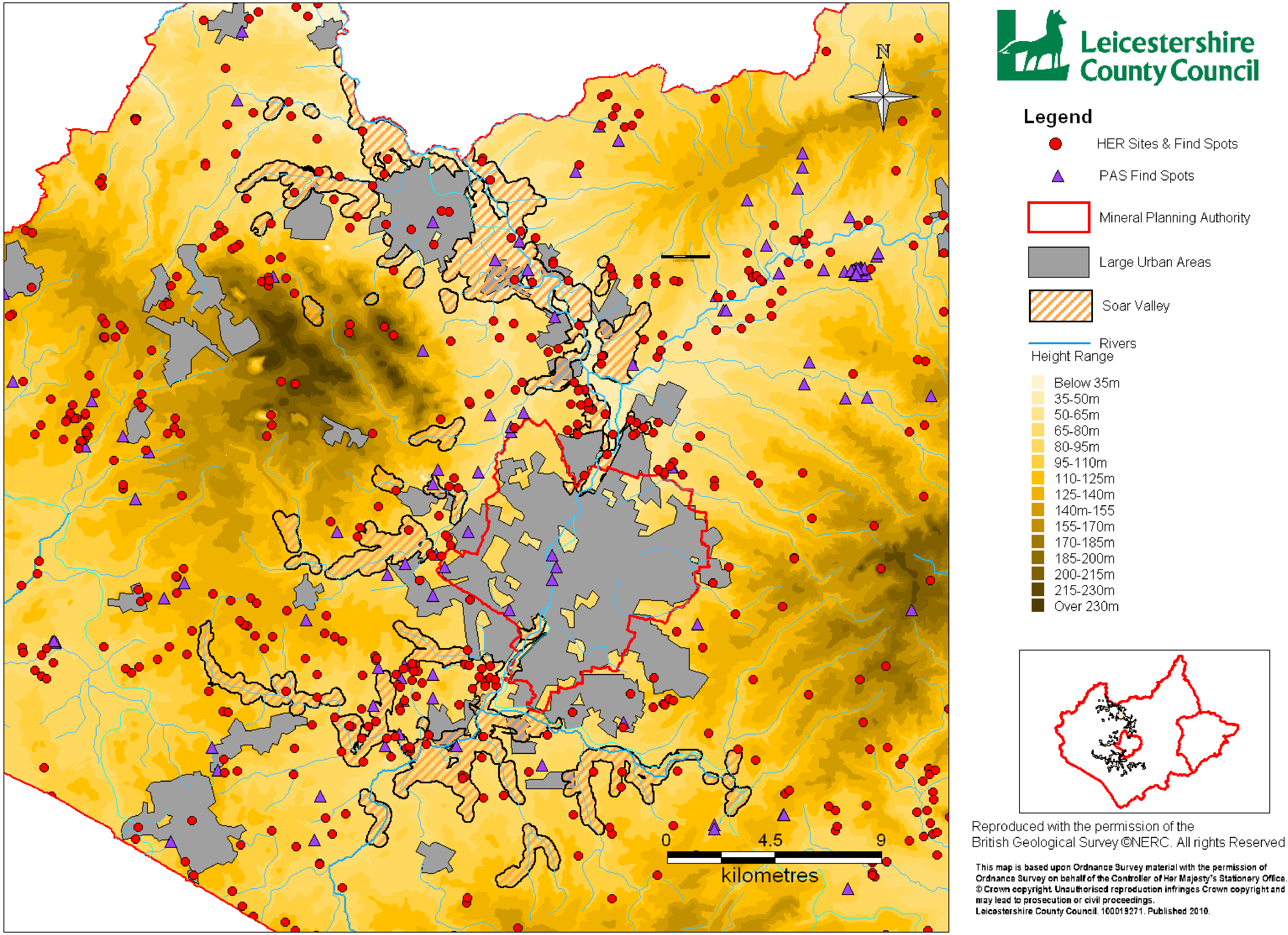
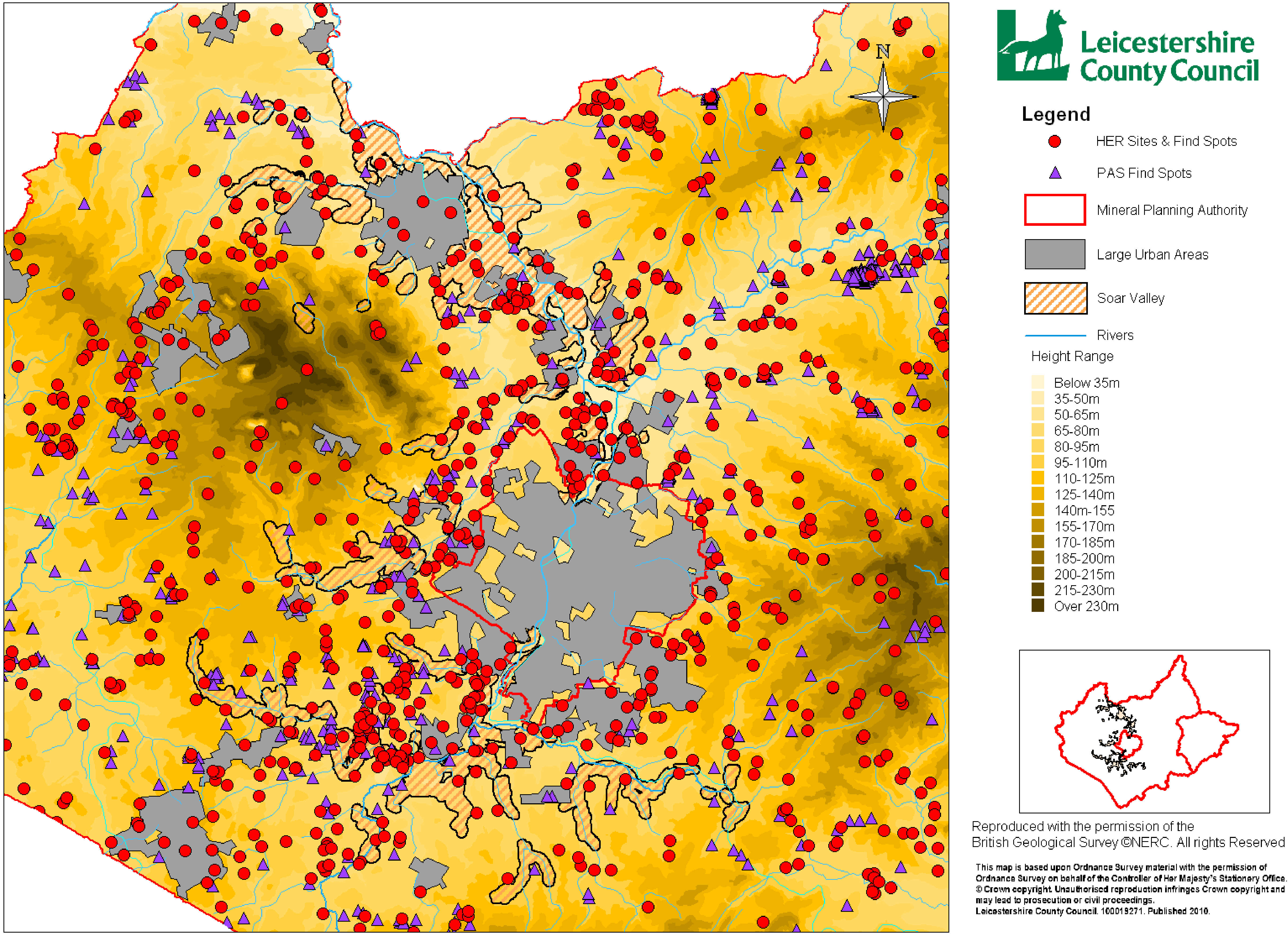


Soar Valley ARA Sub Area Iron Age Sites and Findspots



Soar Valley ARA Sub Area Roman Sites and Findspots

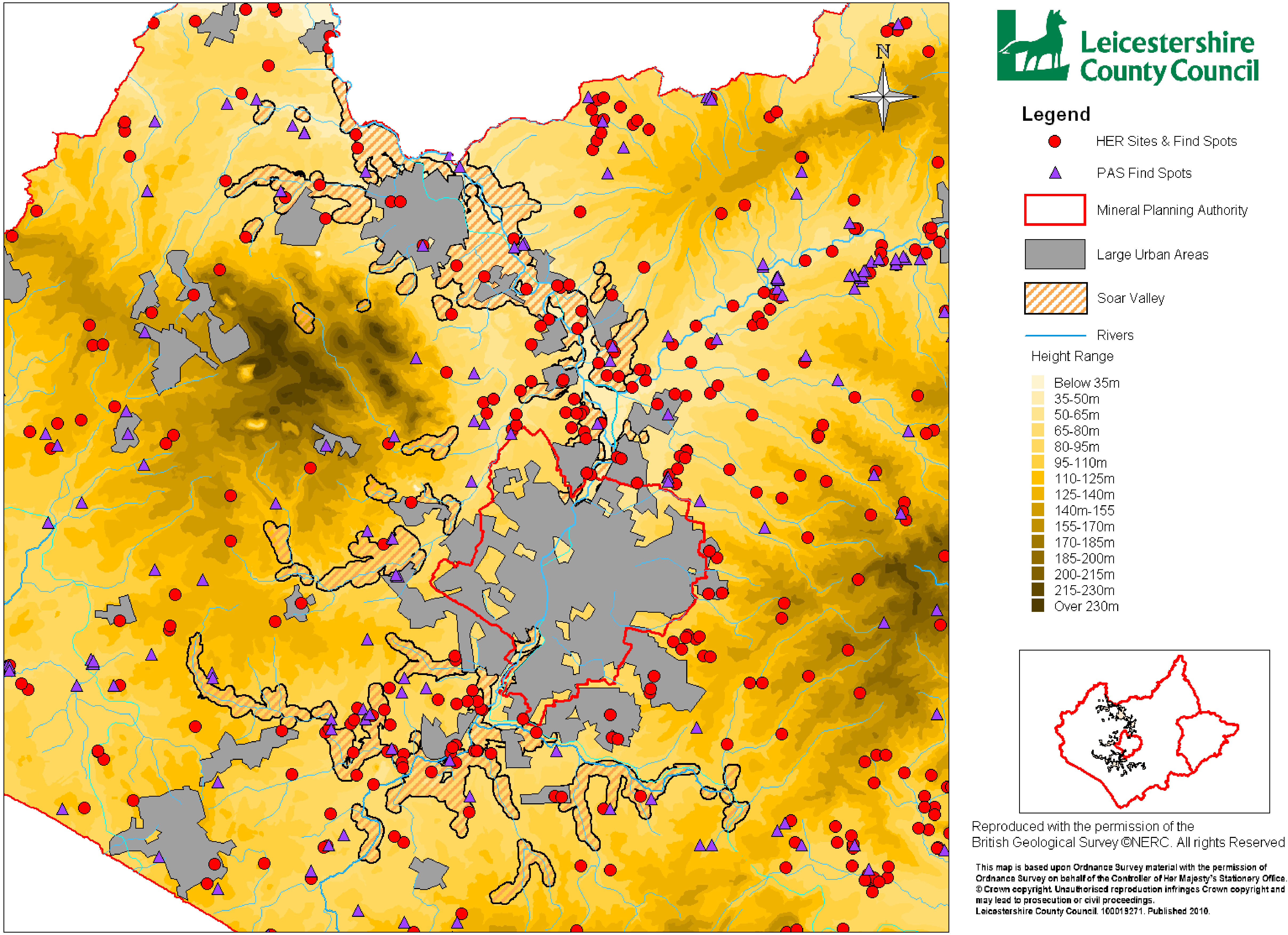


Figure 43 Soar Valley ARA Sub Area Anglo-Saxon Sites and Findspots

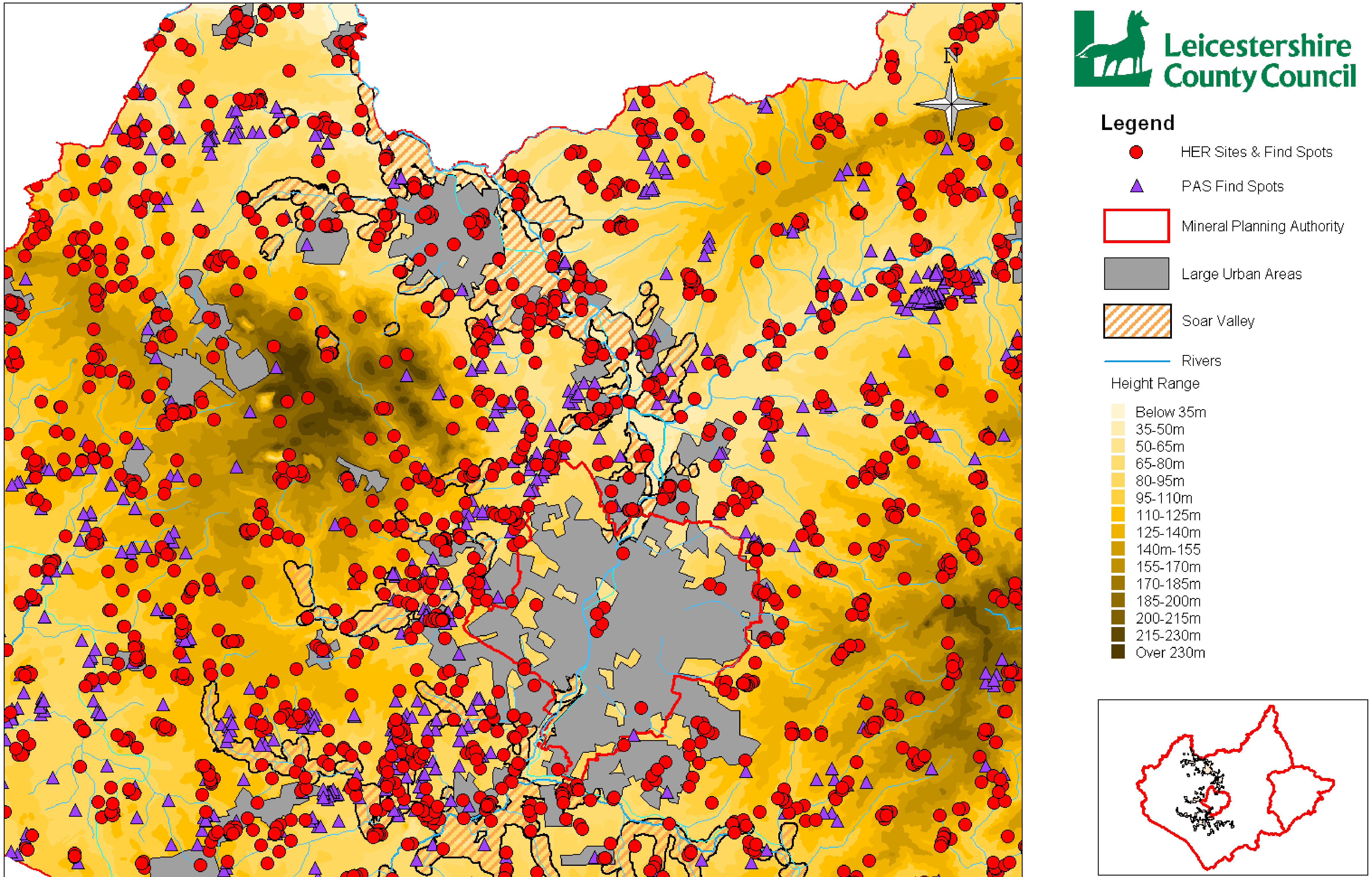
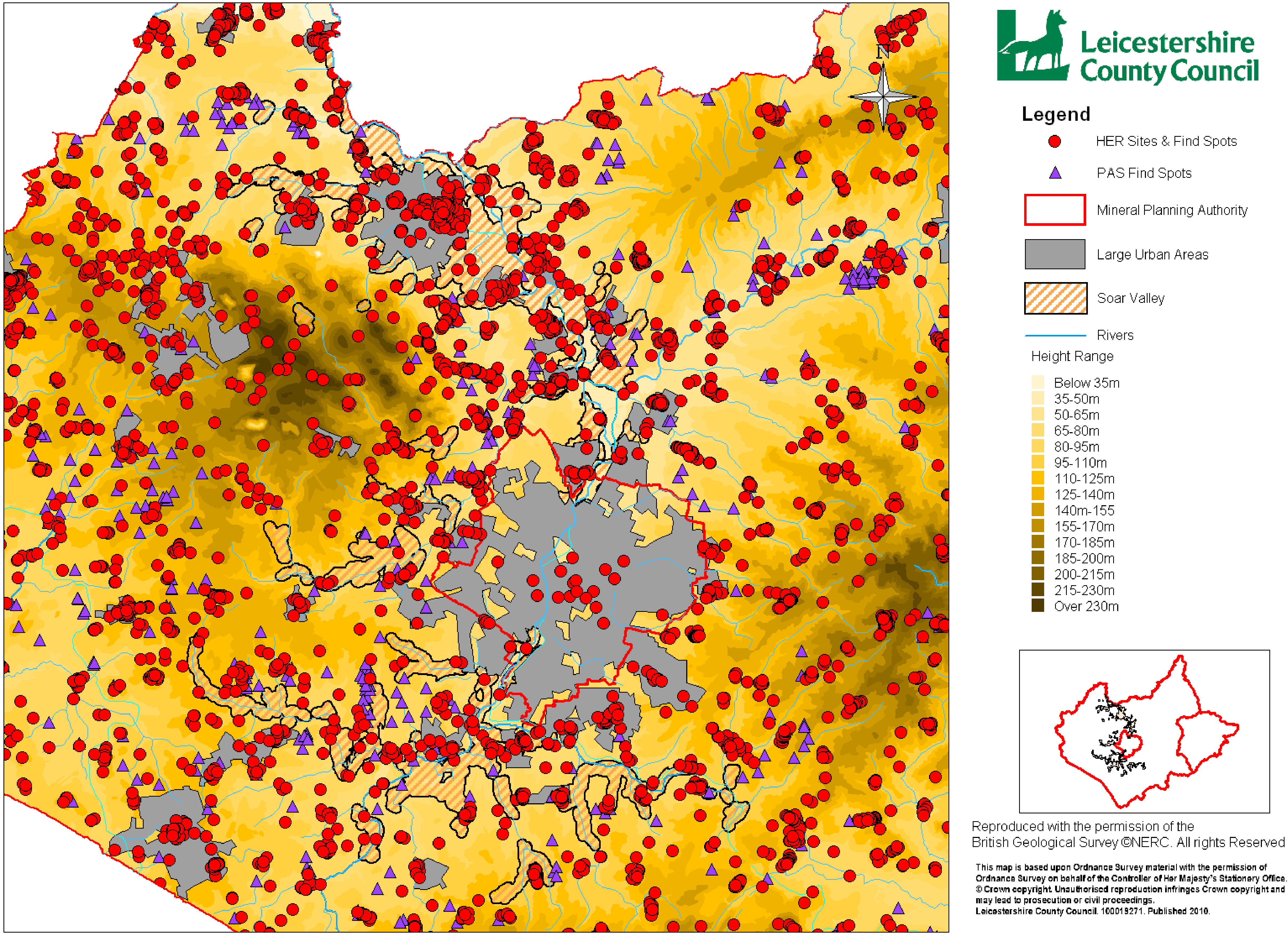


Figure 43 Soar Valley ARA Sub Area Medieval Sites and Findspots



Soar Valley ARA Sub Area Post-Medieval Sites and Findspots

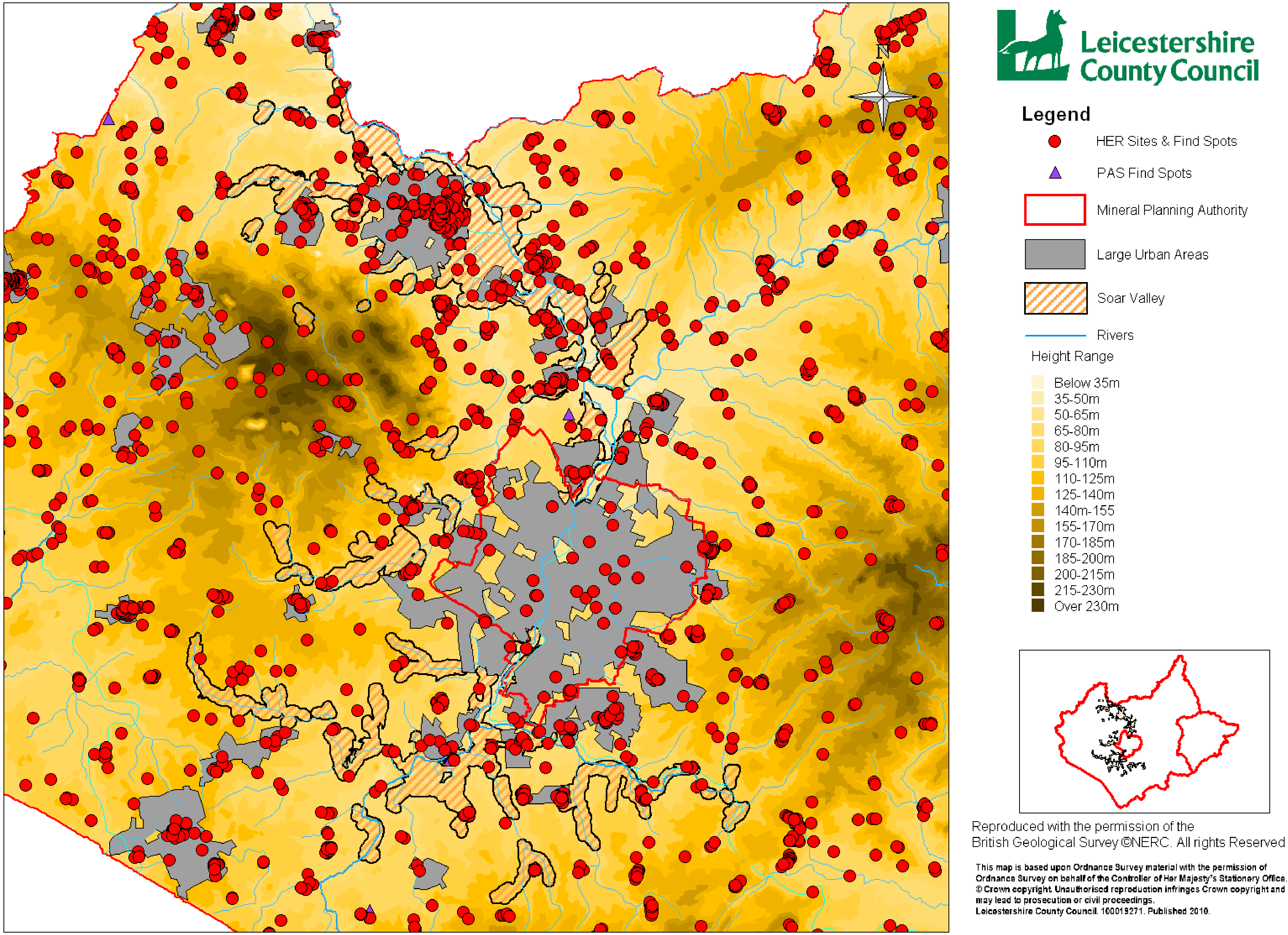
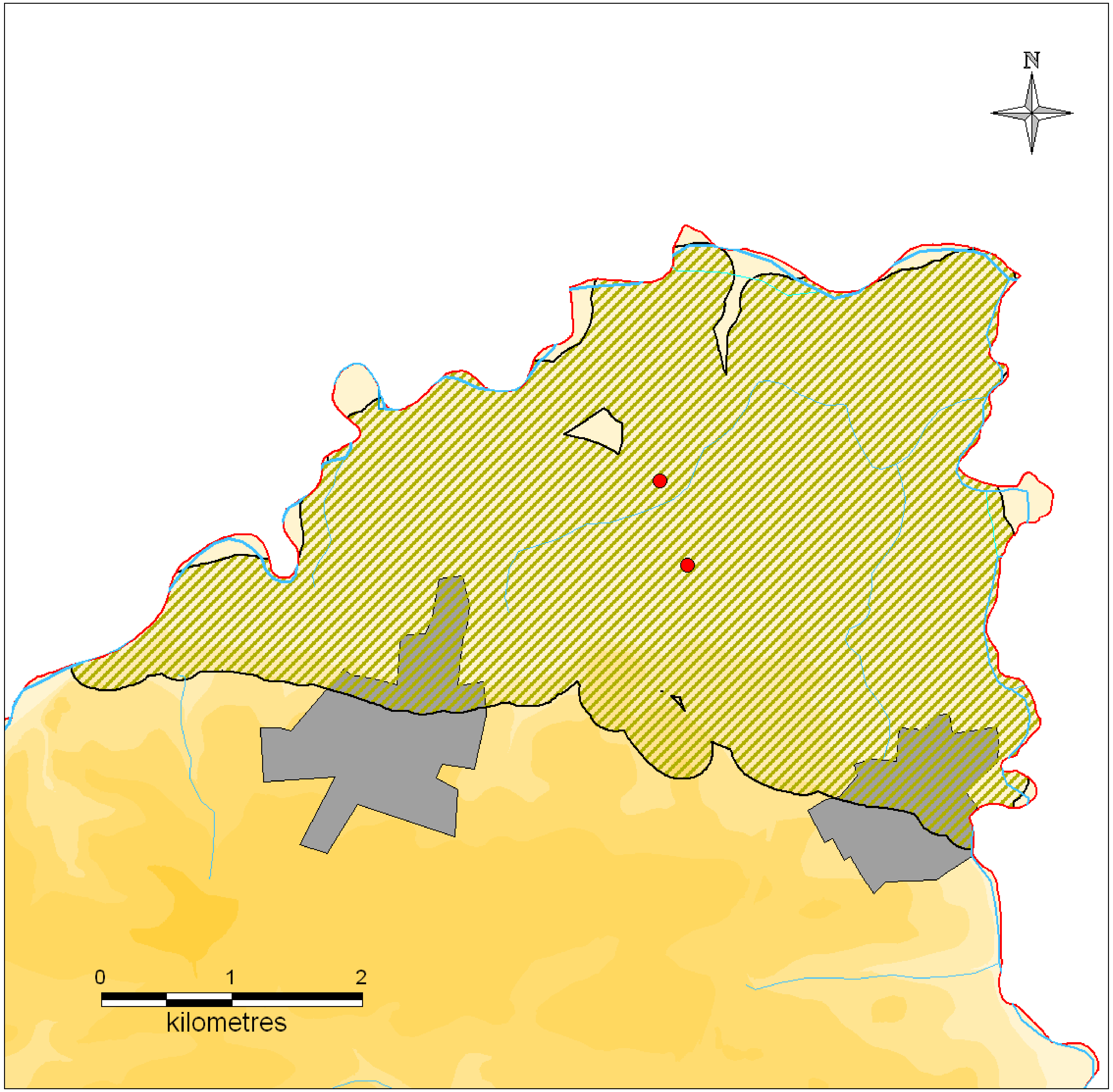


Figure 43 Soar Valley ARA Sub Area Modern Sites and Findspots



Leicestershire County Council

Legend

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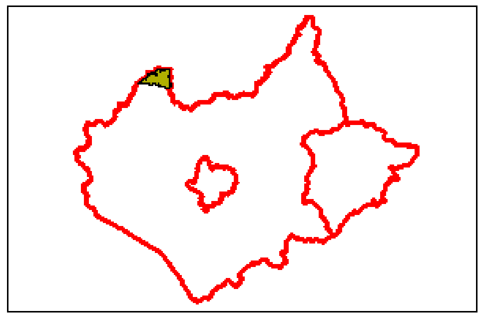
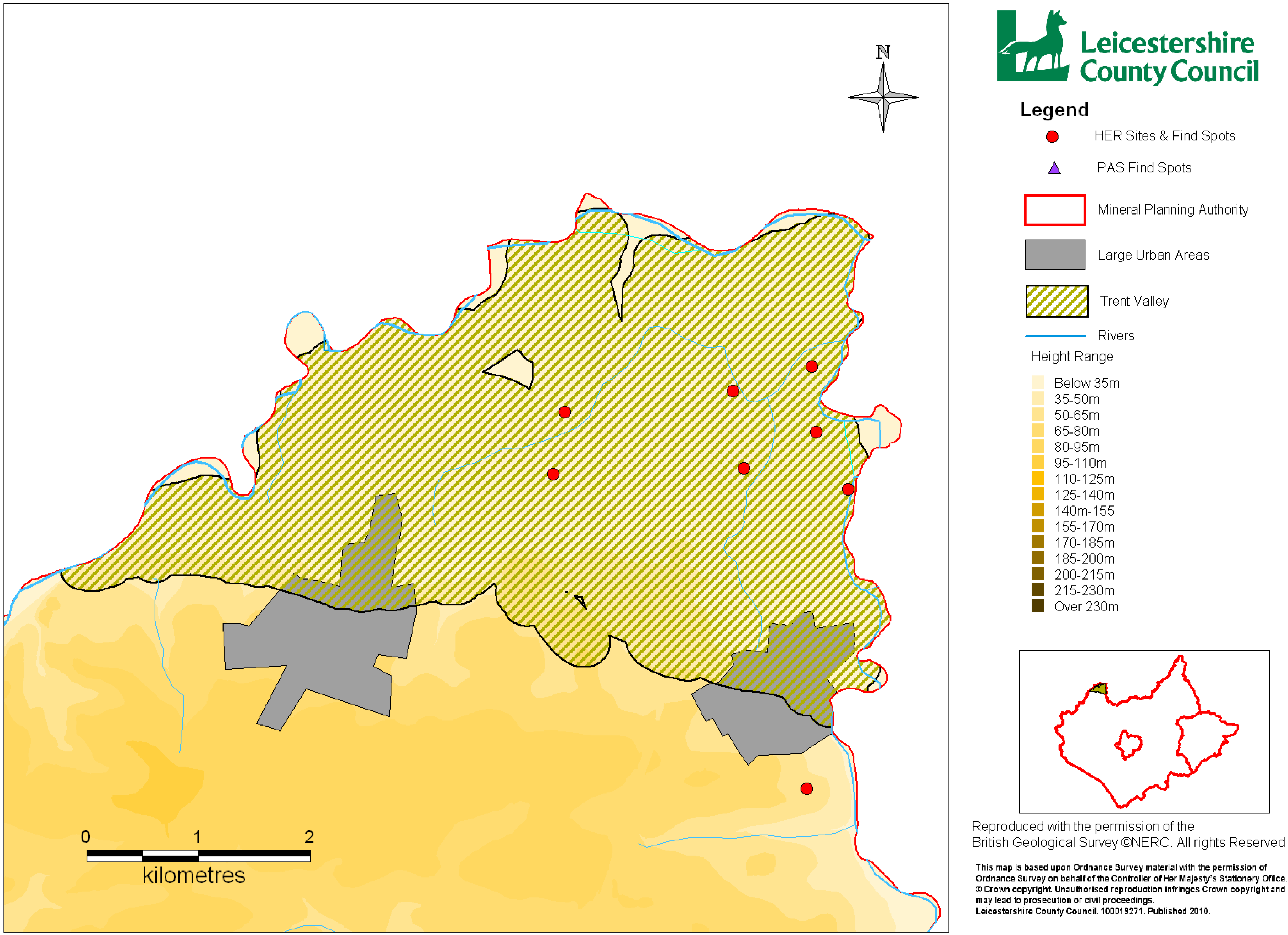
200-215m
215-230m
Over 230m



Trent Valley ARA Sub Area Palaeolithic Sites and Find Spots



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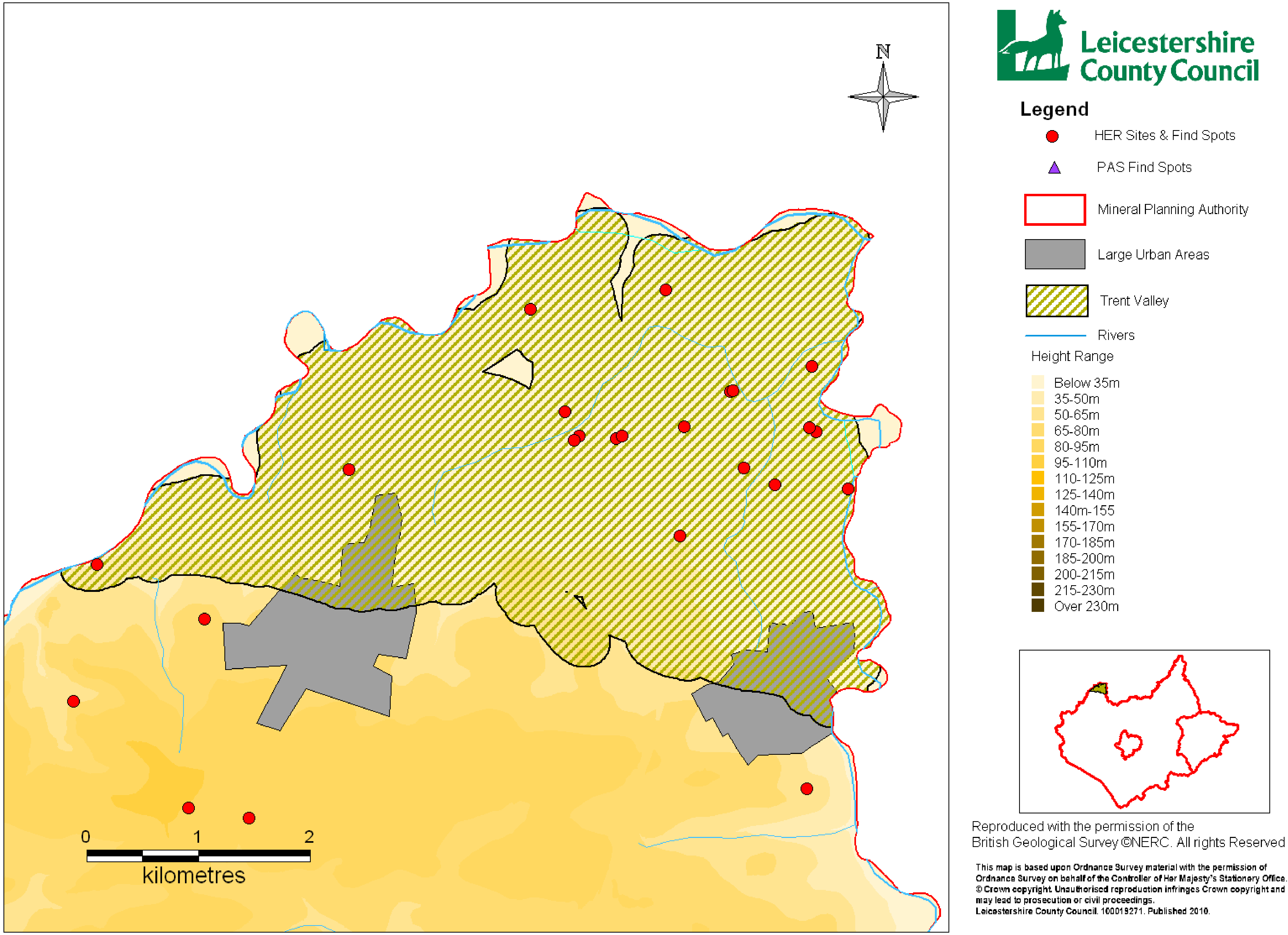

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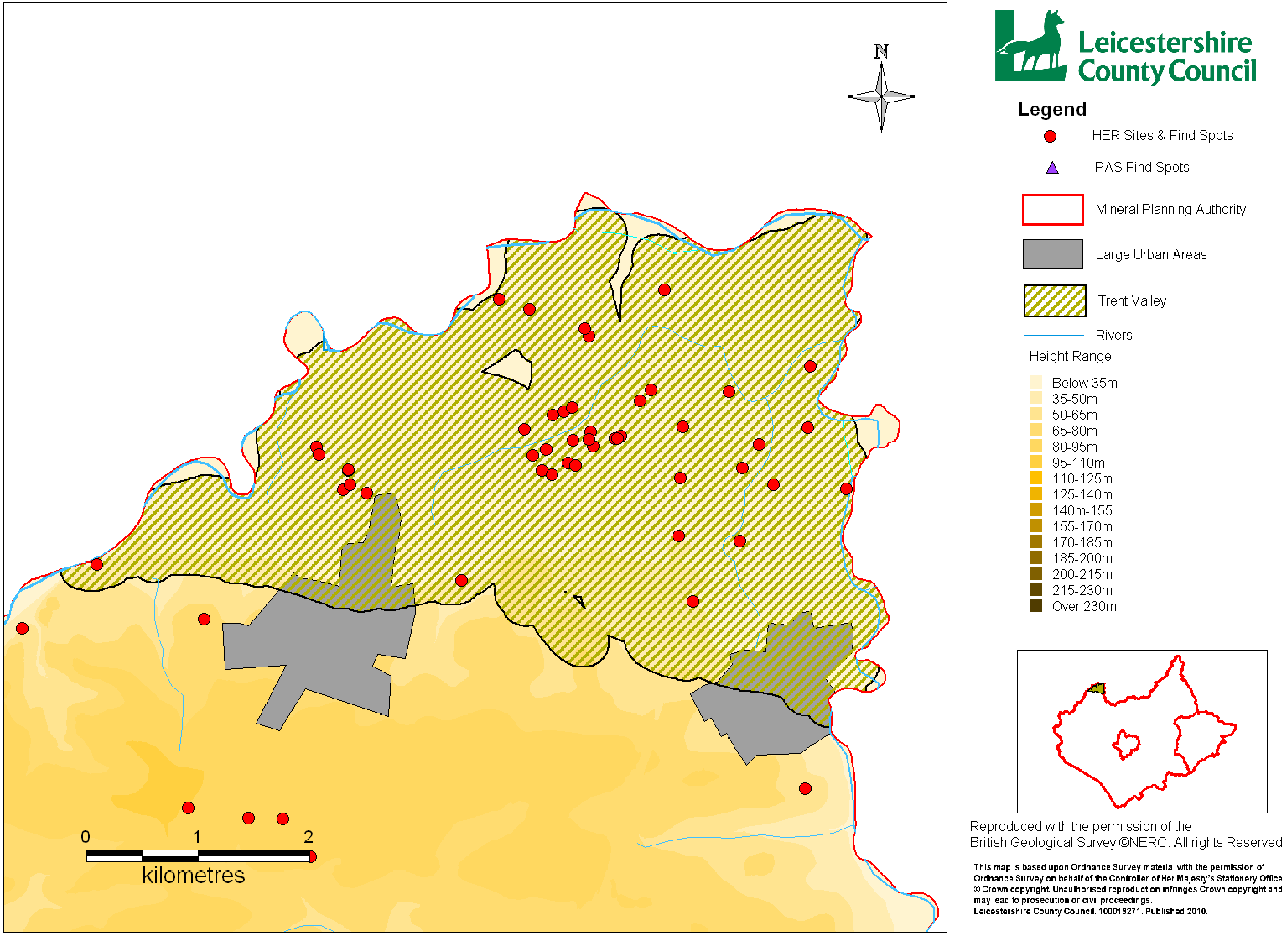

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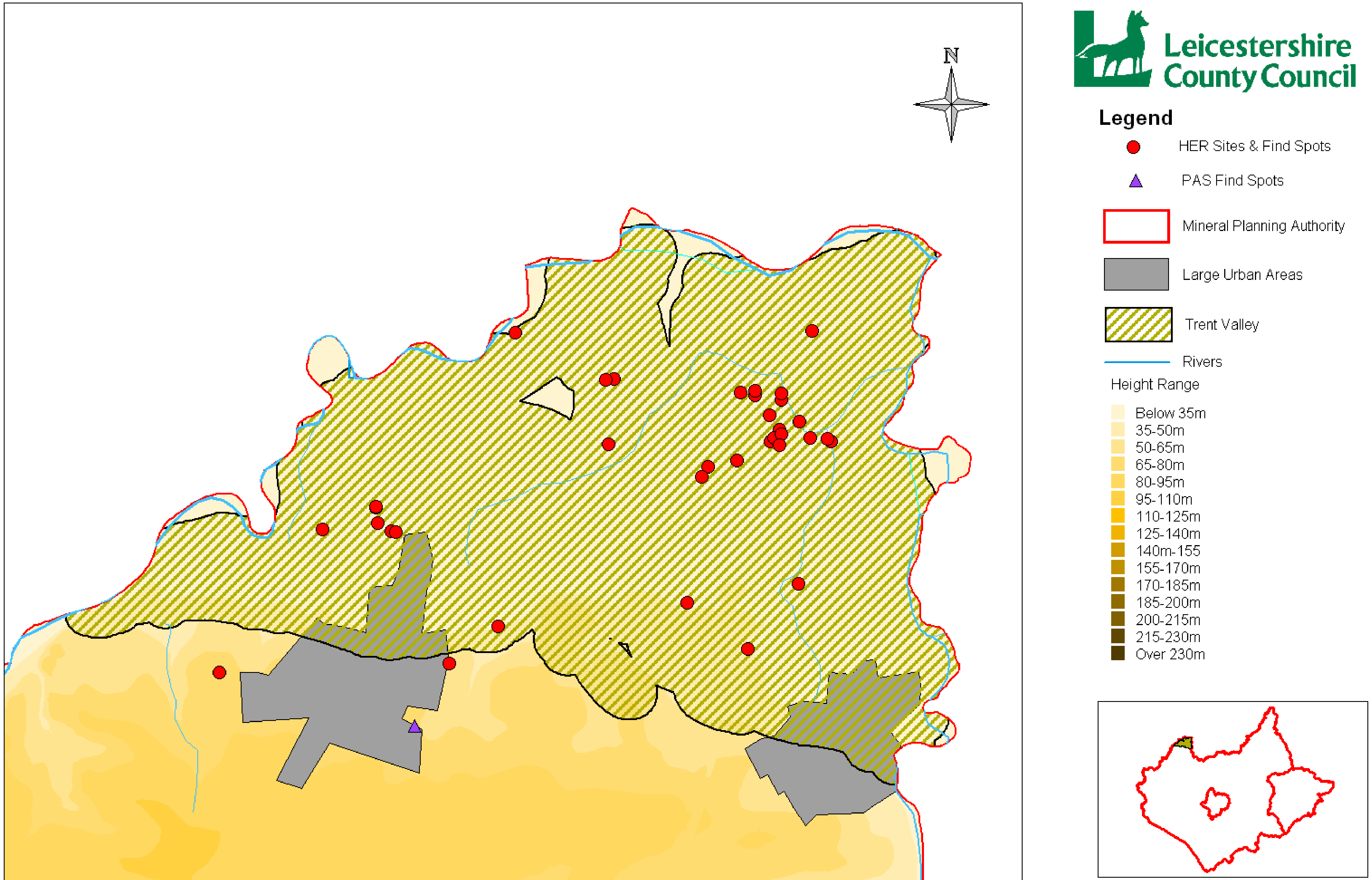

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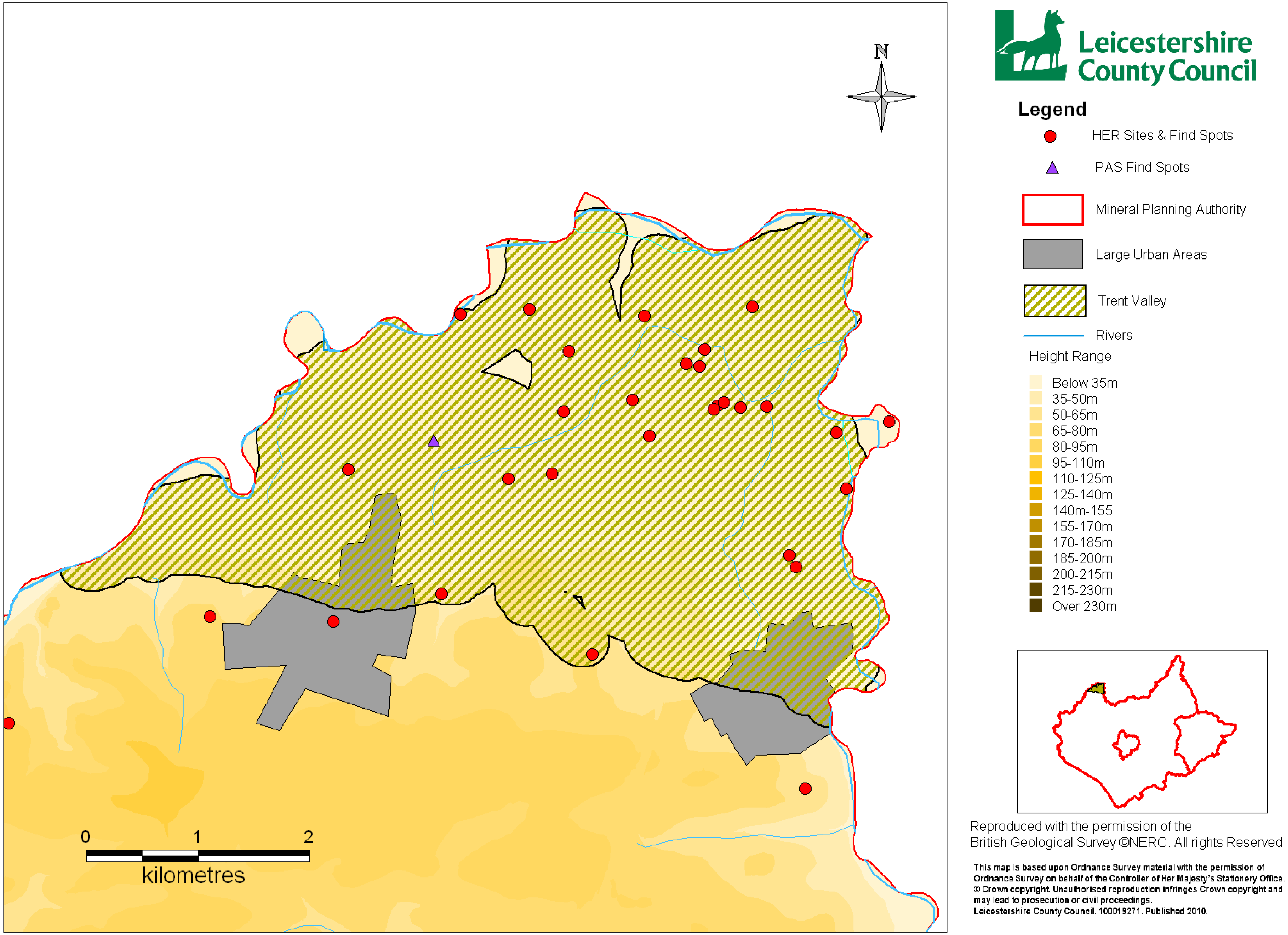
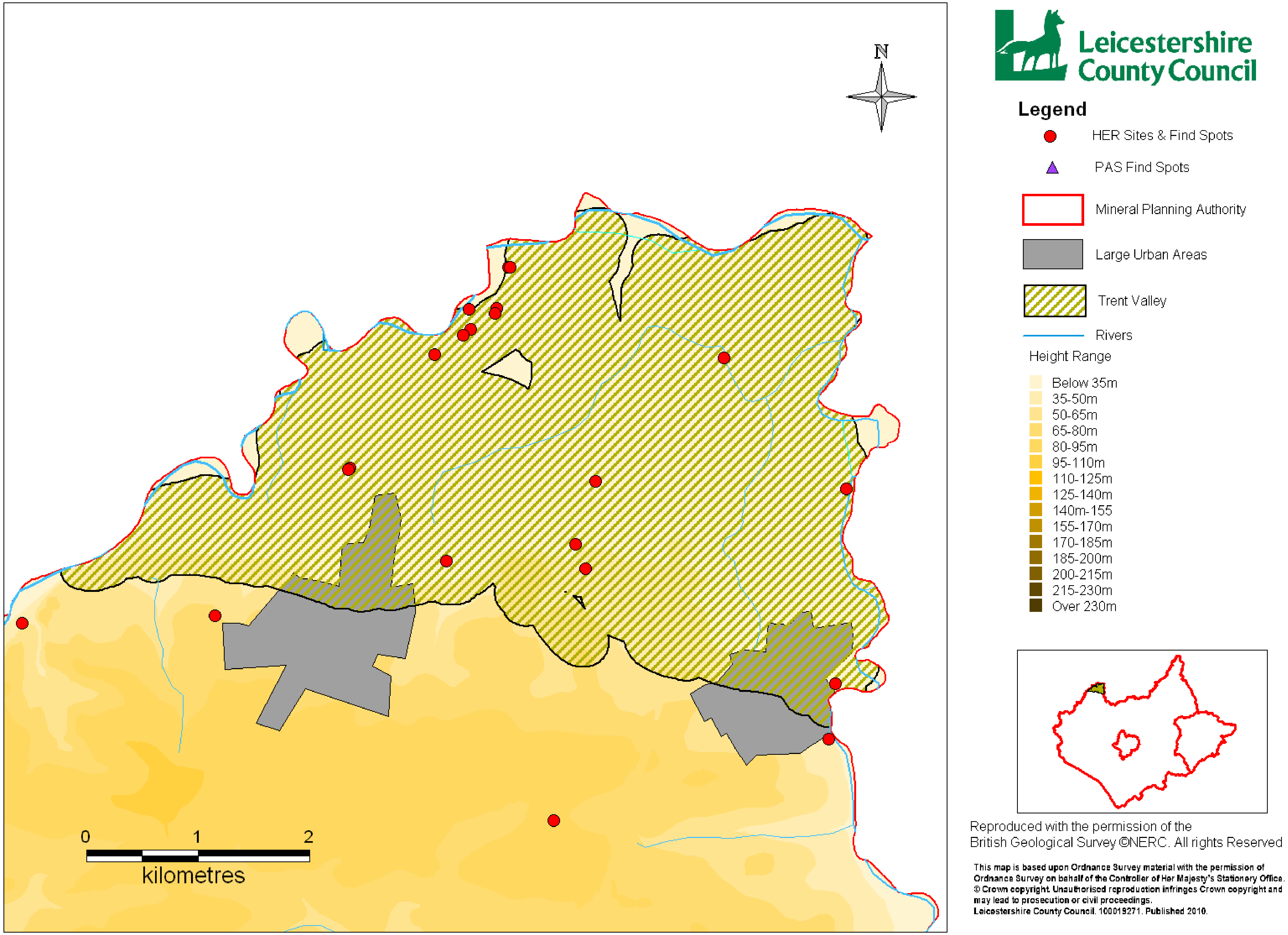
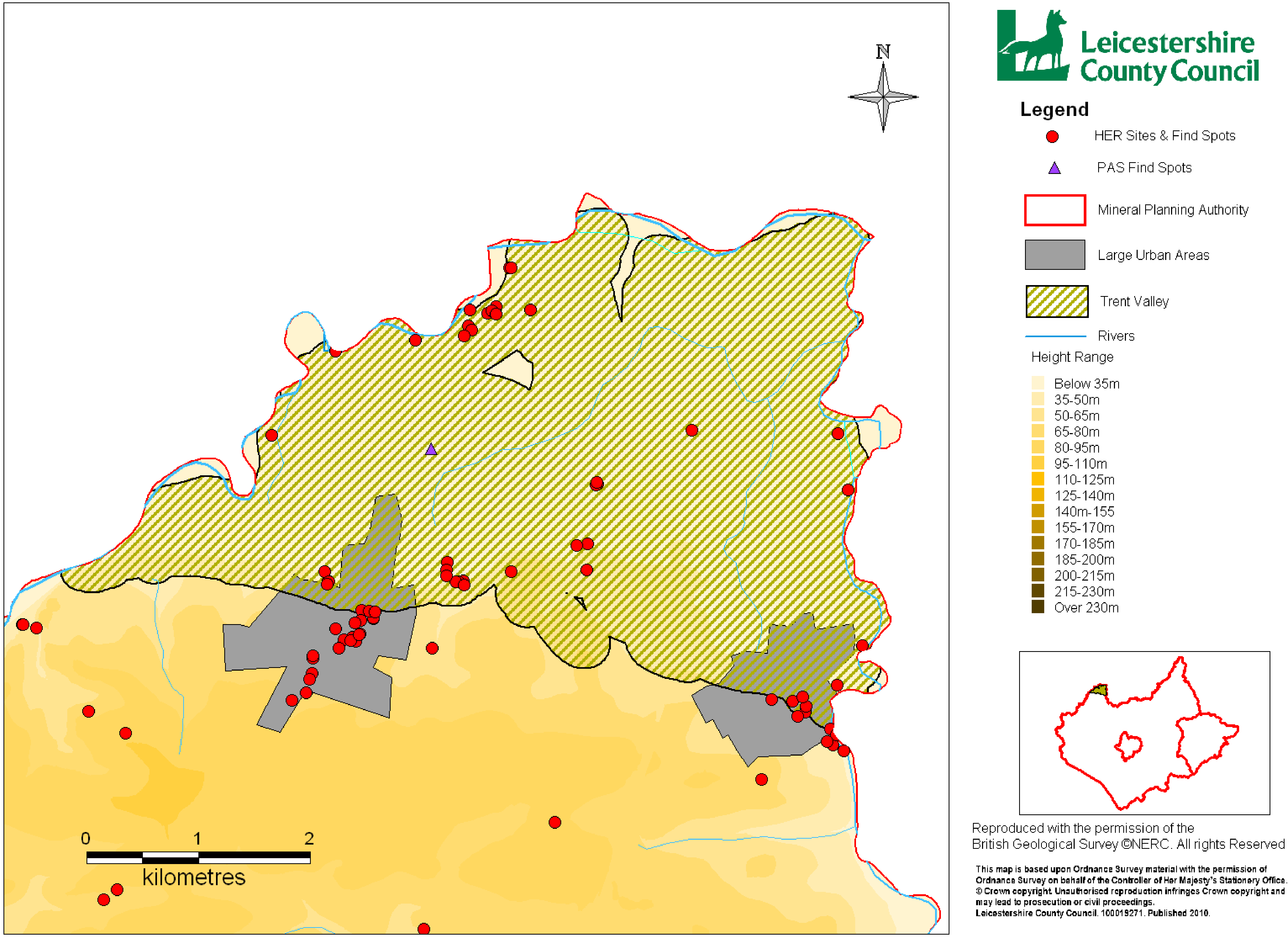


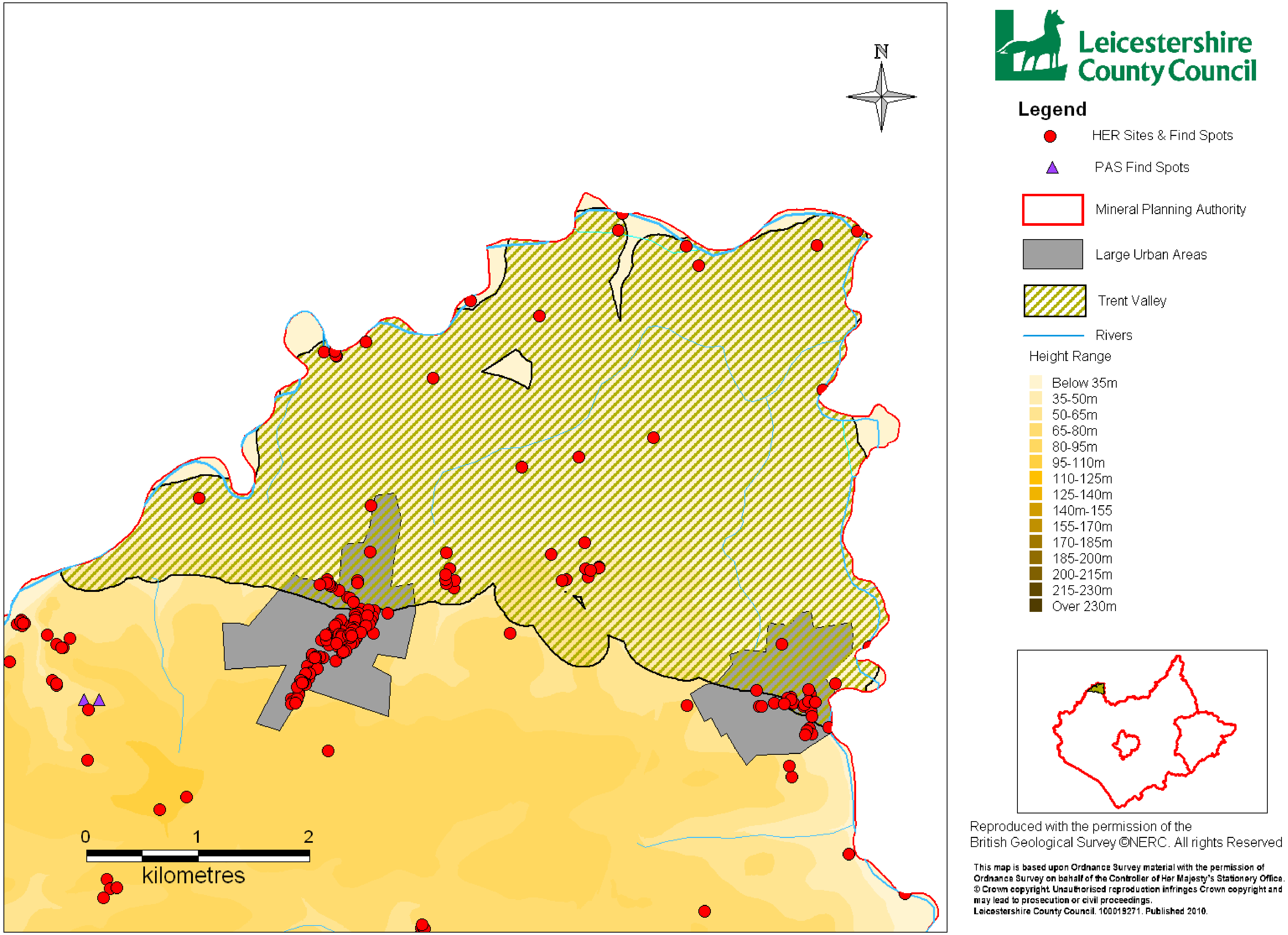
Trent Valley ARA Sub Area Roman Sites and Find Spots



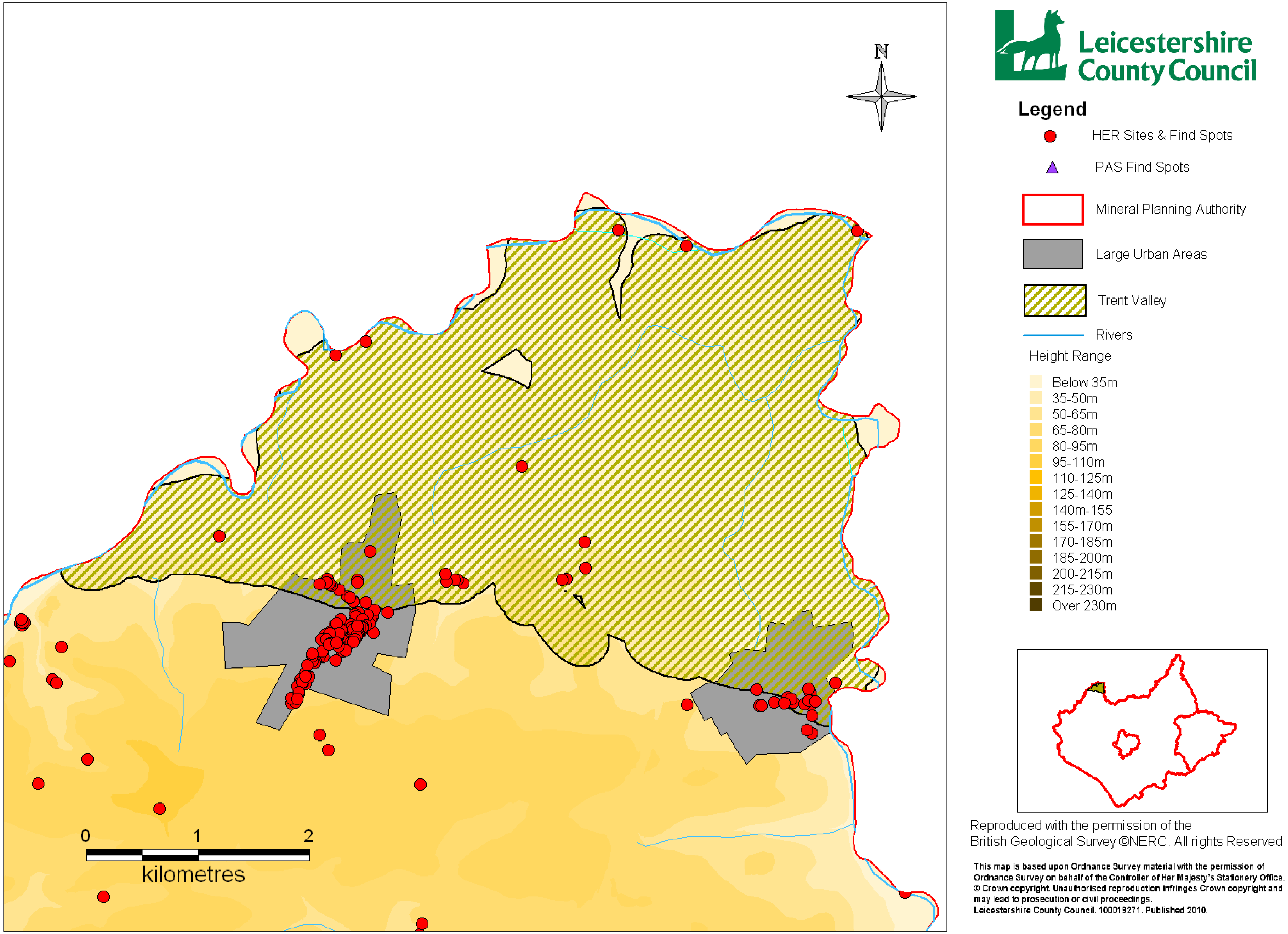
Trent Valley ARA Sub Area Anglo-Saxon Sites and Find Spots



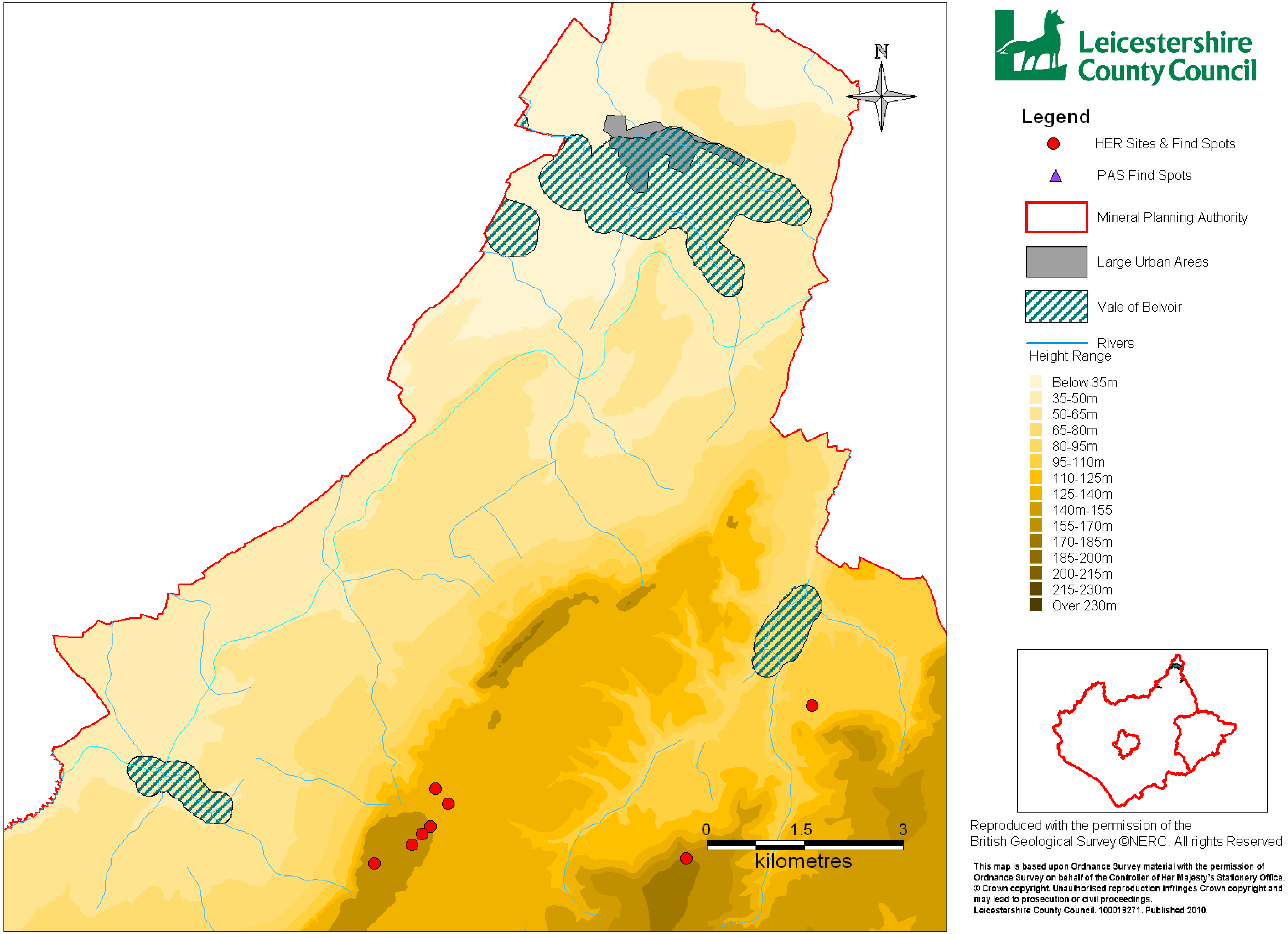
Trent Valley ARA Sub Area Medieval Sites and Find Spots



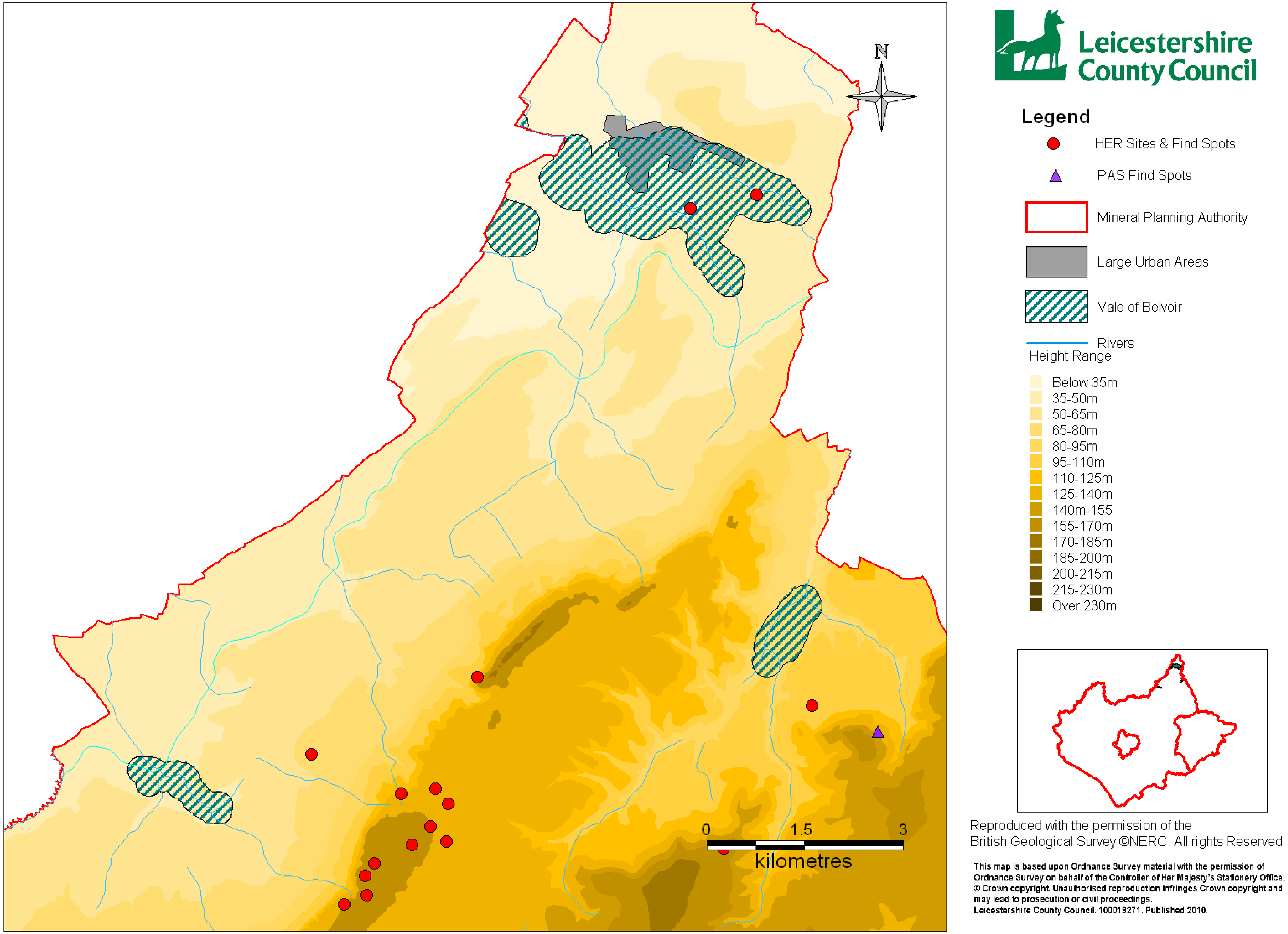
Trent Valley ARA Sub Area Post-Medieval Sites and Find Spots



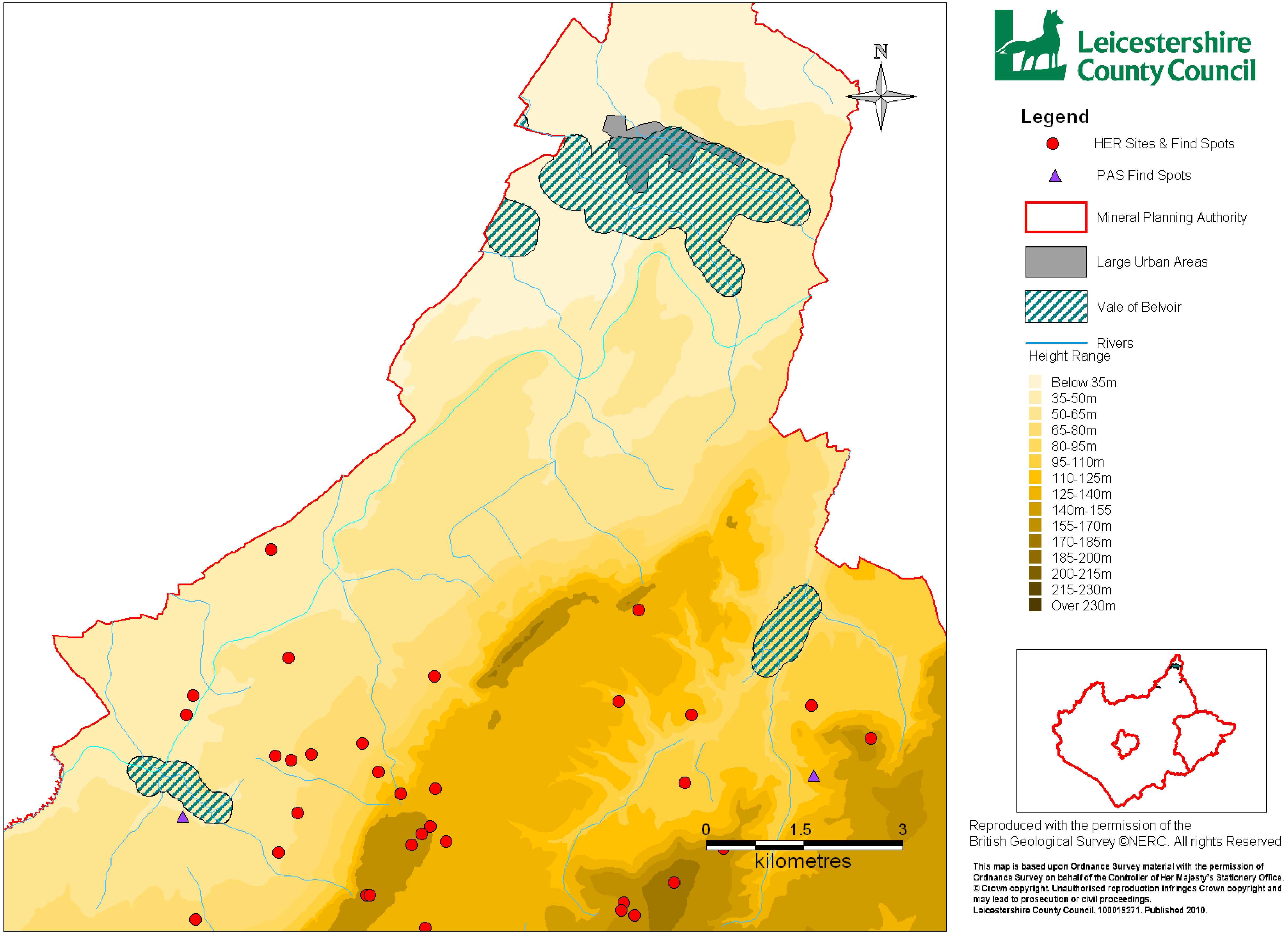
Trent Valley ARA Sub Area Modern Sites and Find Spots



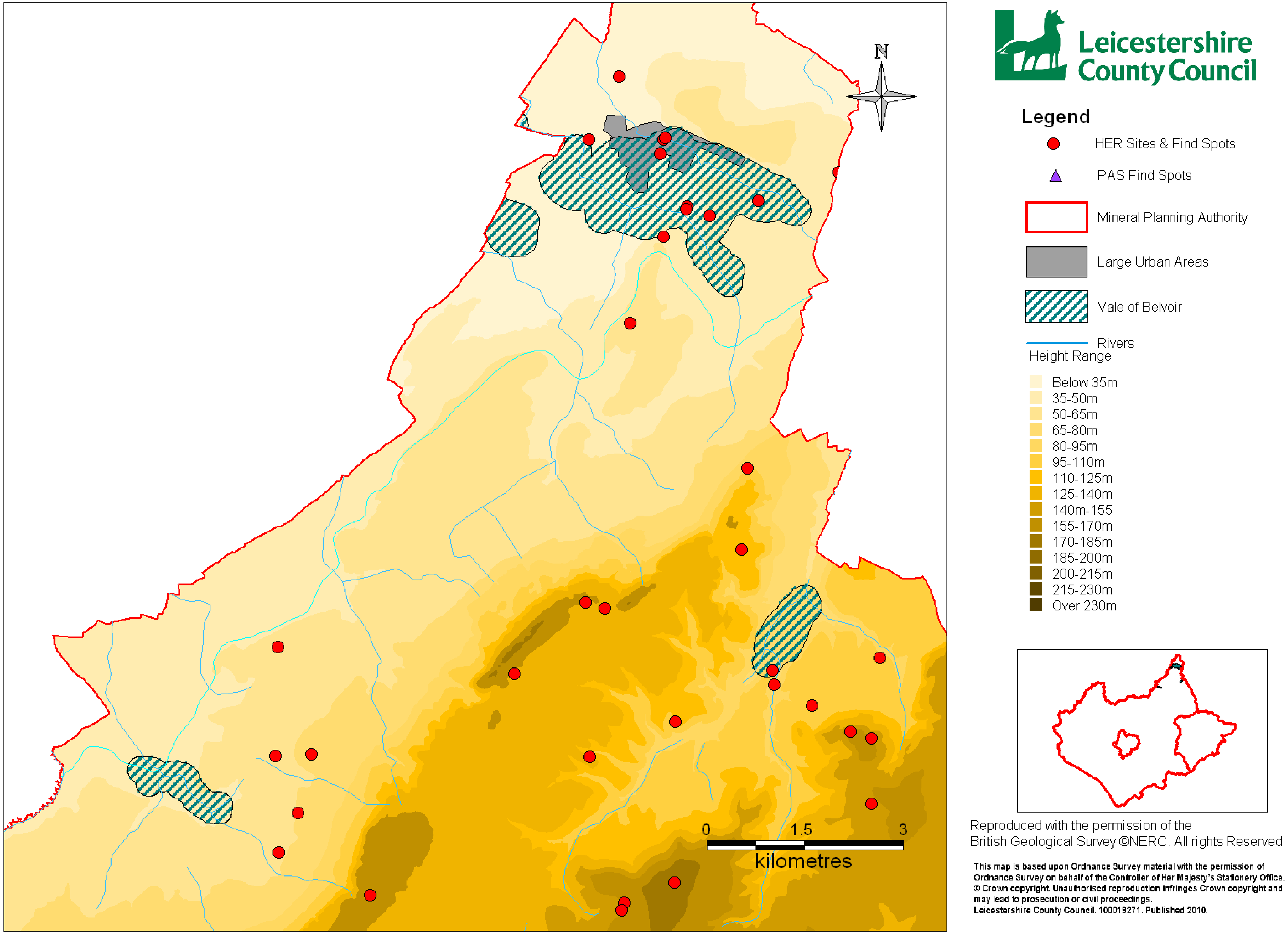
Vale of Belvoir ARA Sub Area Palaeolithic Sites and Findspots



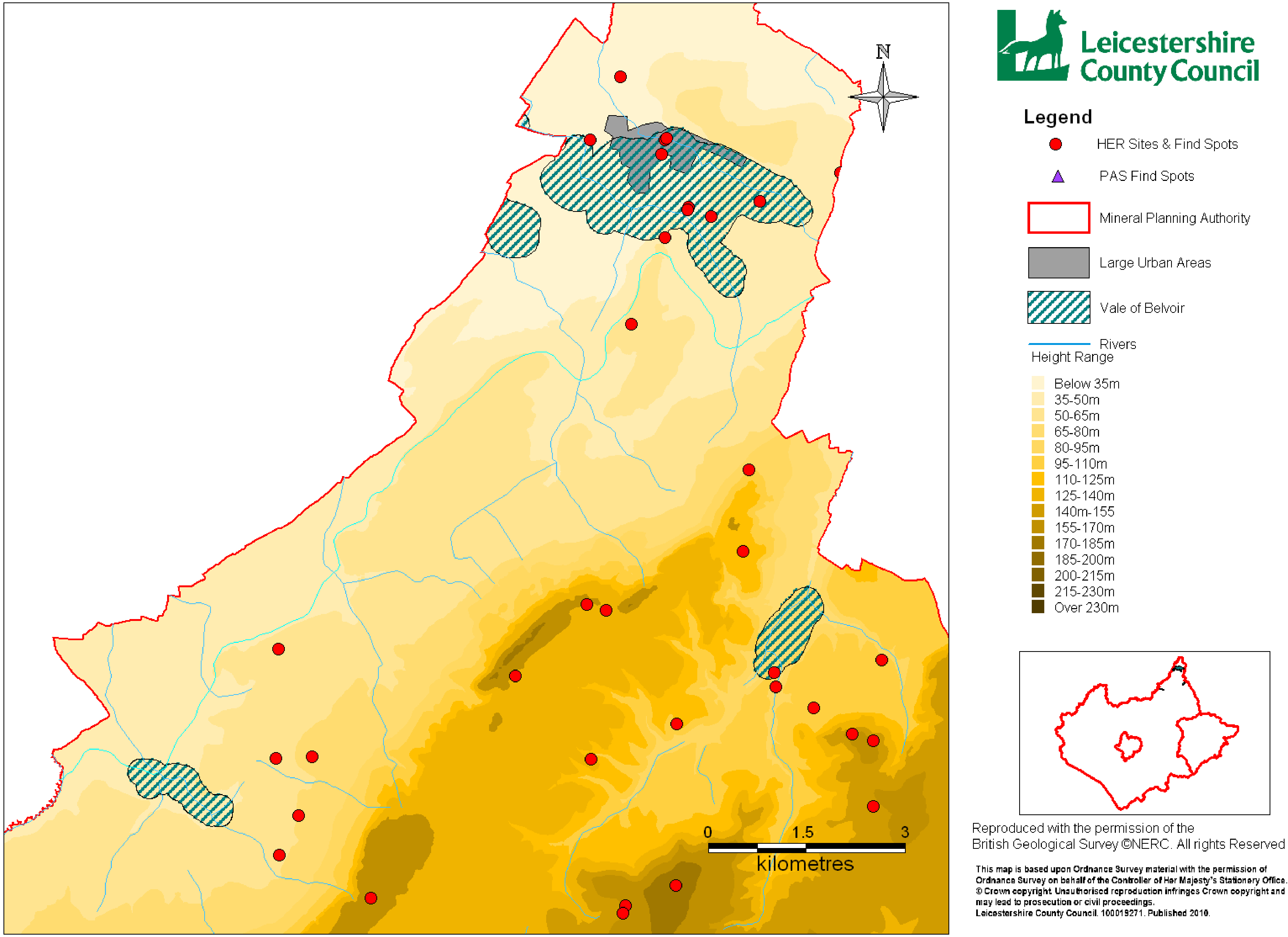
Vale of Belvoir ARA Sub Area Mesolithic Sites and Findspots



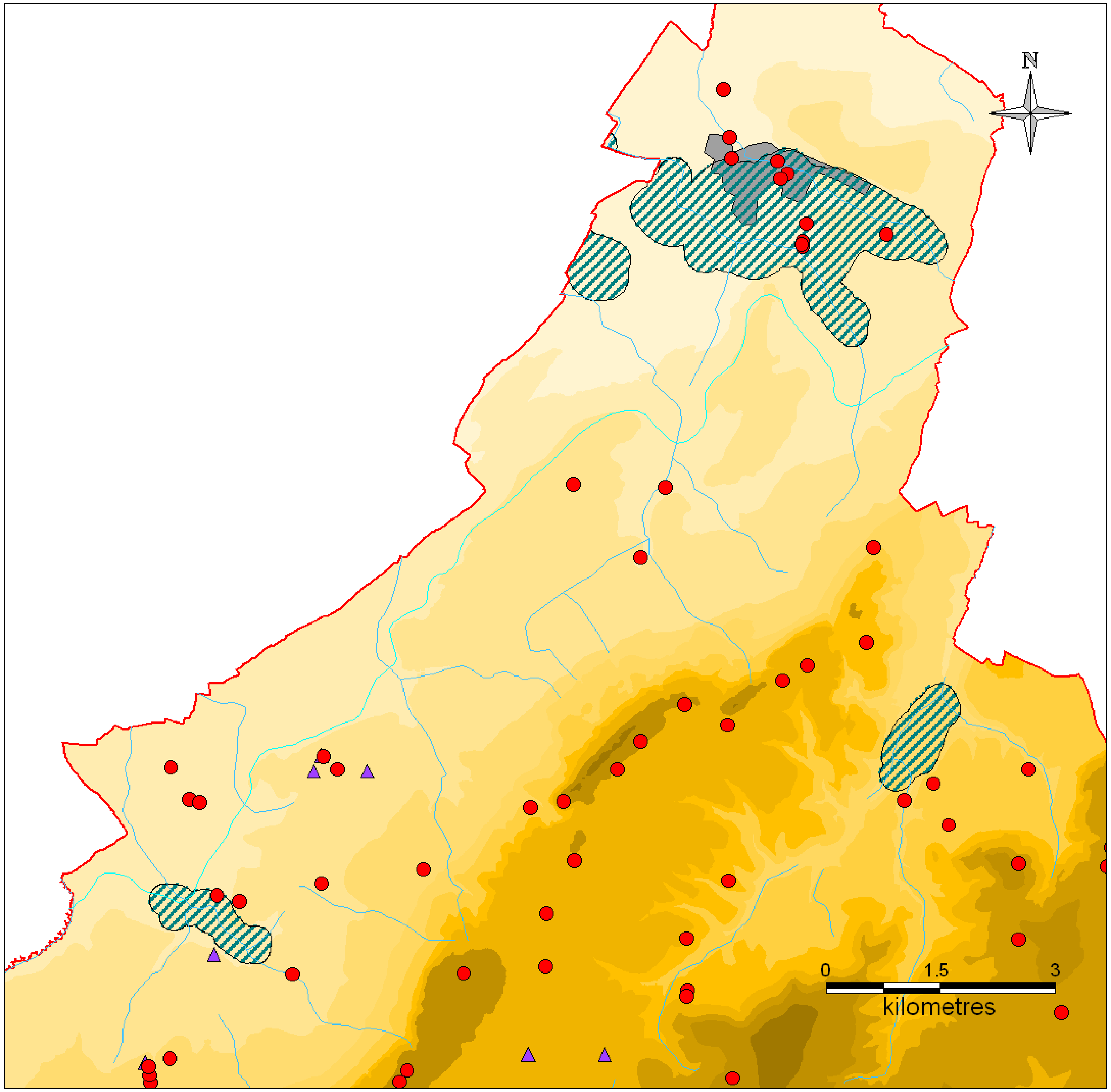
Vale of Belvoir ARA Sub Area Neolithic Sites and Findspots



Vale of Belvoir ARA Sub Area Bronze Age Sites and Findspots



Vale of Belvoir ARA Sub Area Iron Age Sites and Findspots



Leicestershire County Council

Legend

HER Sites & Find Spots

PAS Find Spots

Mineral Planning Authority

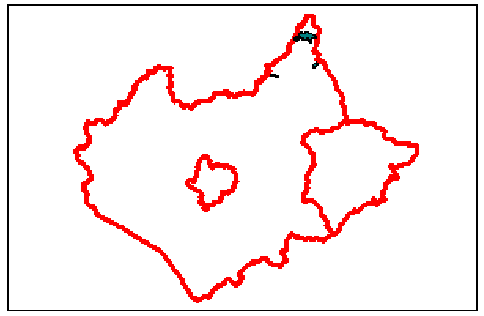
Large Urban Areas

Vale of Belvoir

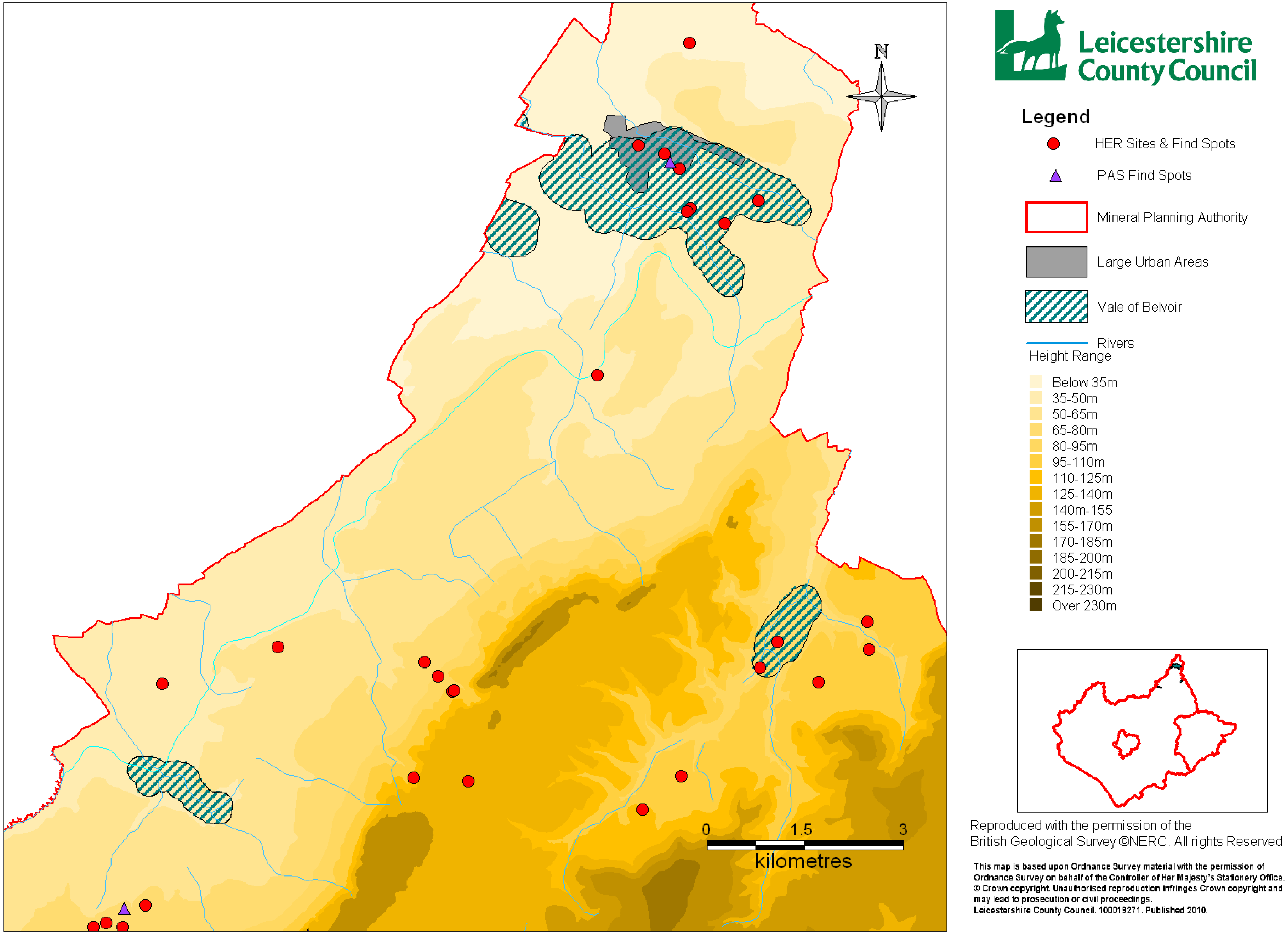
Rivers

Height Range

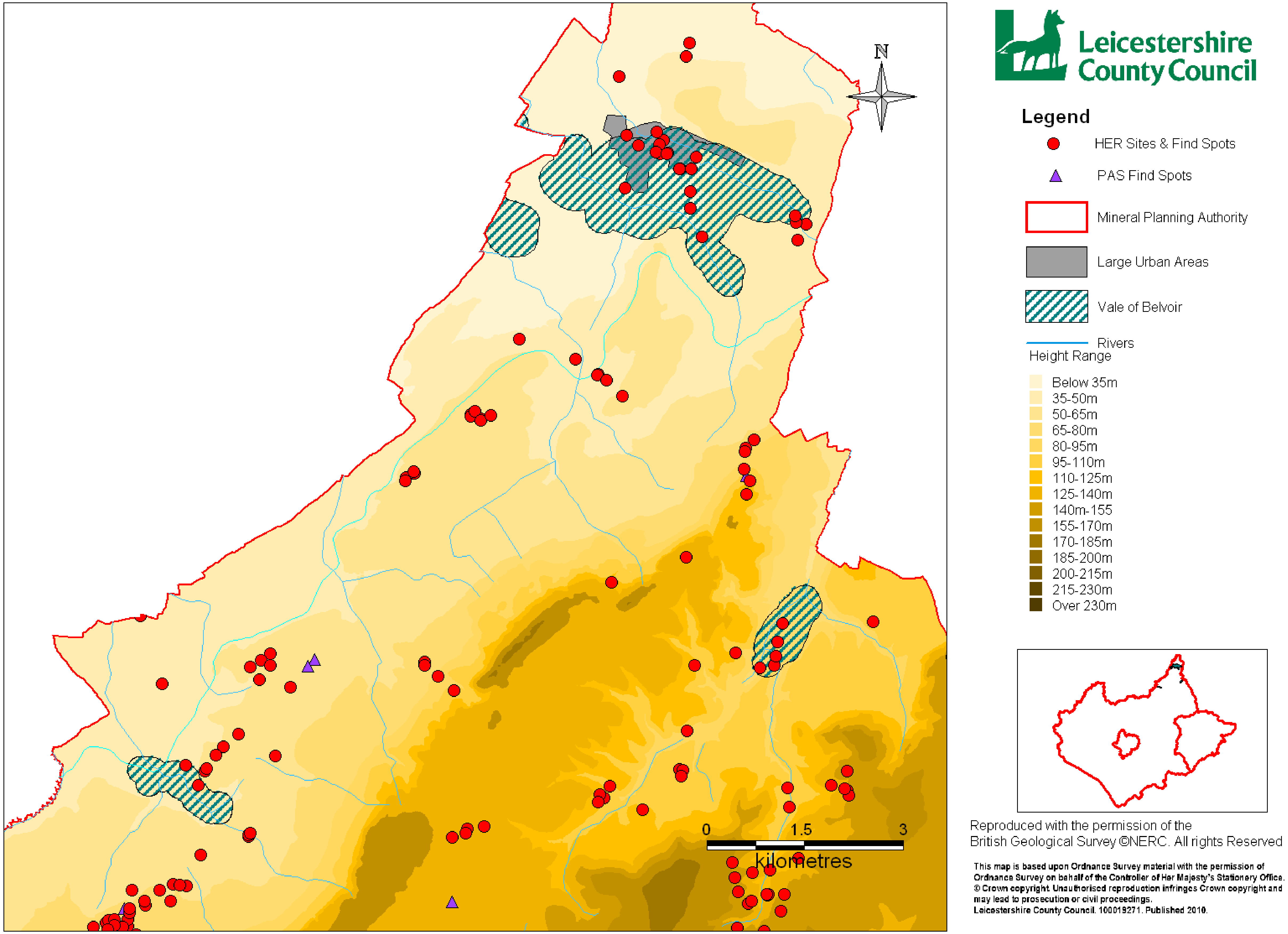
Below 35m
35-50m
50-65m
65-80m
80-95m
95-110m
110-125m
125-140m
140m-155
155-170m
170-185m
185-200m
200-215m
215-230m
Over 230m



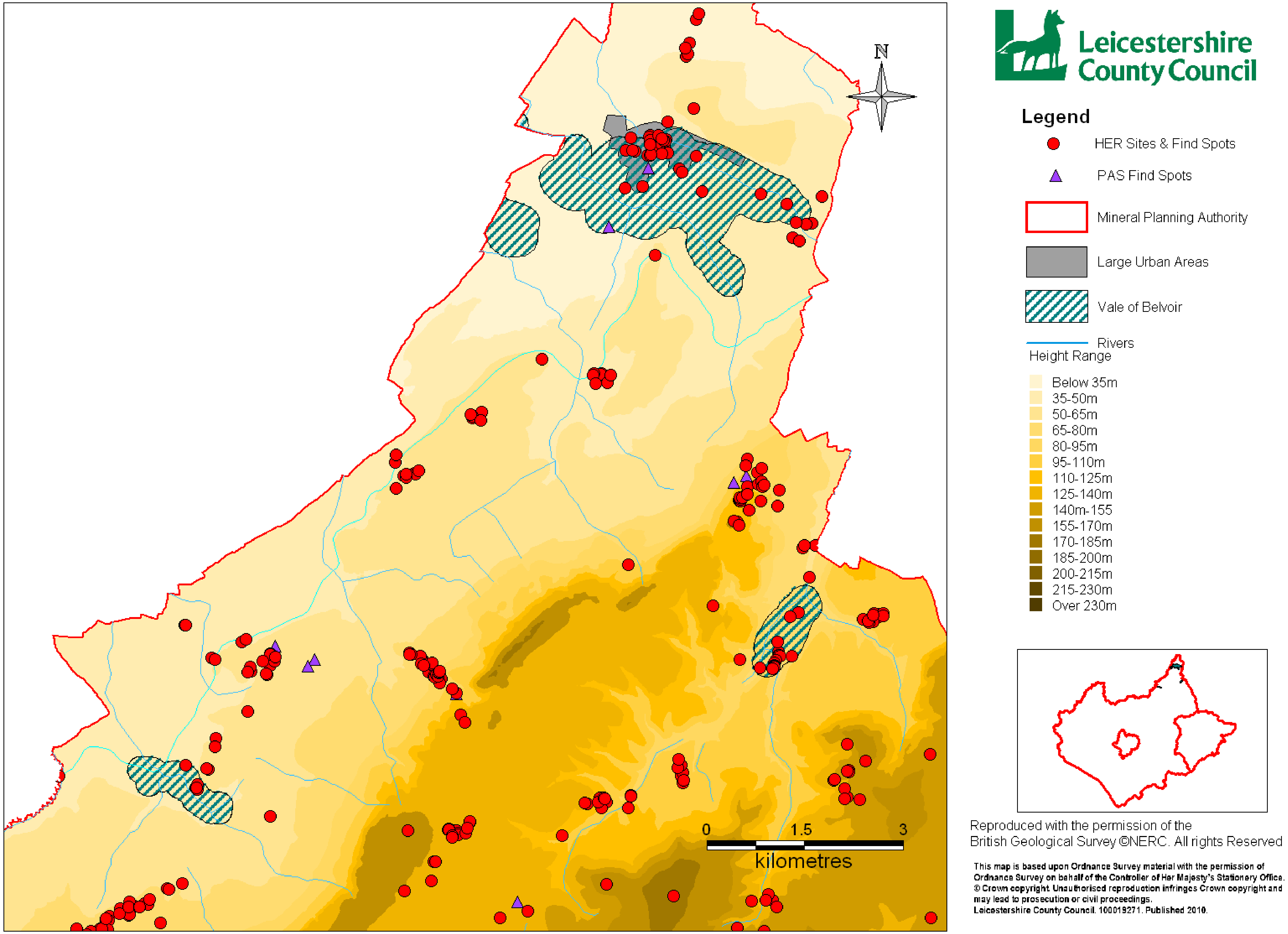
Vale of Belvoir ARA Sub Area Roman Sites and Findspots



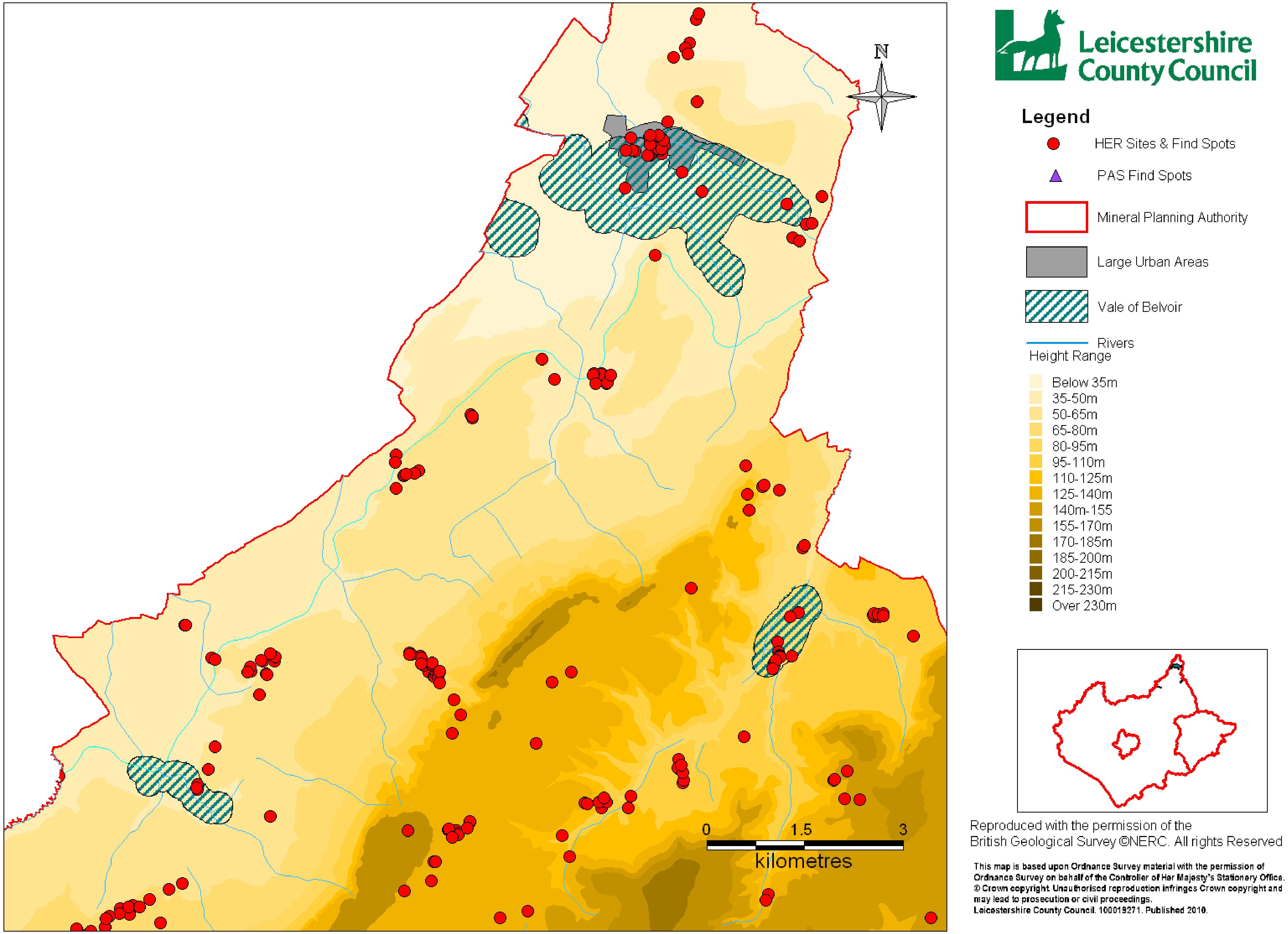
Vale of Belvoir ARA Sub Area Anglo-Saxon Sites and Findspots



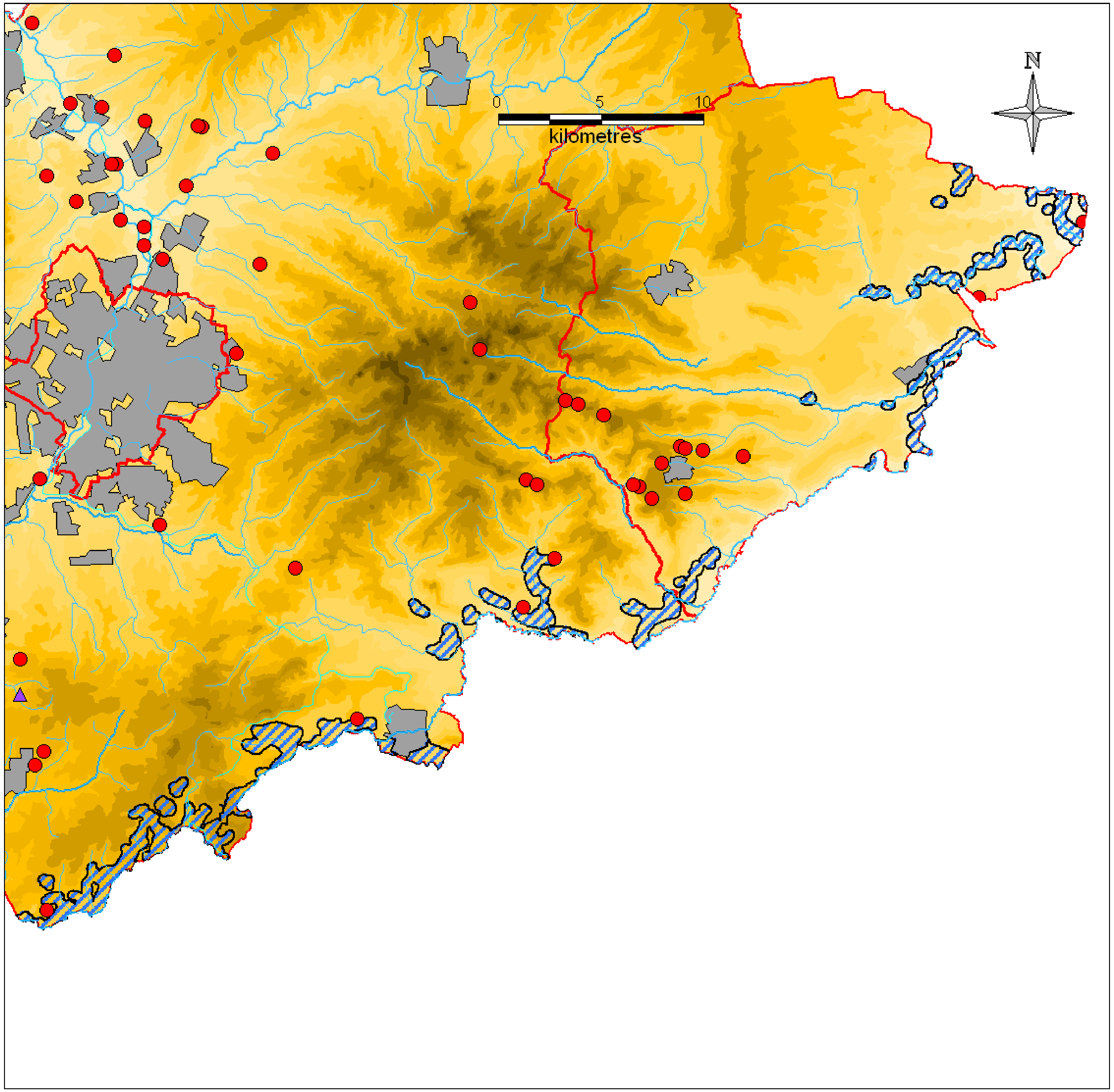
Vale of Belvoir ARA Sub Area Medieval Sites and Findspots



Vale of Belvoir ARA Sub Area Post-Medieval Sites and Findspots



Vale of Belvoir ARA Sub Area Modern Sites and Findspots



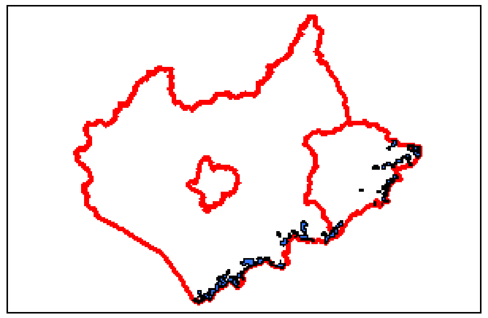
Leicestershire County Council

Legend

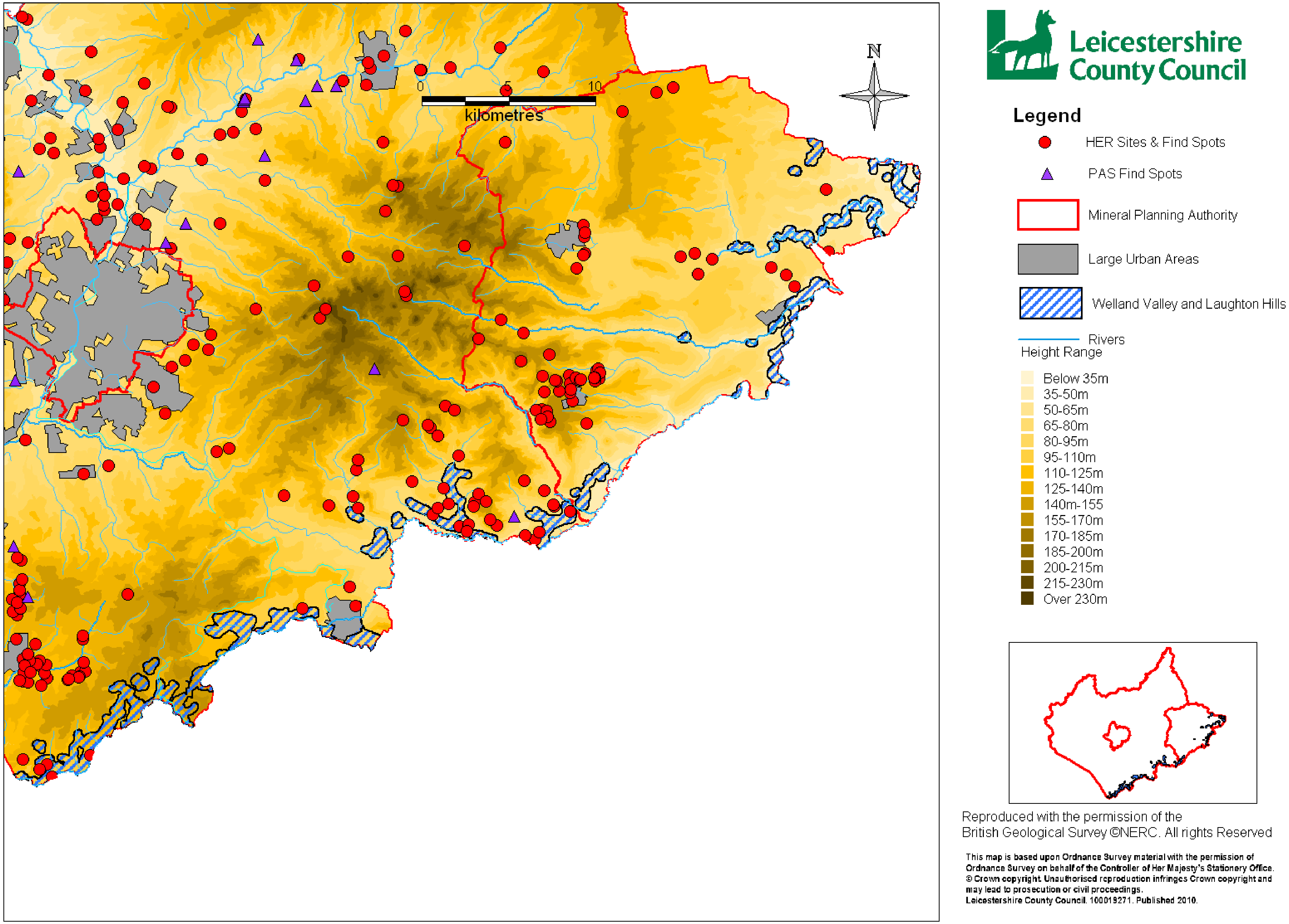
HER Sites & Find Spots
PAS Find Spots
Mineral Planning Authority
Large Urban Areas
Welland Valley and Laughton Hills
Rivers

Height Range

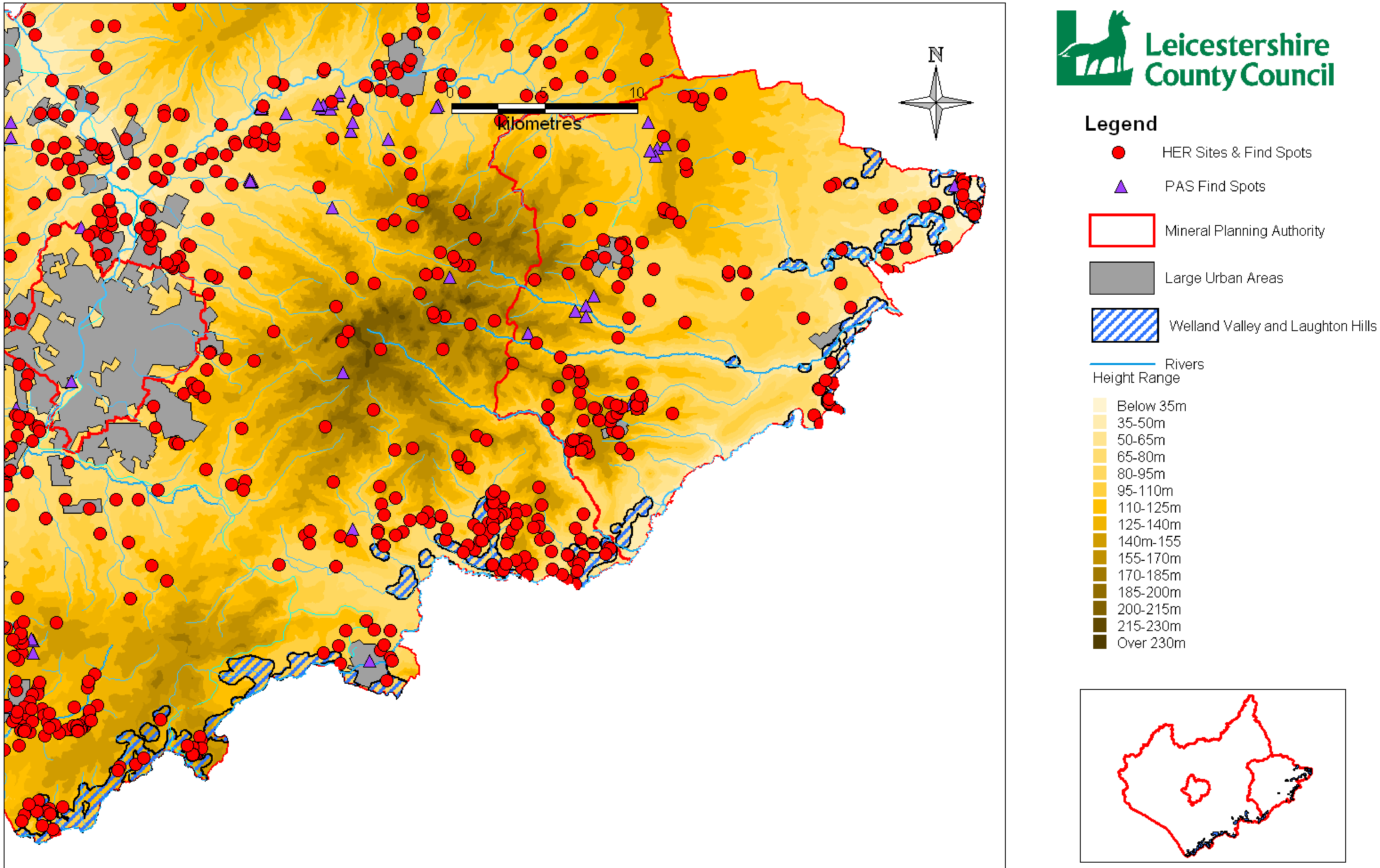
Below 35m
35-50m
50-65m
65-80m
80-95m
95-110m
110-125m
125-140m
140m-155
155-170m
170-185m
185-200m
200-215m
215-230m
Over 230m



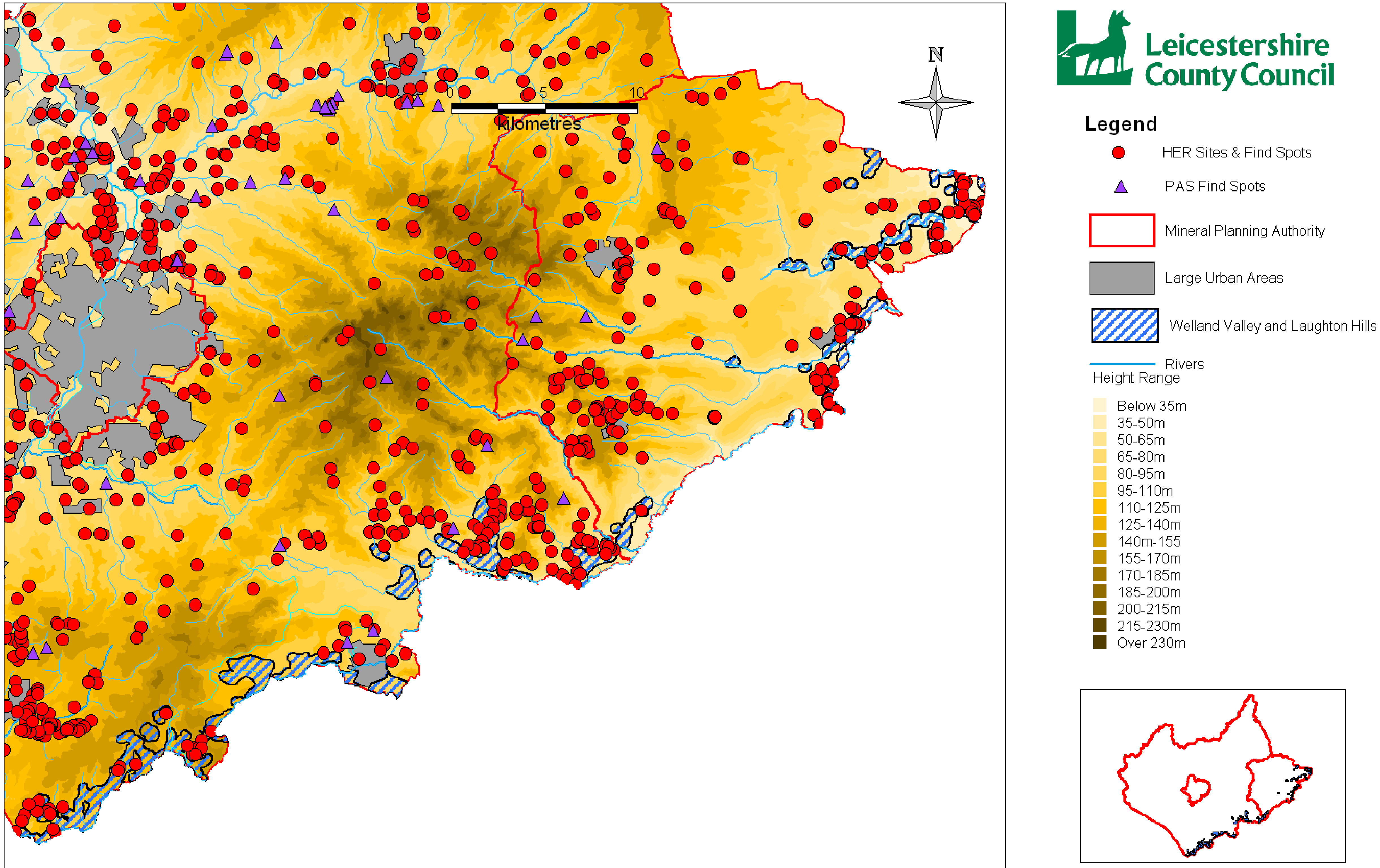
Welland Valley & Laughton Hills ARA Sub Area Palaeolithic Sites and Findspots



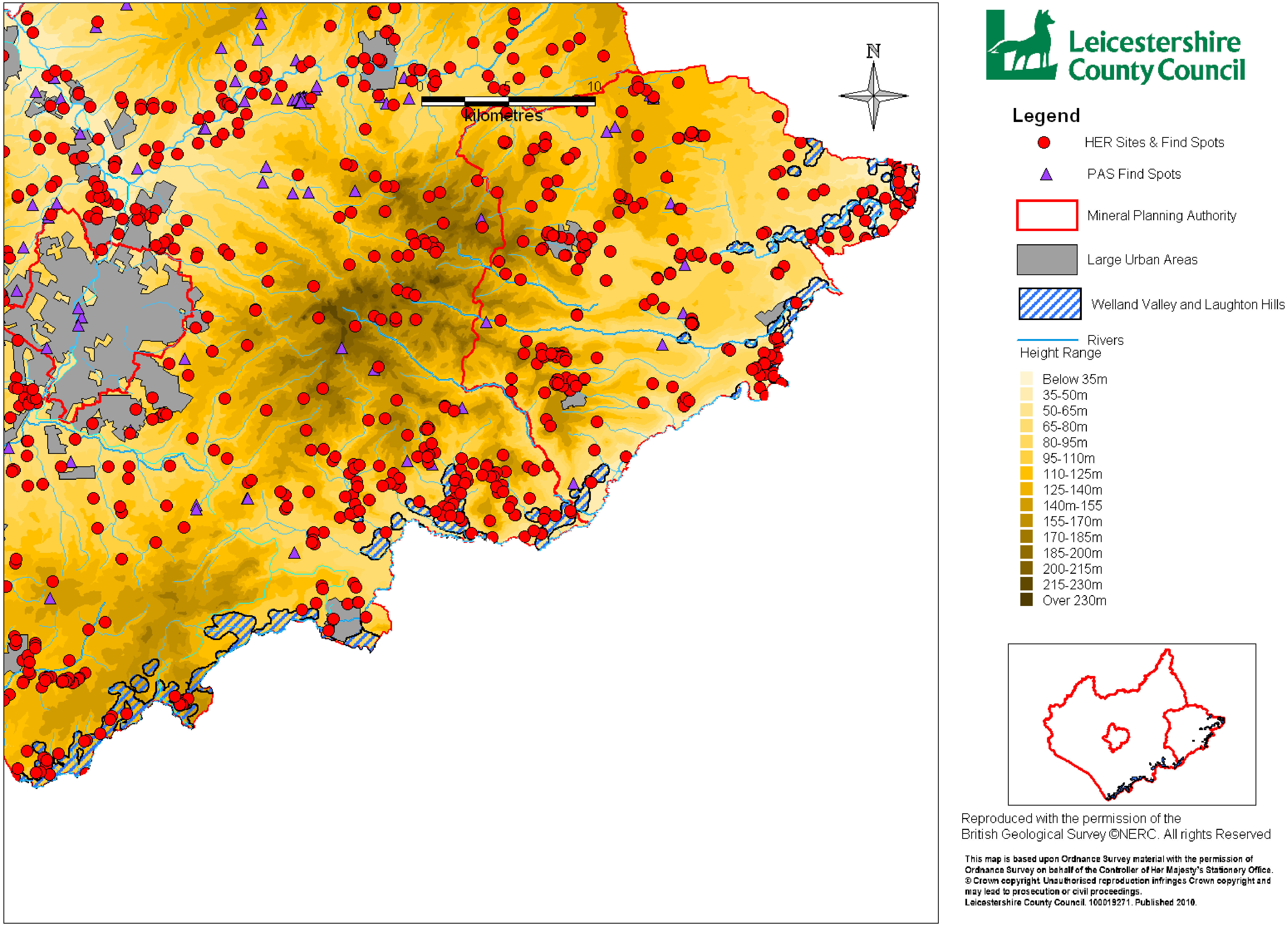
Welland Valley & Laughton Hills ARA Sub Area Mesolithic Sites and Findspots



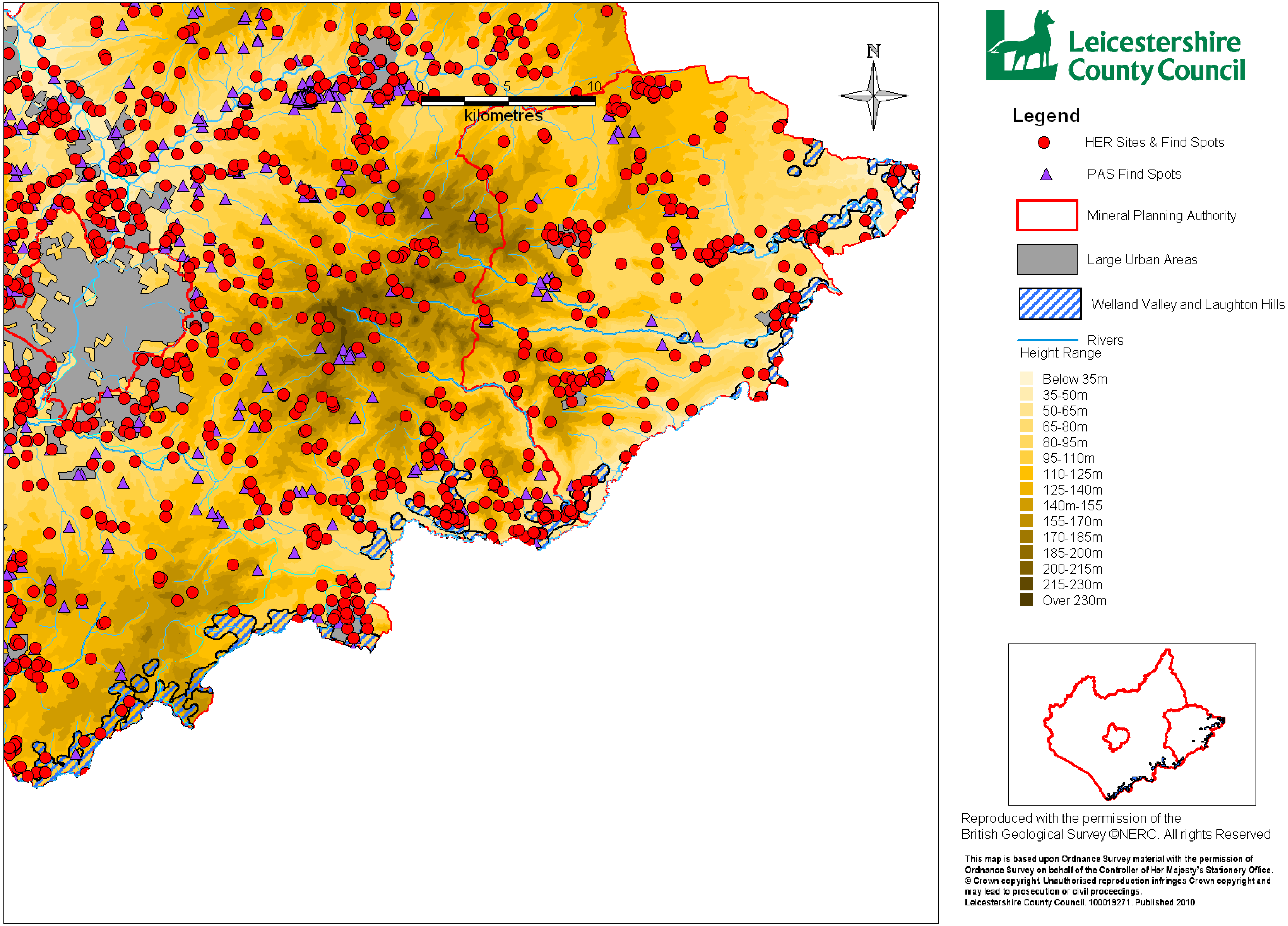
Welland Valley & Laughton Hills ARA Sub Area Neolithic Sites and Findspots



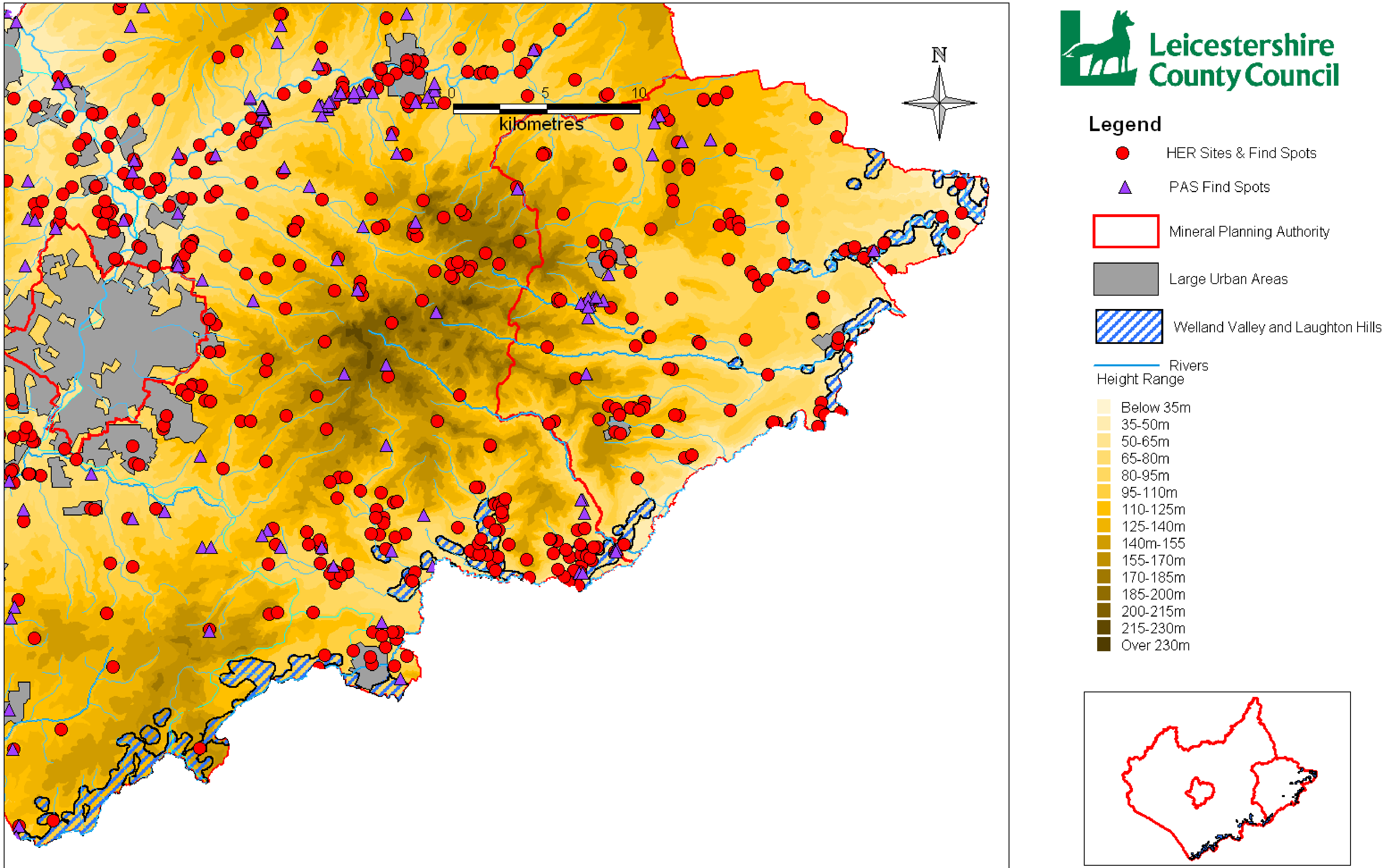
Welland Valley & Laughton Hills ARA Sub Area Bronze Age Sites and Findspots



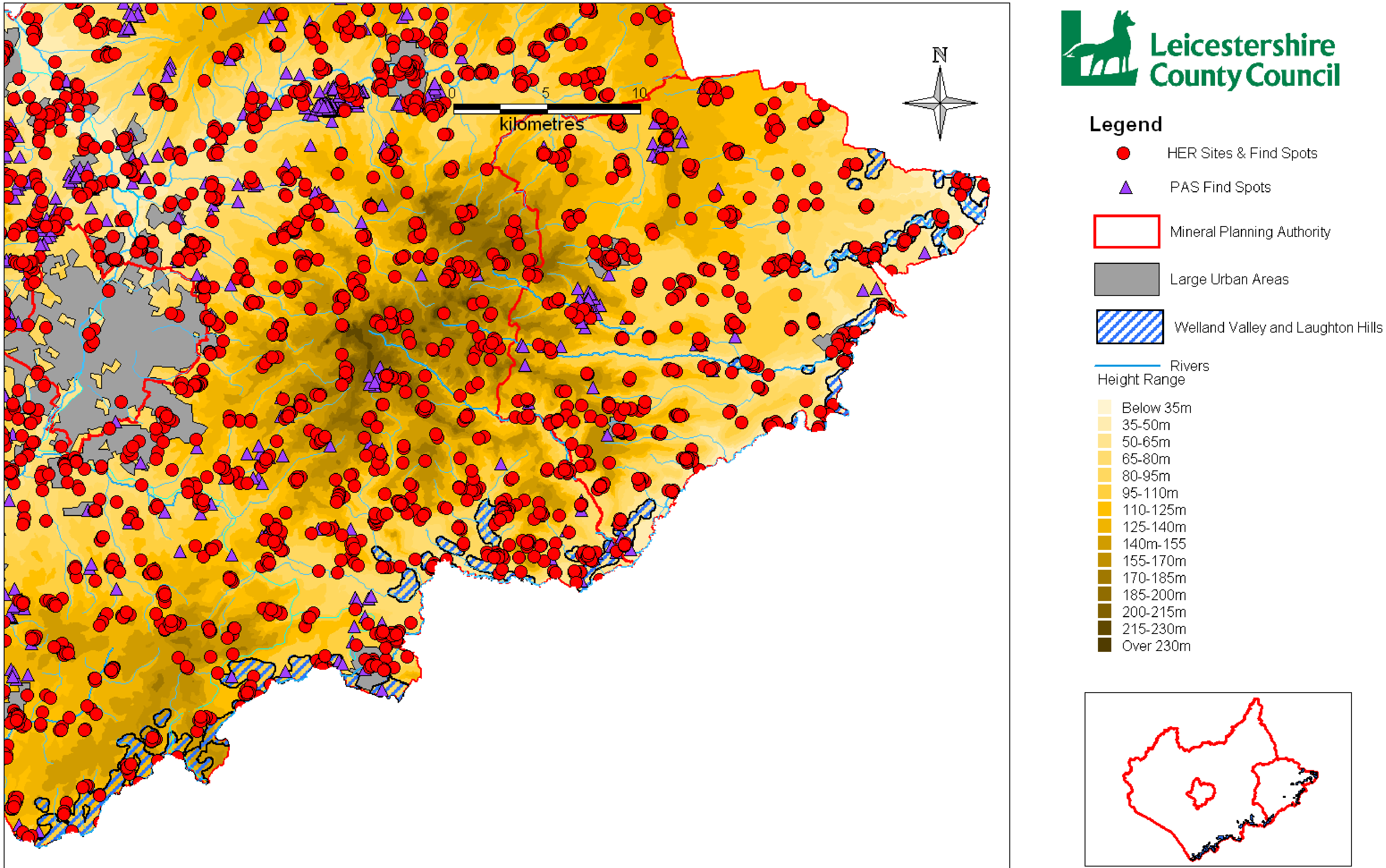
Welland Valley & Laughton Hills ARA Sub Area Iron Age Sites and Findspots



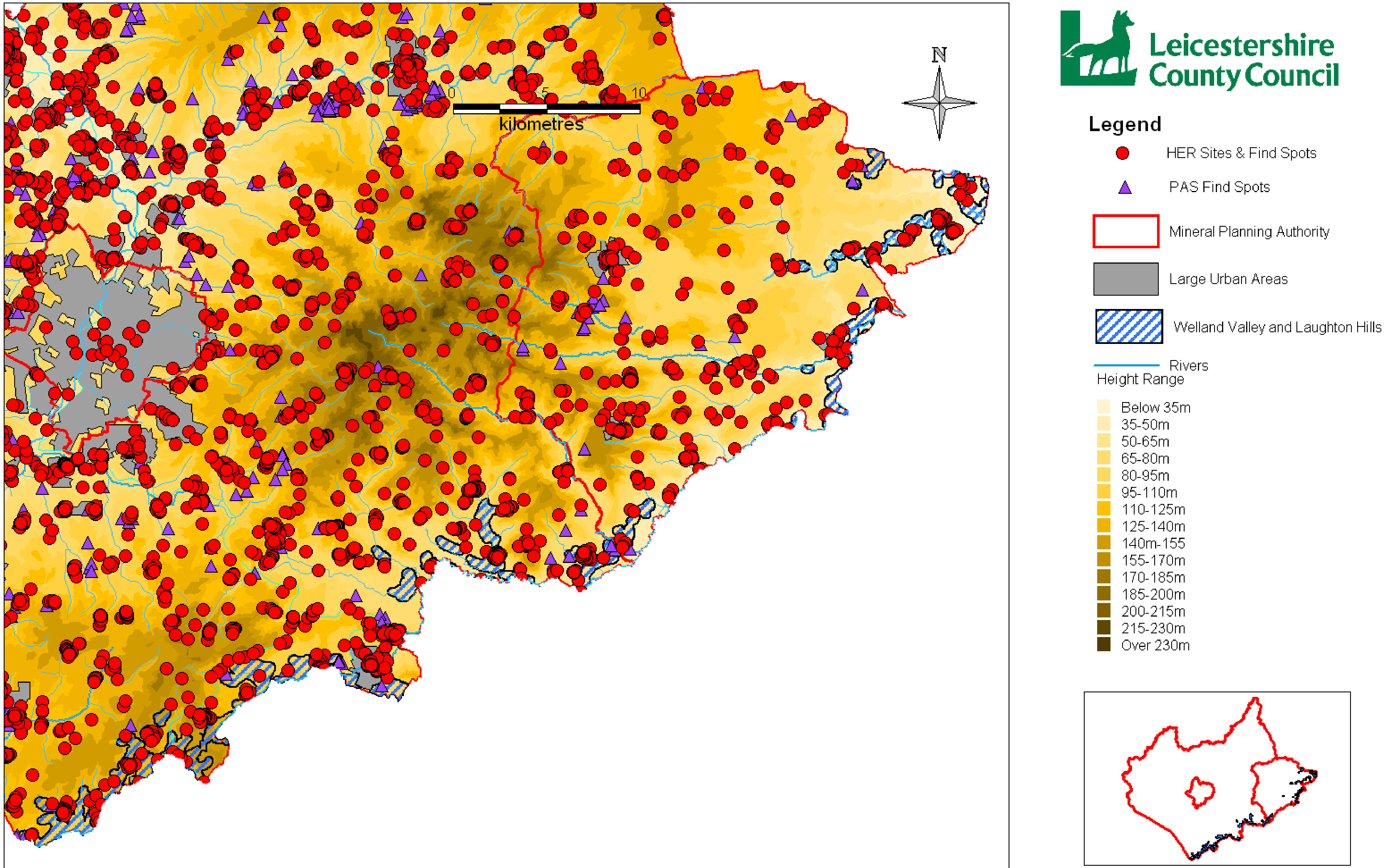
Welland Valley & Laughton Hills ARA Sub Area Roman Sites and Findspots



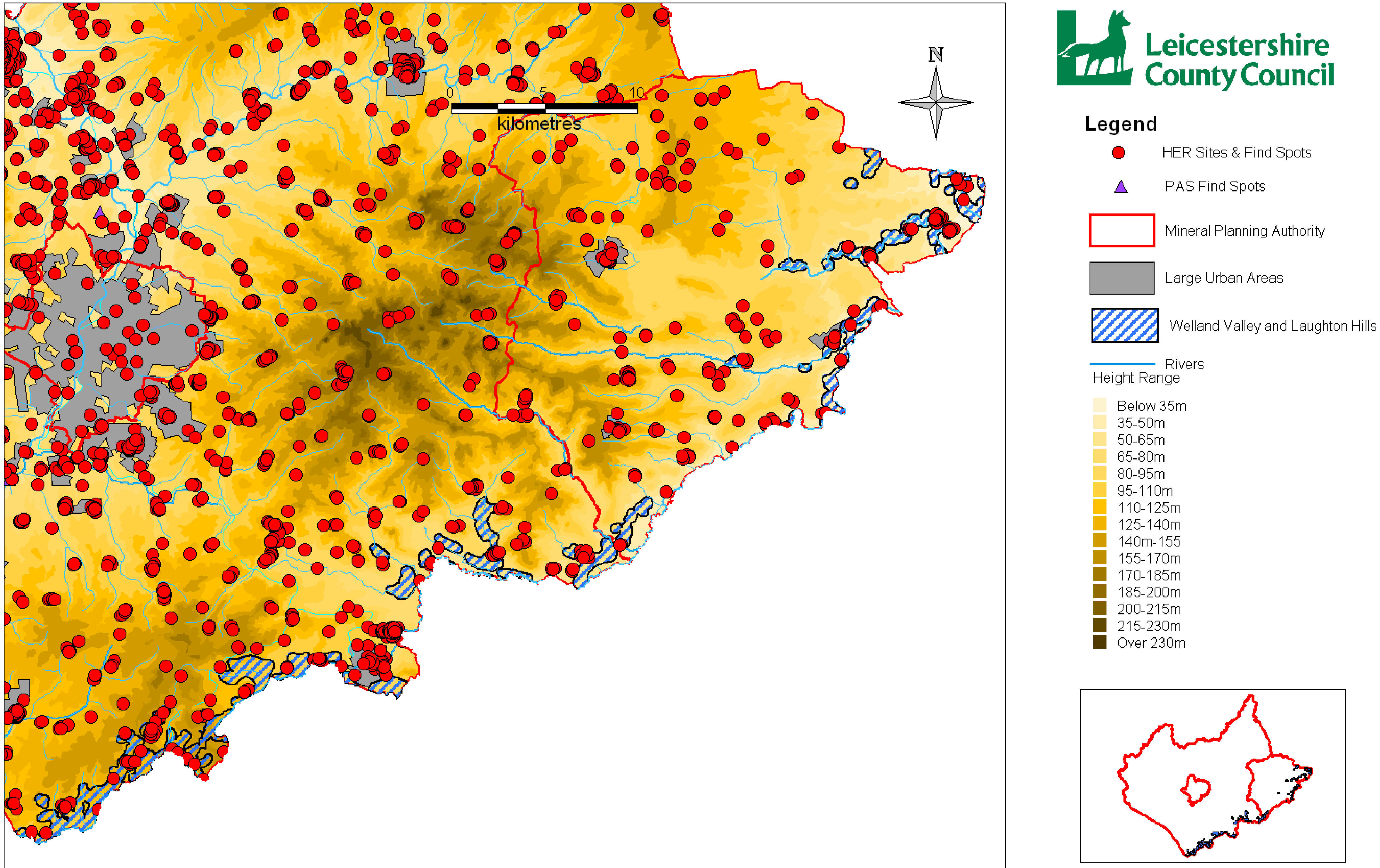
Welland Valley & Laughton Hills ARA Sub Area Anglo-Saxon Sites and Findspots



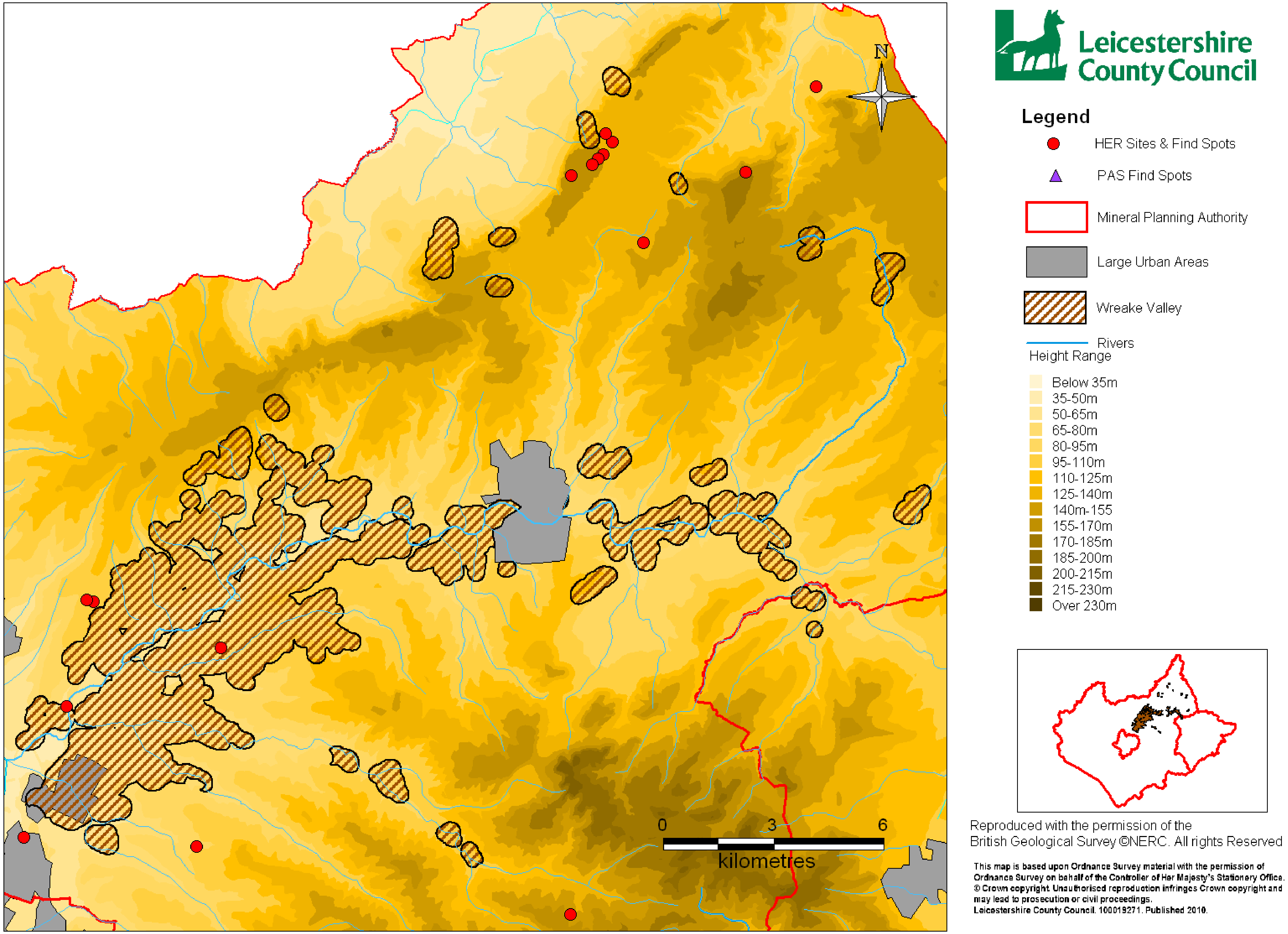
Welland Valley & Laughton Hills ARA Sub Area Medieval Sites and Findspots



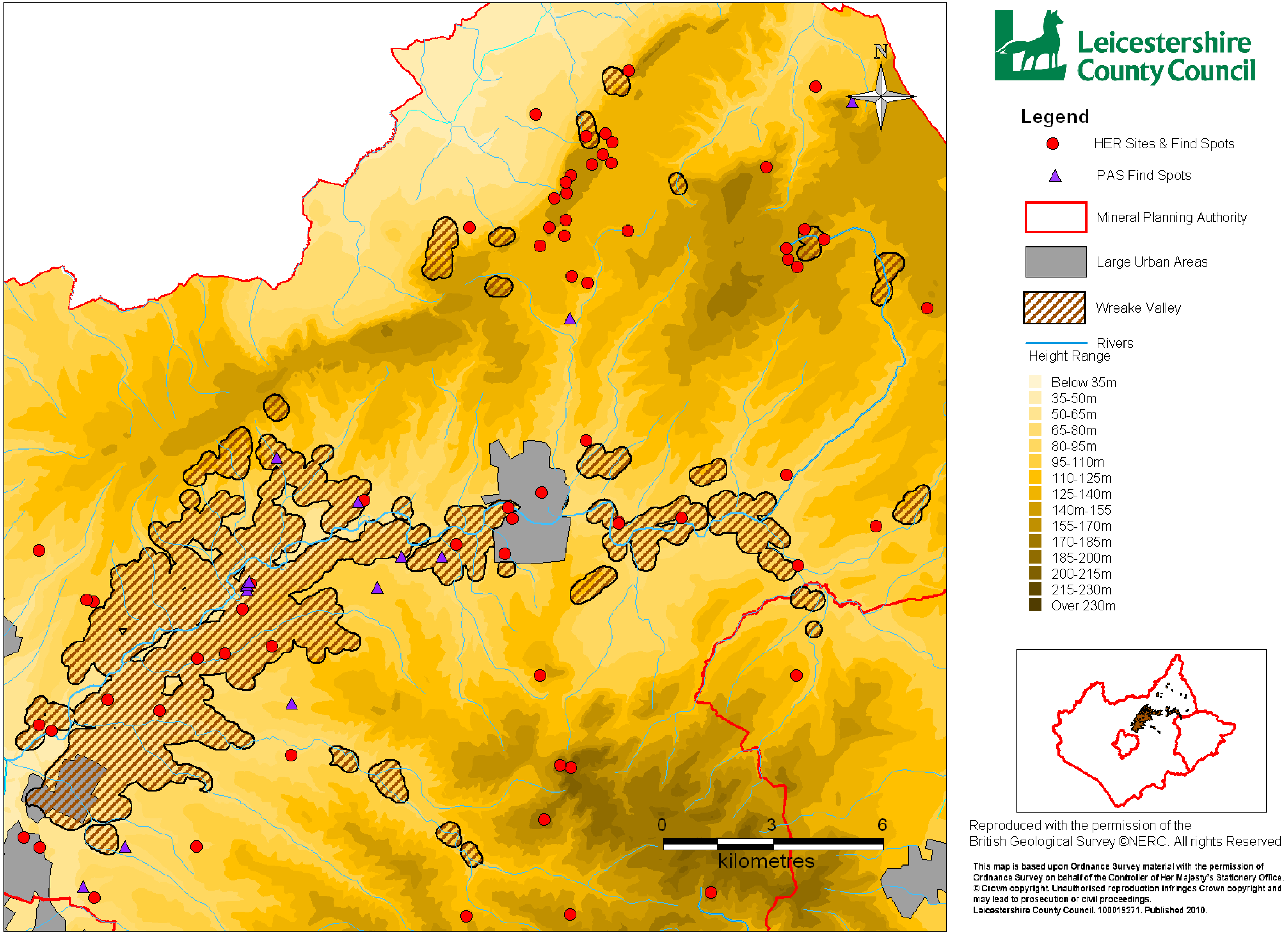
Welland Valley & Laughton Hills ARA Sub Area Post-Medieval Sites and Findspots



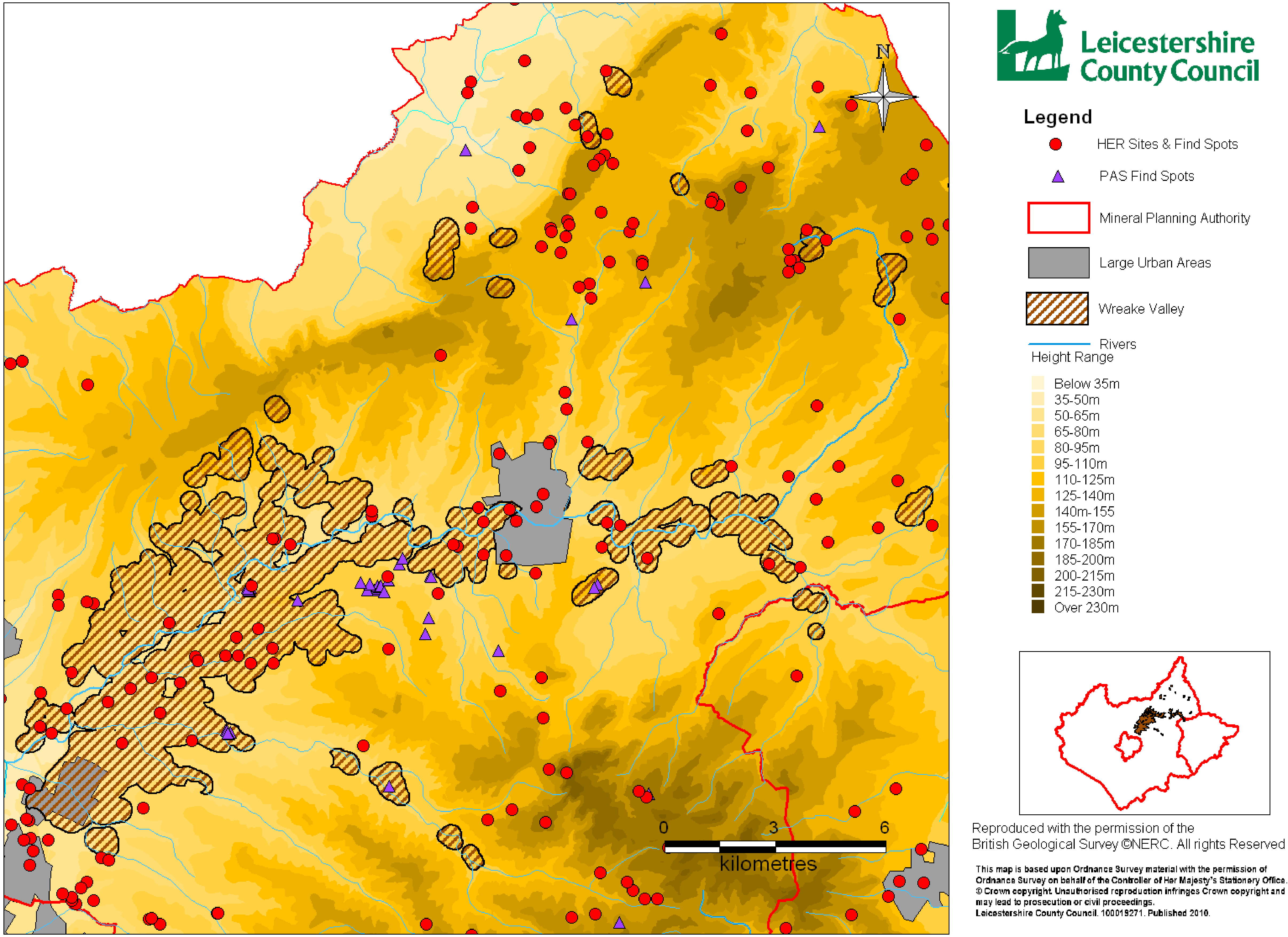
Welland Valley & Laughton Hills ARA Sub Area Modern Sites and Findspots



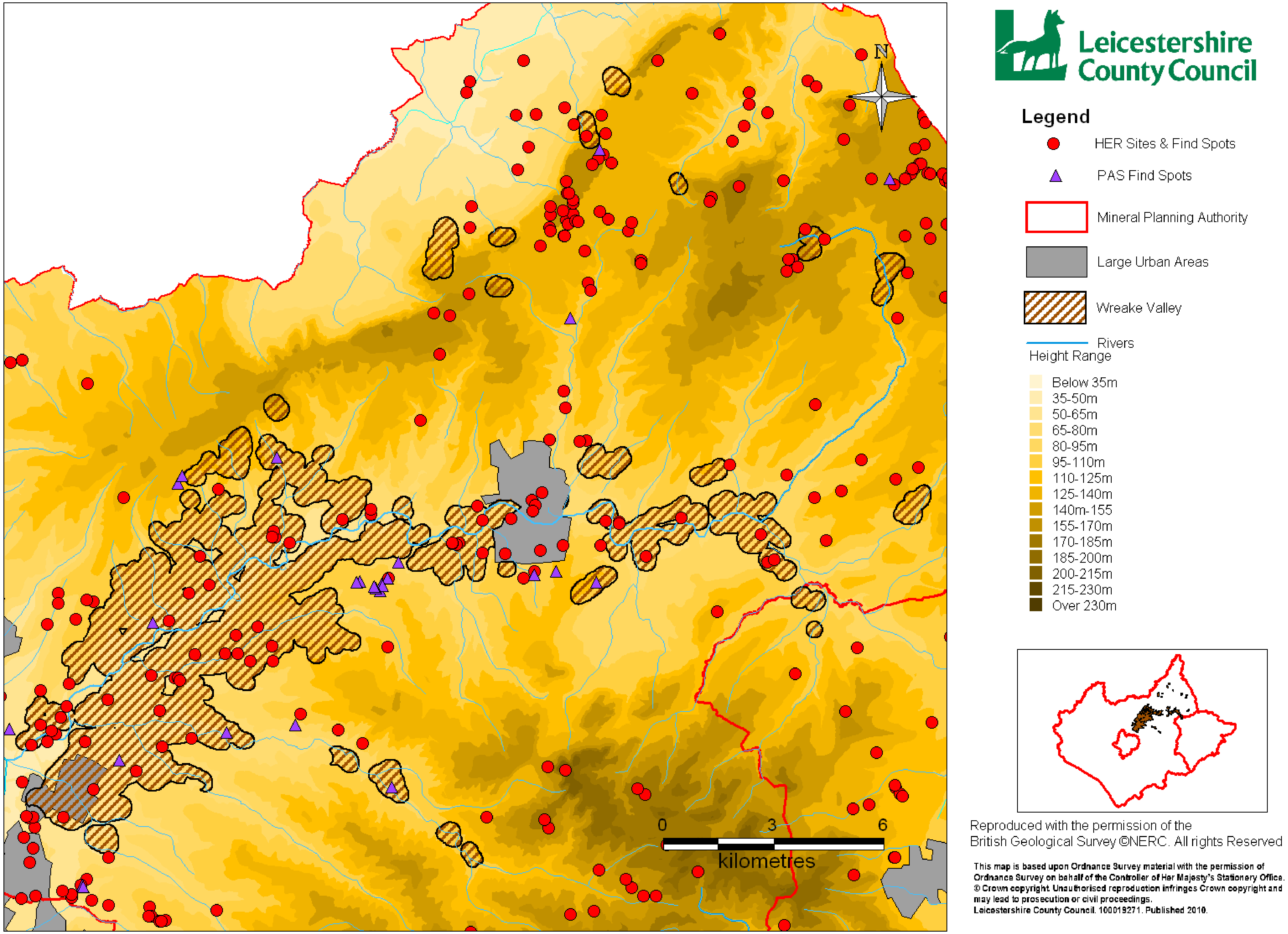
Wreake Valley ARA Sub Area Palaeolithic Sites and Findspots



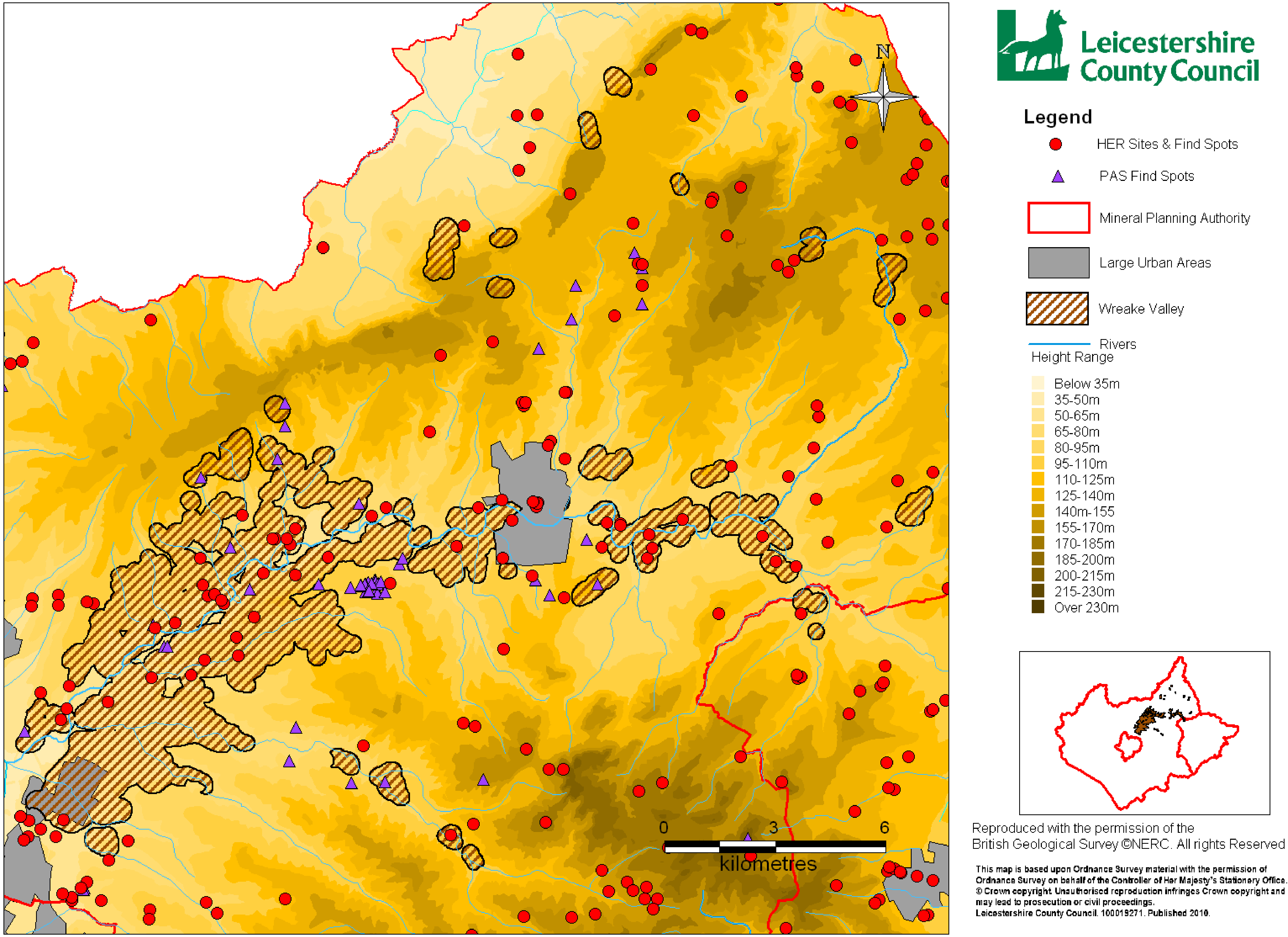
Wreake Valley ARA Sub Area Mesolithic Sites and Findspots



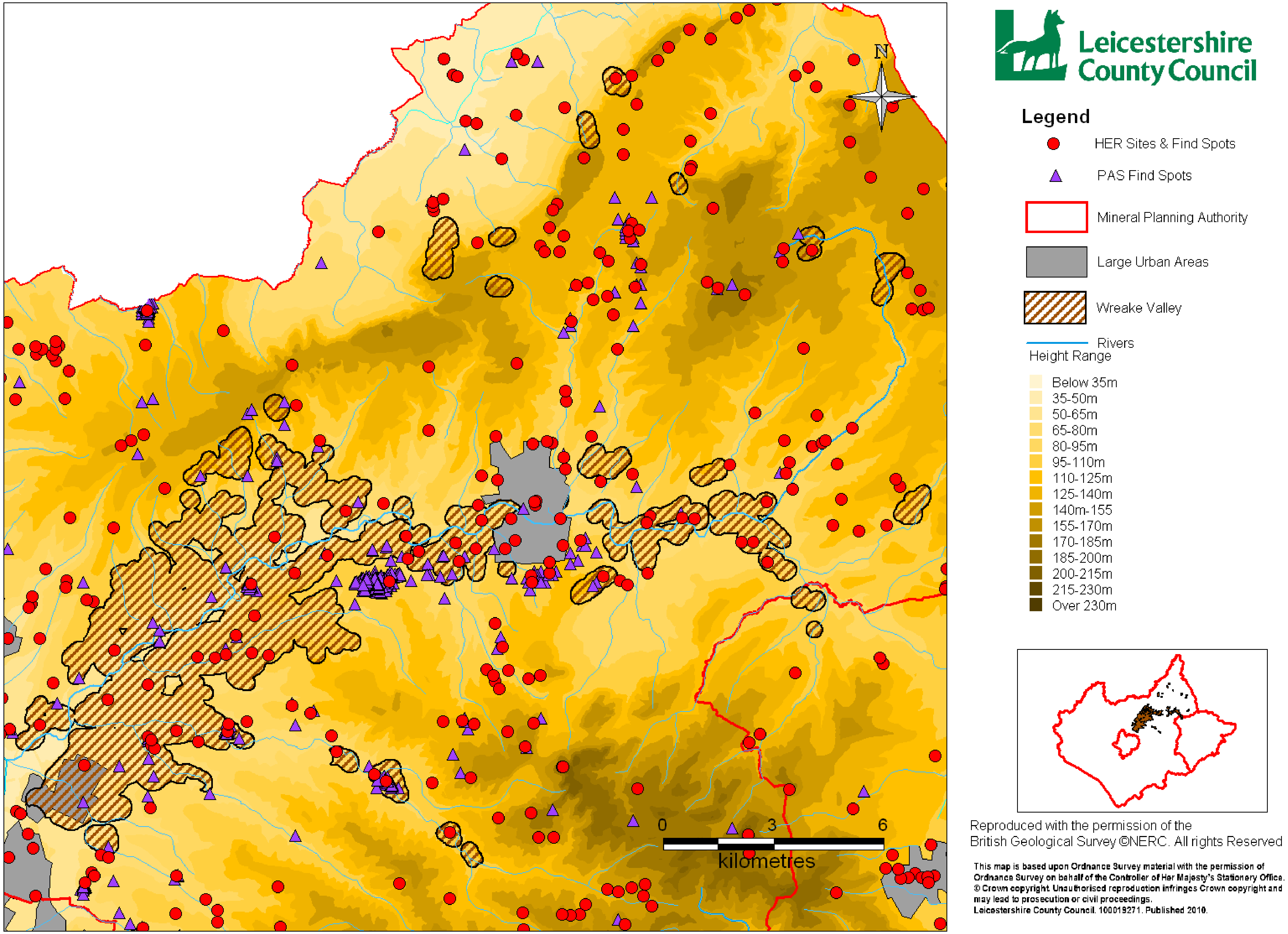
Wreake Valley ARA Sub Area Neolithic Sites and Findspots



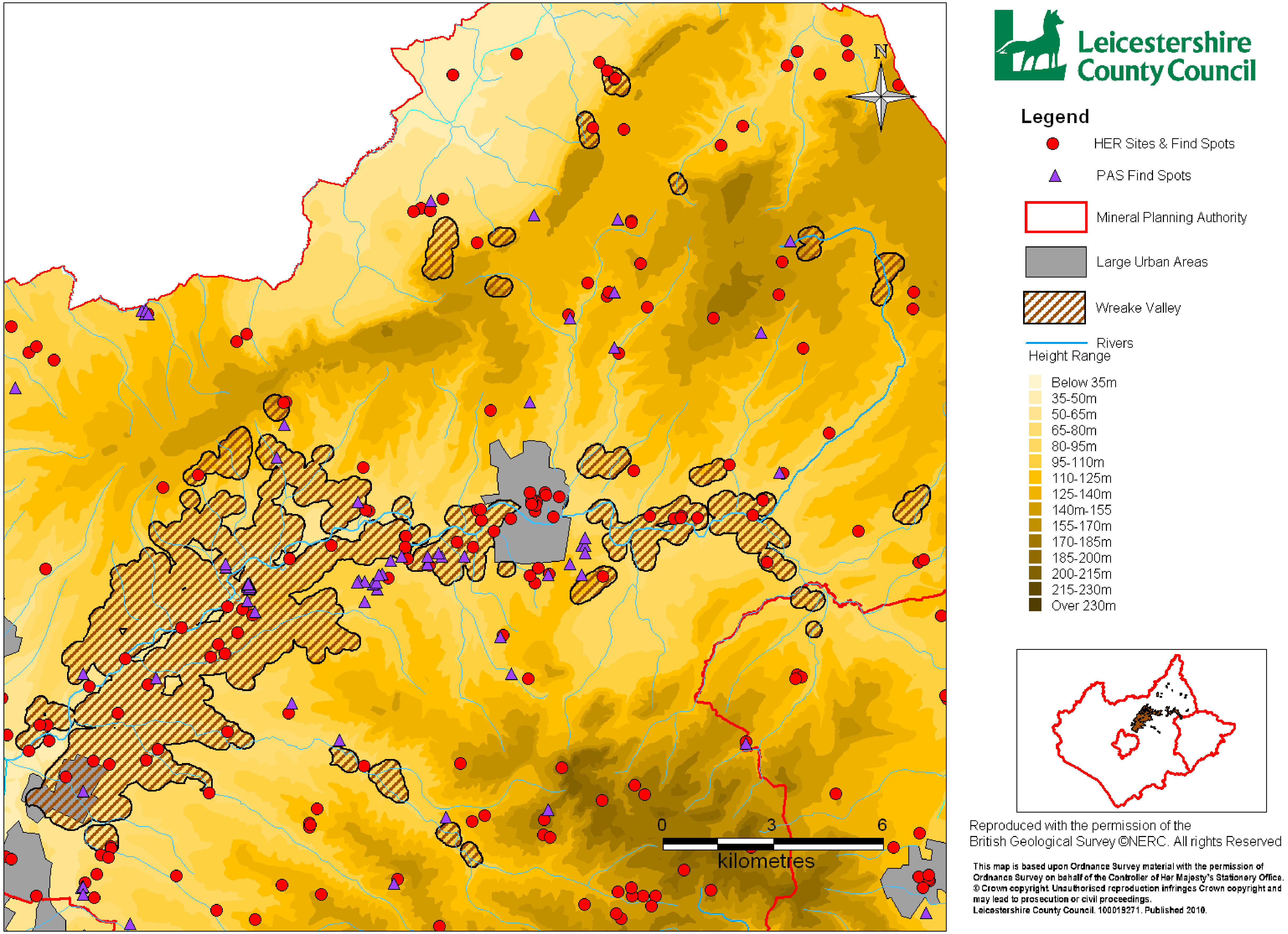
Wreake Valley ARA Sub Area Bronze Age Sites and Findspots



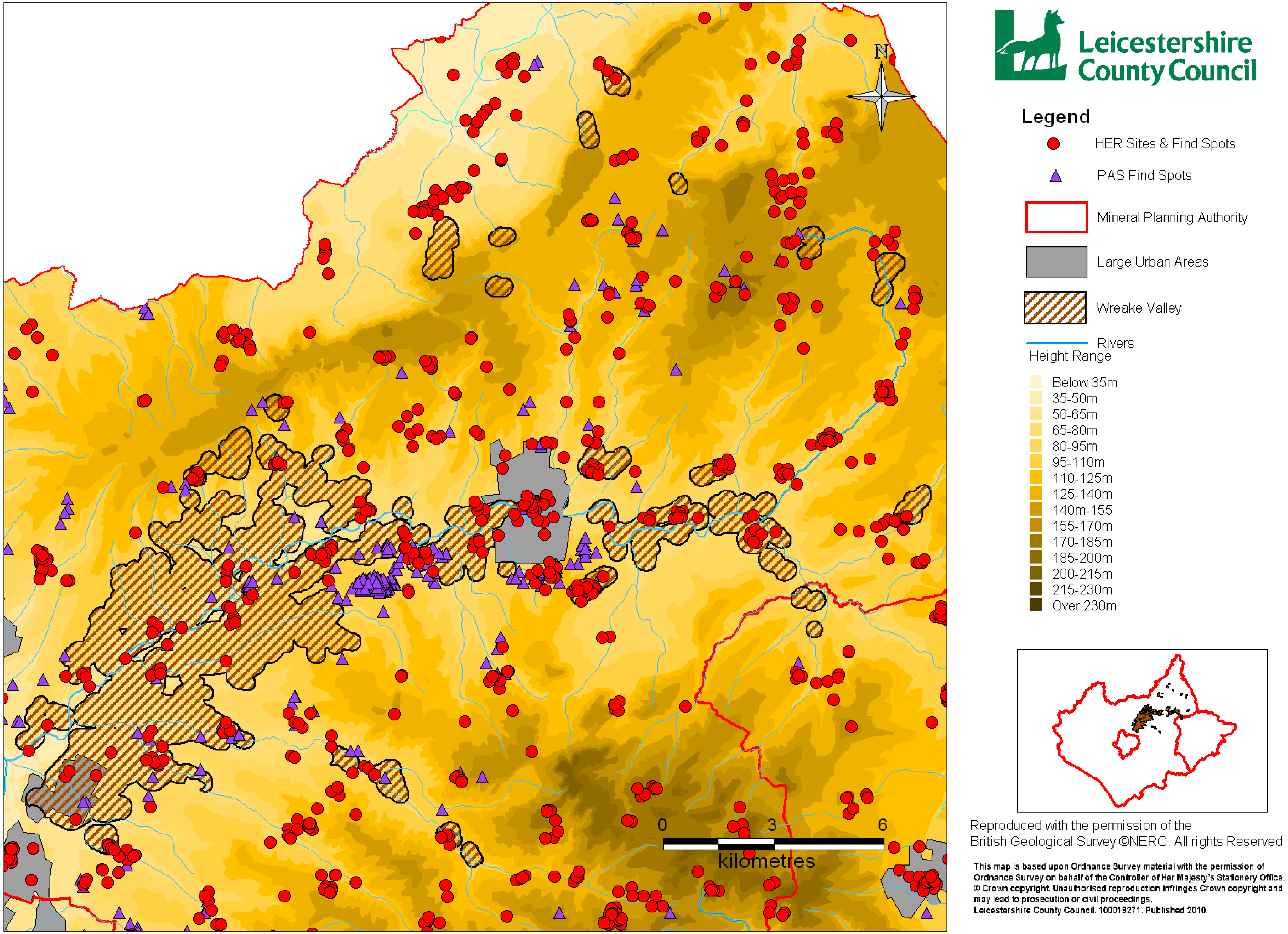
Wreake Valley ARA Sub Area Iron Age Sites and Findspots



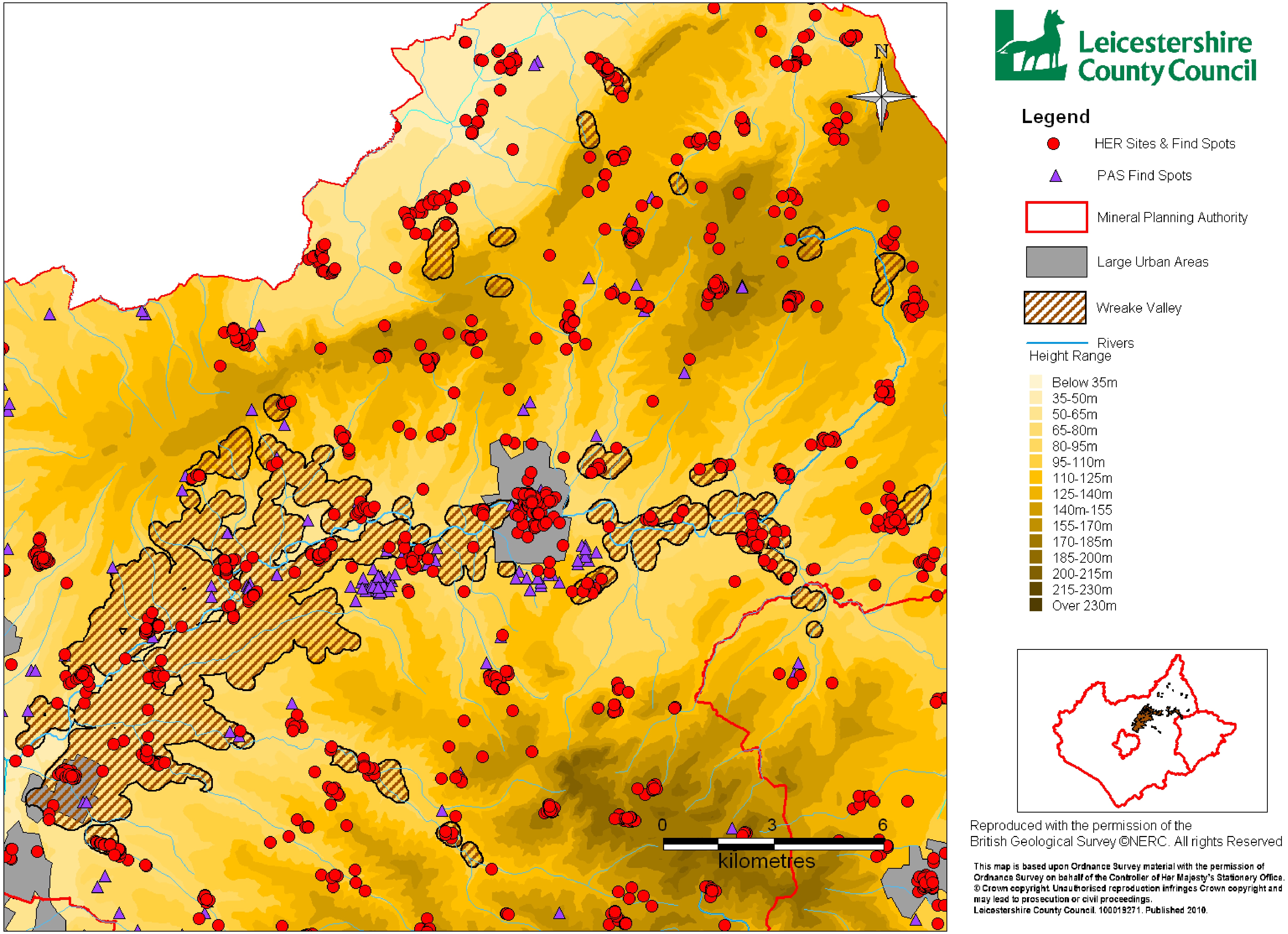
Wreake Valley ARA Sub Area Roman Sites and Findspots



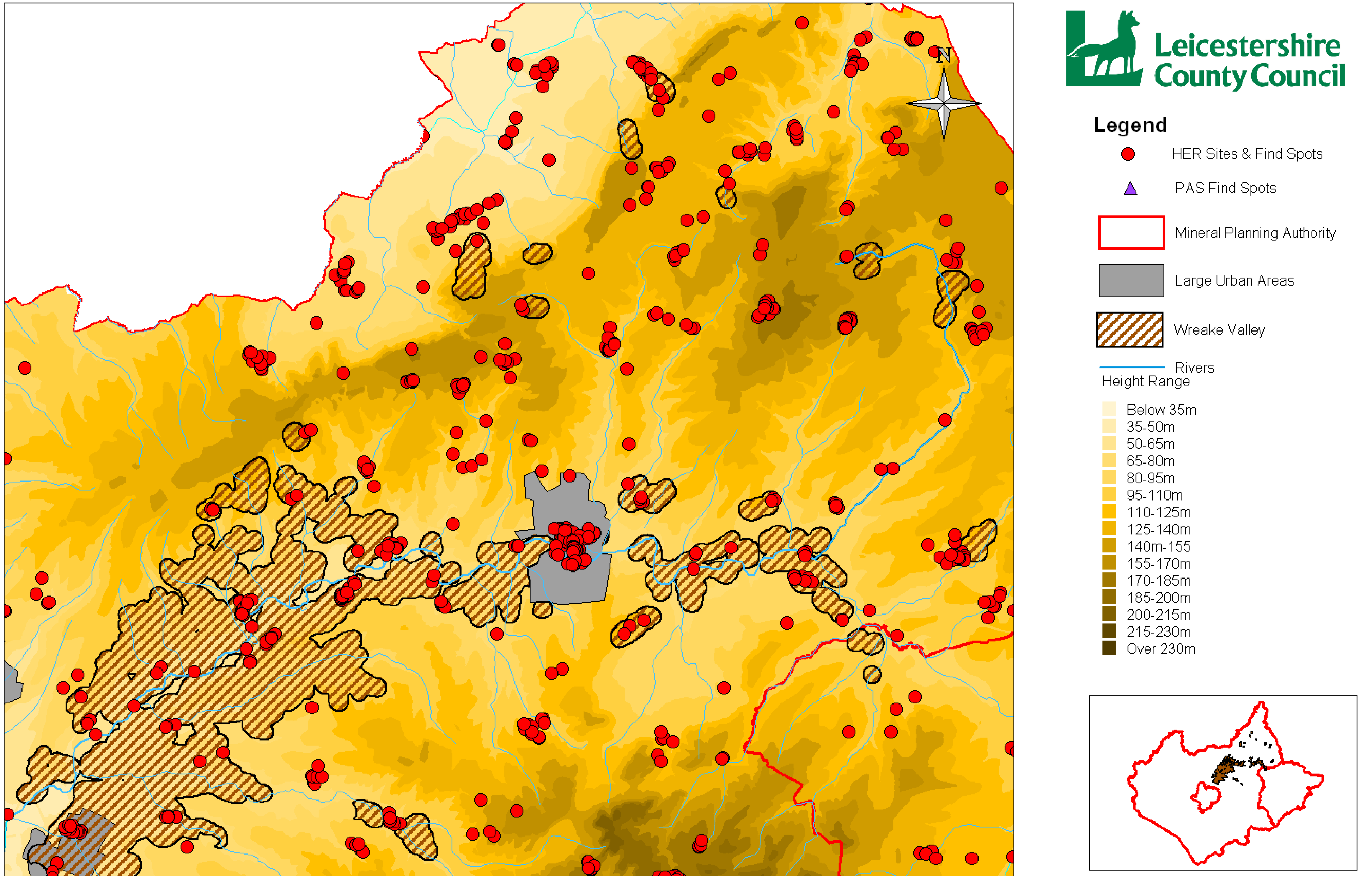
Wreake Valley ARA Sub Area Anglo-Saxon Sites and Findspots



Wreake Valley ARA Sub Area Medieval Sites and Findspots

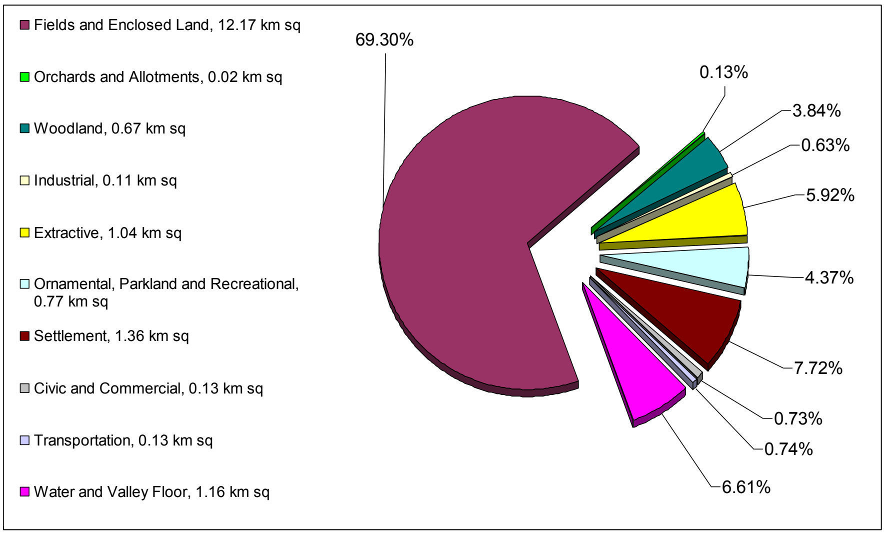


Wreake Valley ARA Sub Area Post-Medieval Sites and Findspots

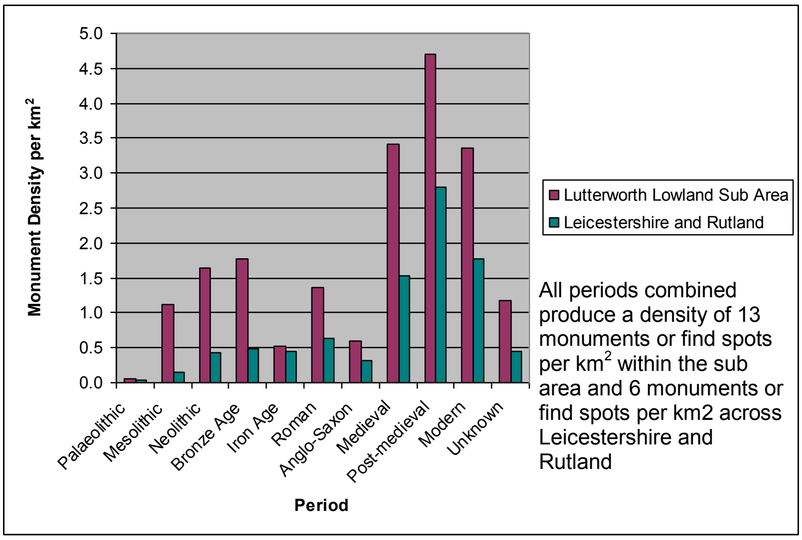


Wreake Valley ARA Sub Area Modern Sites and Findspots

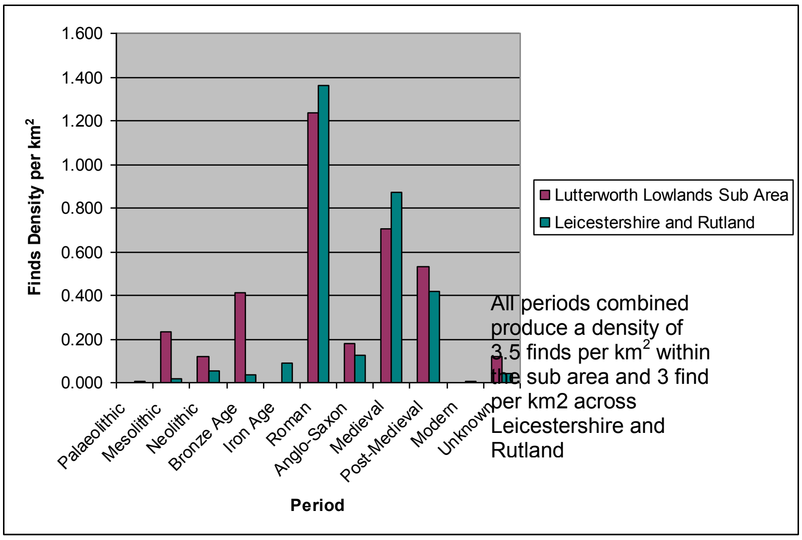
Appendix 2: HLC, HER and PAS Density and distribution Information for the Fluvial Sands and Gravels Sub Areas



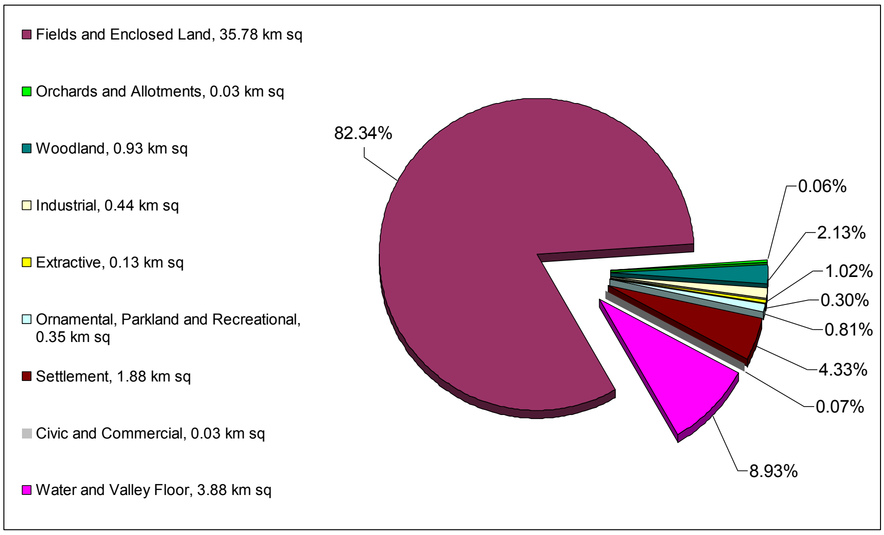
HLC Broad Types within the Lutterworth Lowlands ARA sub area



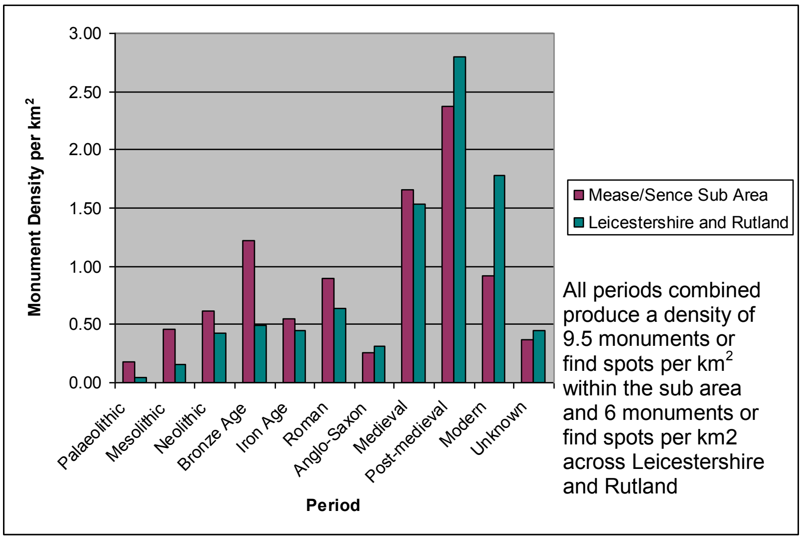
Density of monuments and find spots recorded on HER for the Lutterworth Lowlands Sub Area and the whole project area



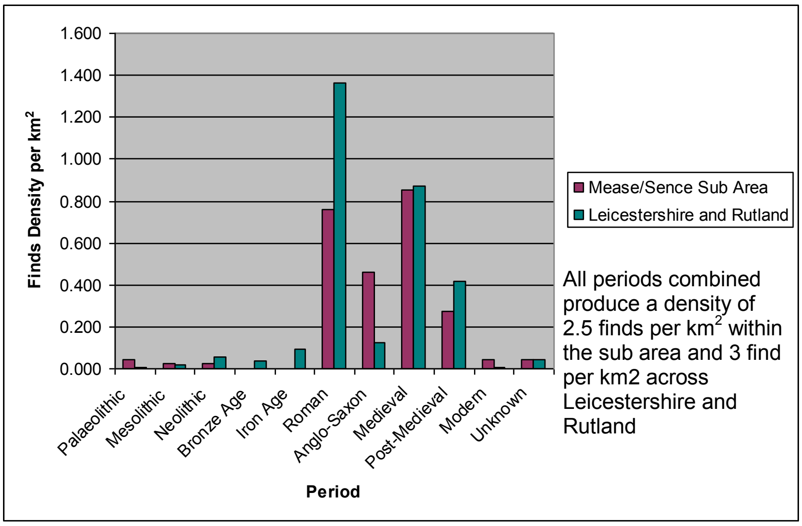
Density of find spots recorded through PAS comparing the Lutterworth Lowlands sub area with the whole project area



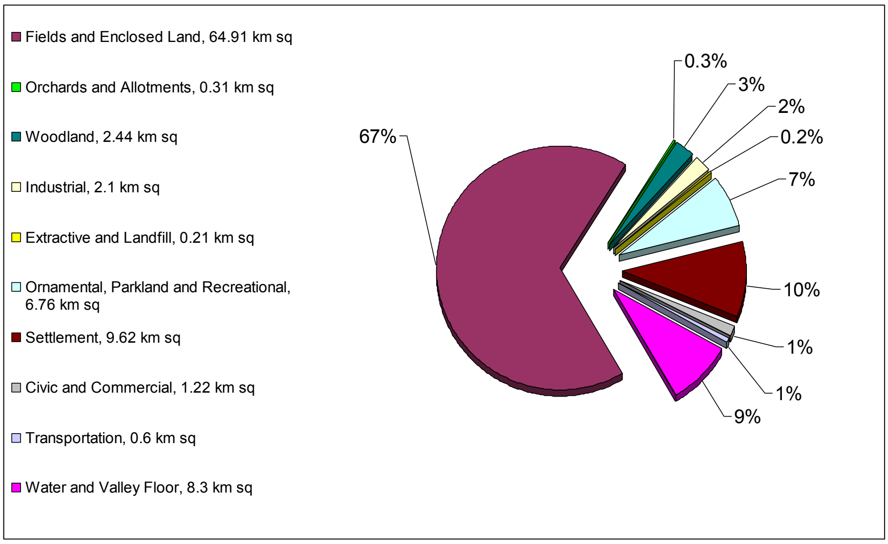
HLC Broad Types within the Mease/Sence ARA sub area



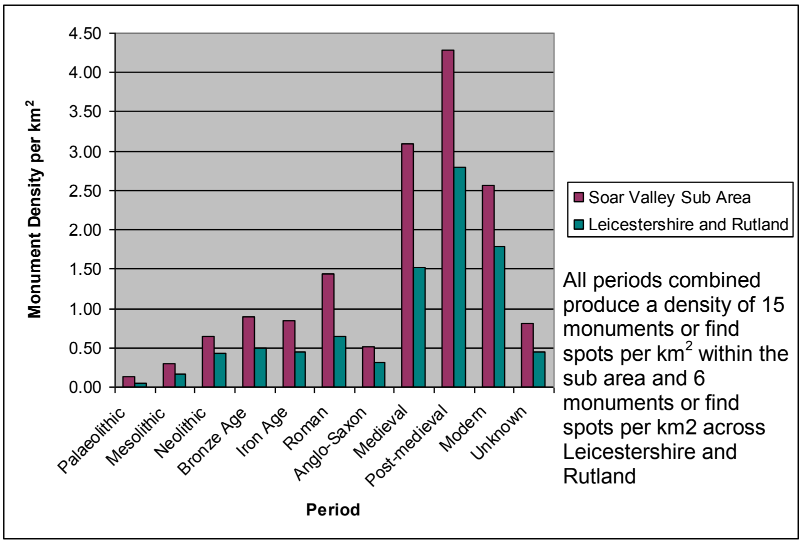
Density of monuments and find spots recorded on HER for the Mease/Sence Sub Area compared with the whole project area



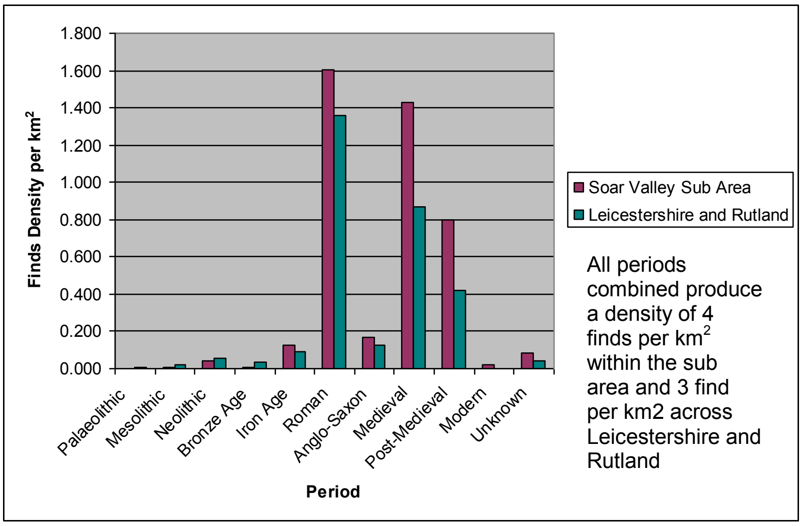
Density of find spots recorded through PAS comparing the Mease/Sence sub area compared with the whole project area



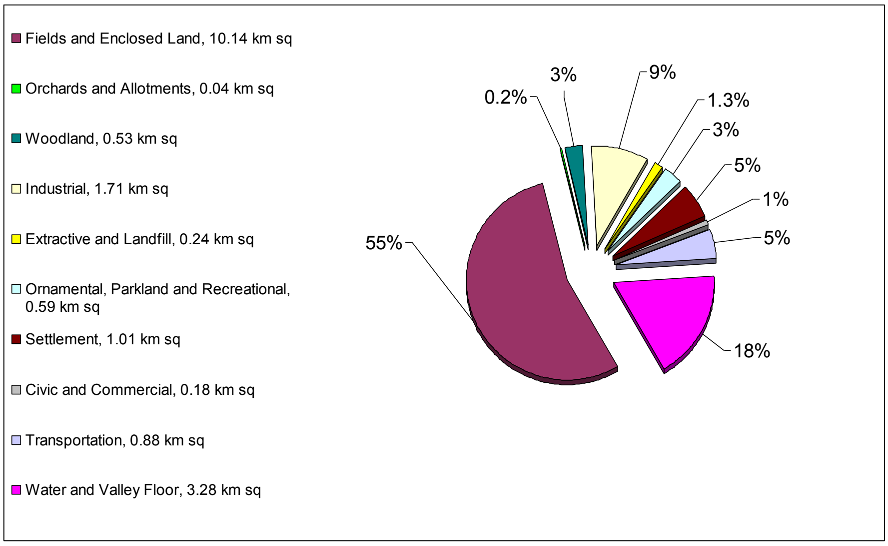
HLC Broad Types within the Soar Valley ARA Sub Area



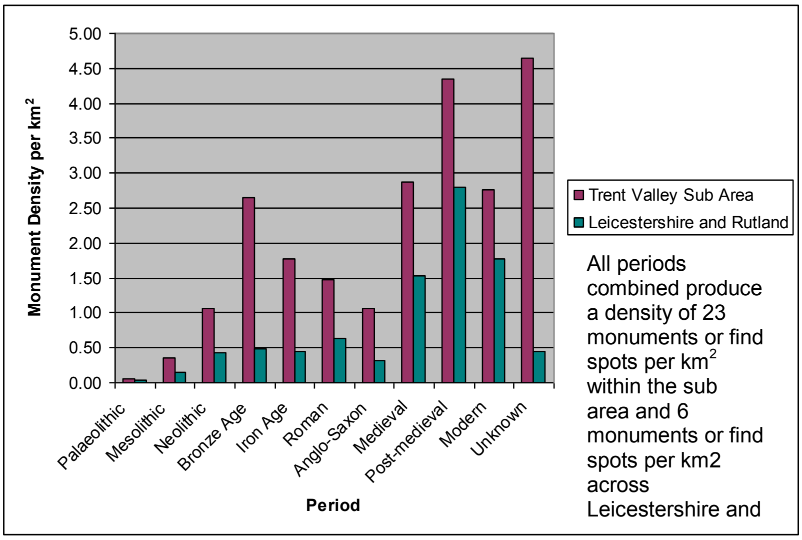
Density of monuments and find spots recorded on HER for the Soar Valley Sub Area compared with the whole project area



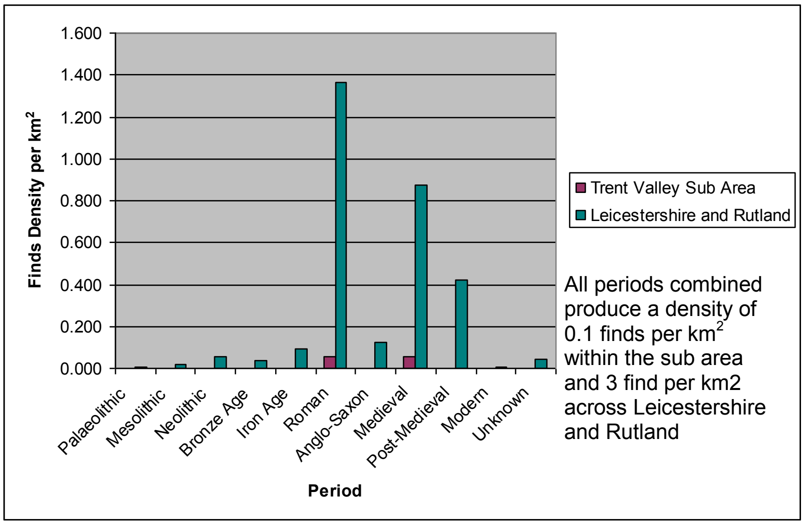
Density of find spots recorded through PAS comparing the Soar Valley sub area compared with the whole project area



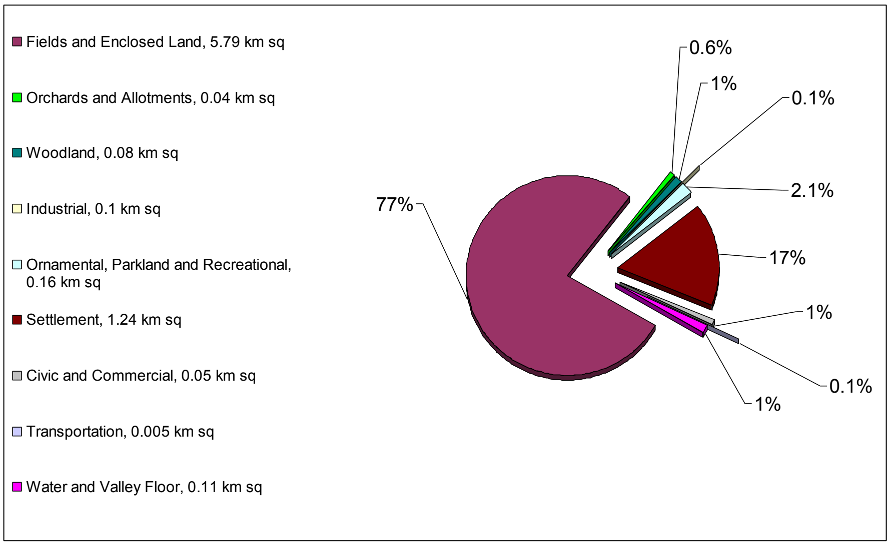
HLC Broad Types within the Trent Valley ARA Sub Area



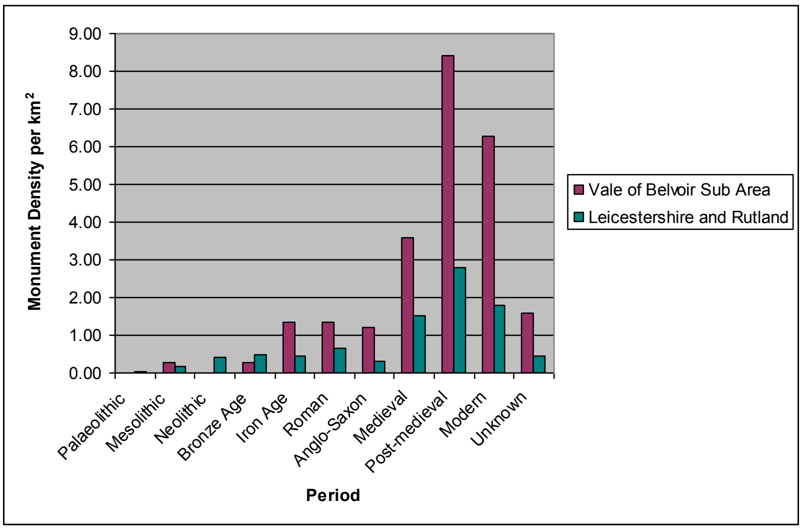
Density of monuments and find spots recorded on HER for the Trent Valley Sub Area compared with the whole project area



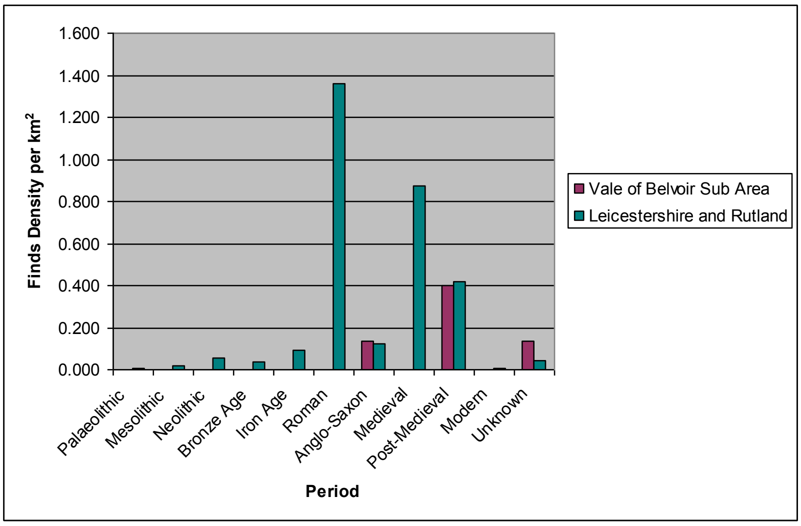
Density of find spots recorded through PAS comparing the Trent Valley sub area compared with the whole project area



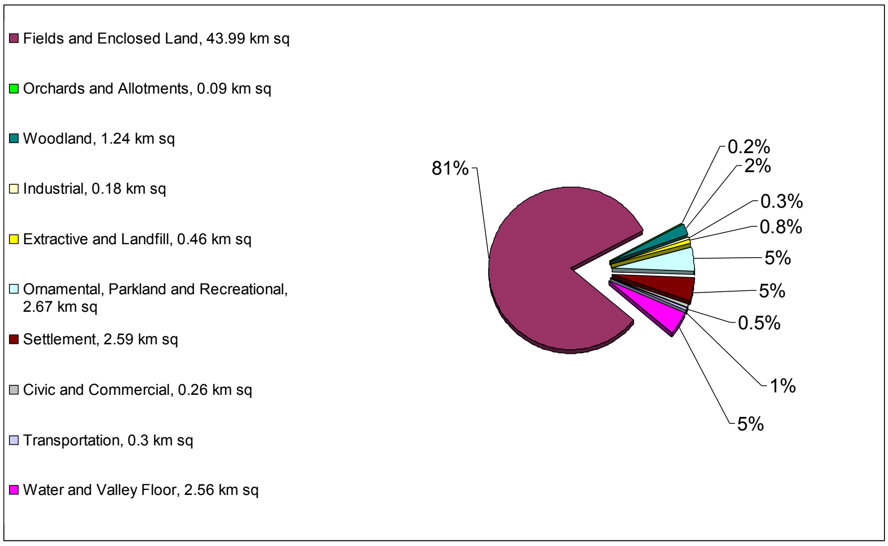
HLC Broad Types within the Vale of Belvoir ARA sub area



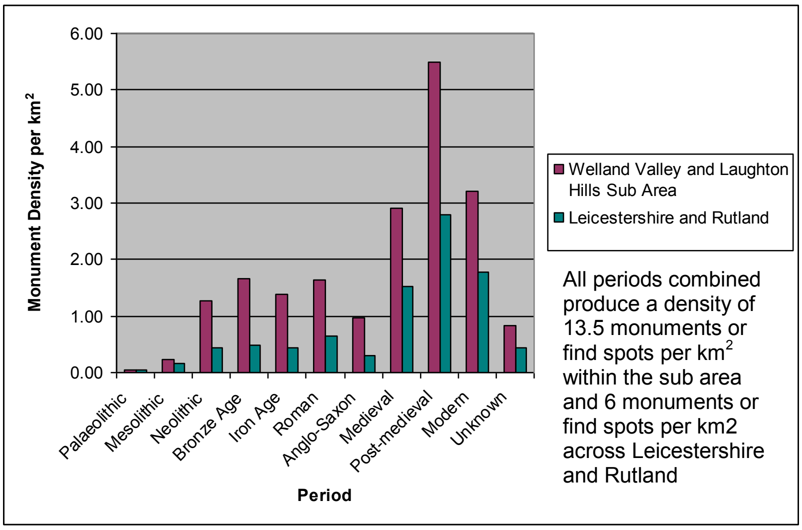
Density of monuments and find spots recorded on HER for the Vale of Belvoir Sub Area compared with the whole project area



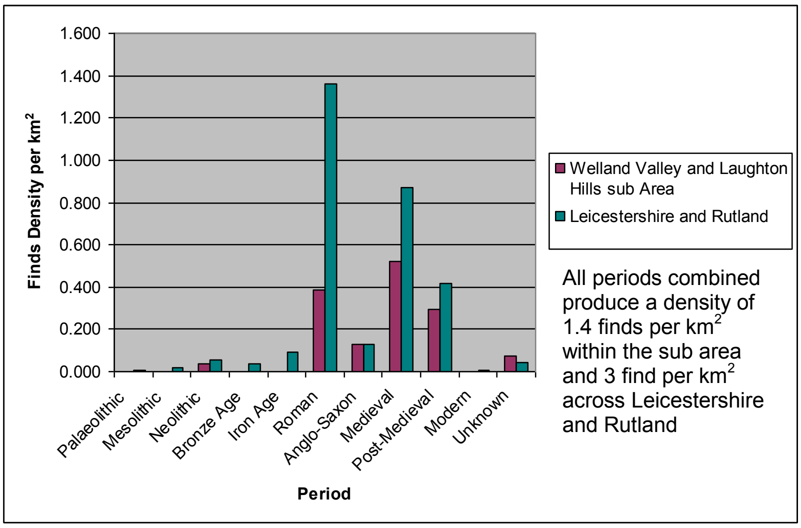
Density of find spots recorded through PAS comparing the Vale of Belvoir sub area compared with the whole project area



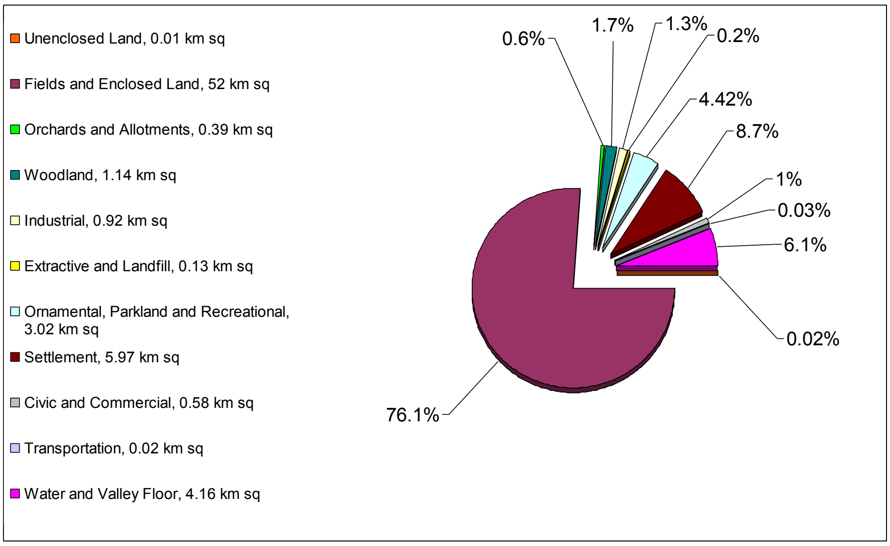
HLC Broad Types within the Welland Valley and Laughton Hills ARA sub area



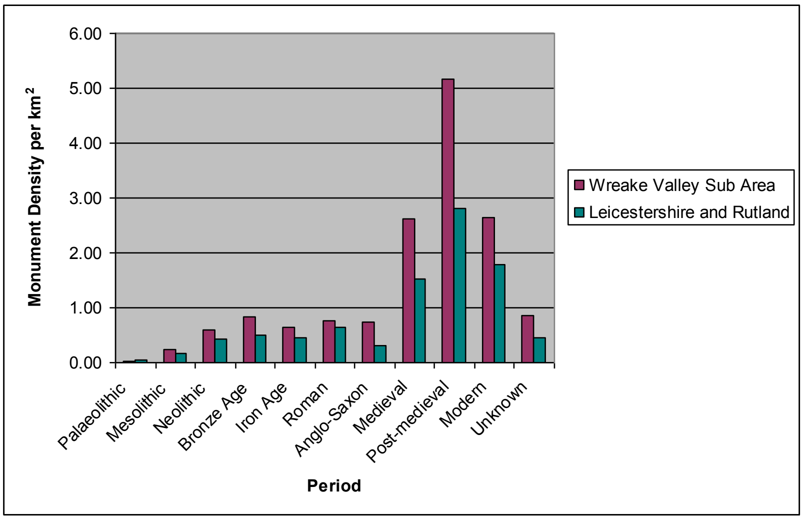
Density of monuments and find spots recorded on HER for the Welland Valley and Laughton Hills Sub Area compared with the whole project area



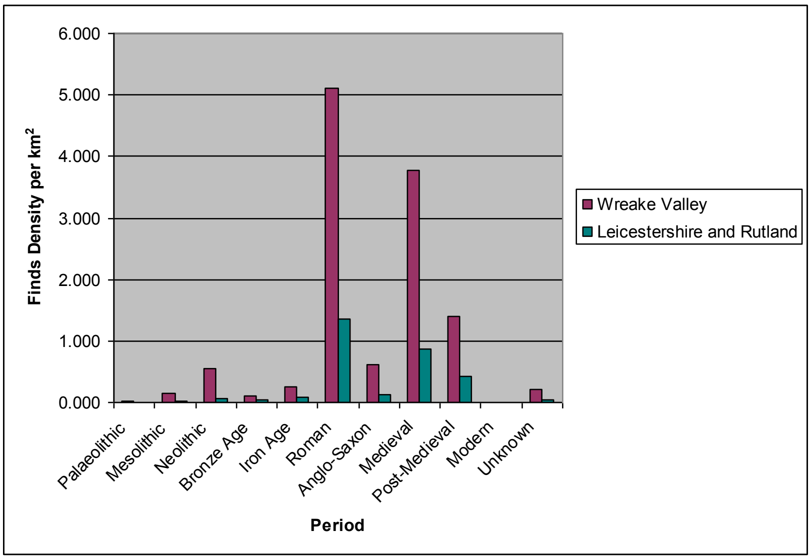
Density of find spots recorded through PAS comparing the Welland Valley and Laughton Hills sub area compared with the whole project area



HLC Broad Types within the Wreake Valley ARA sub area

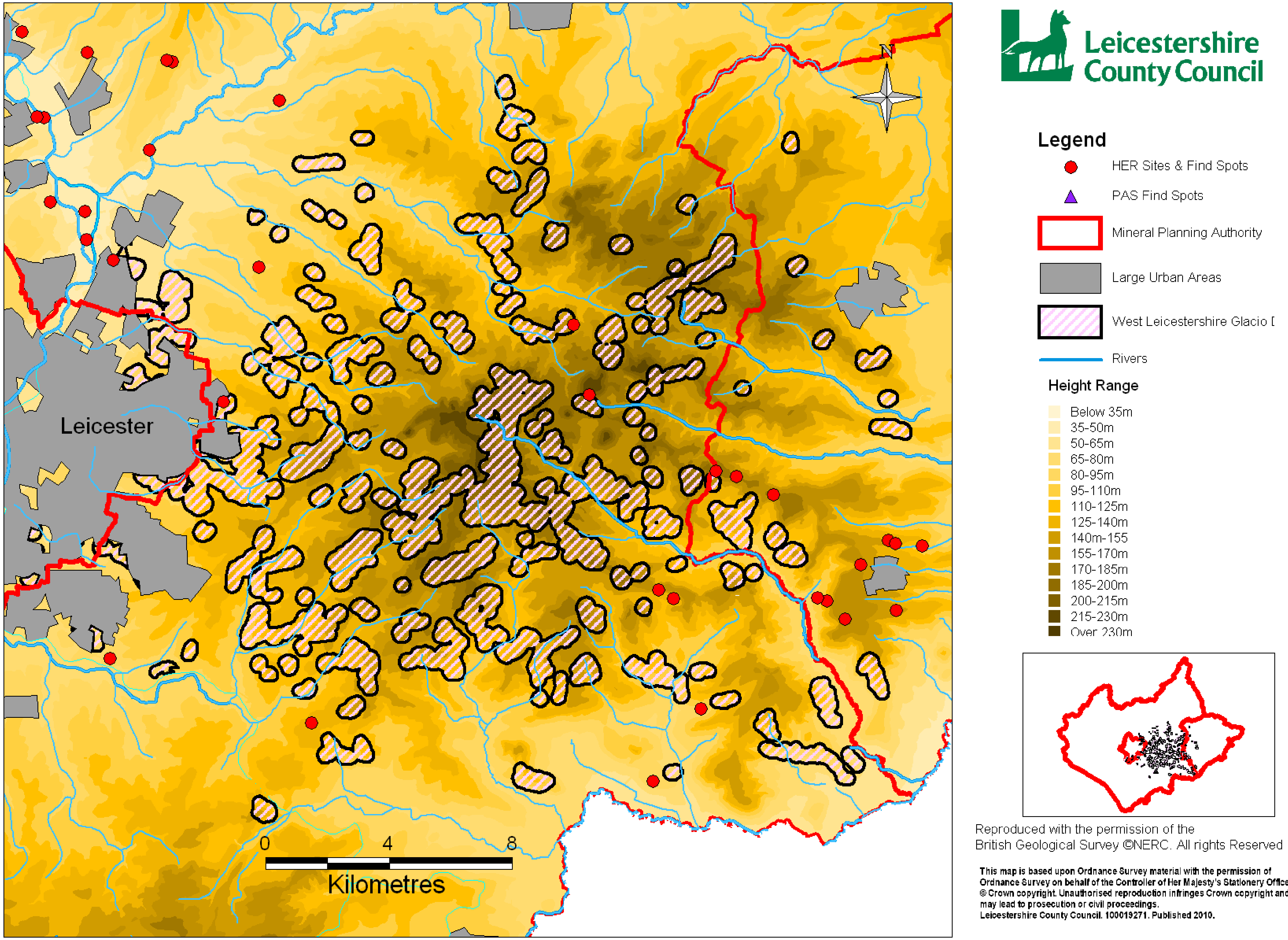


Density of monuments and find spots recorded on HER for the Wreake Valley Sub Area compared with the whole project area

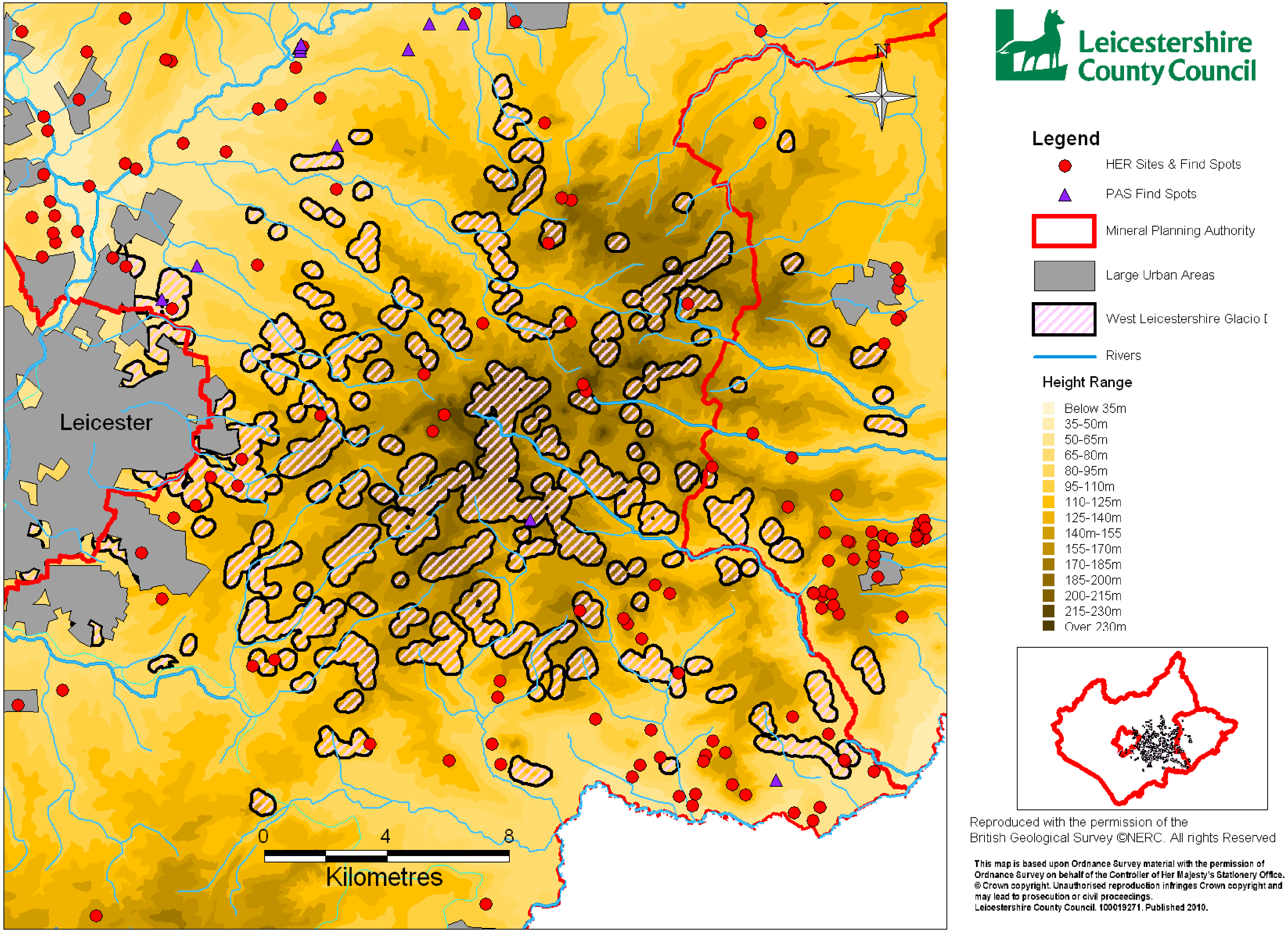


Density of find spots recorded through PAS comparing the Wreake Valley sub area compared with the whole project area

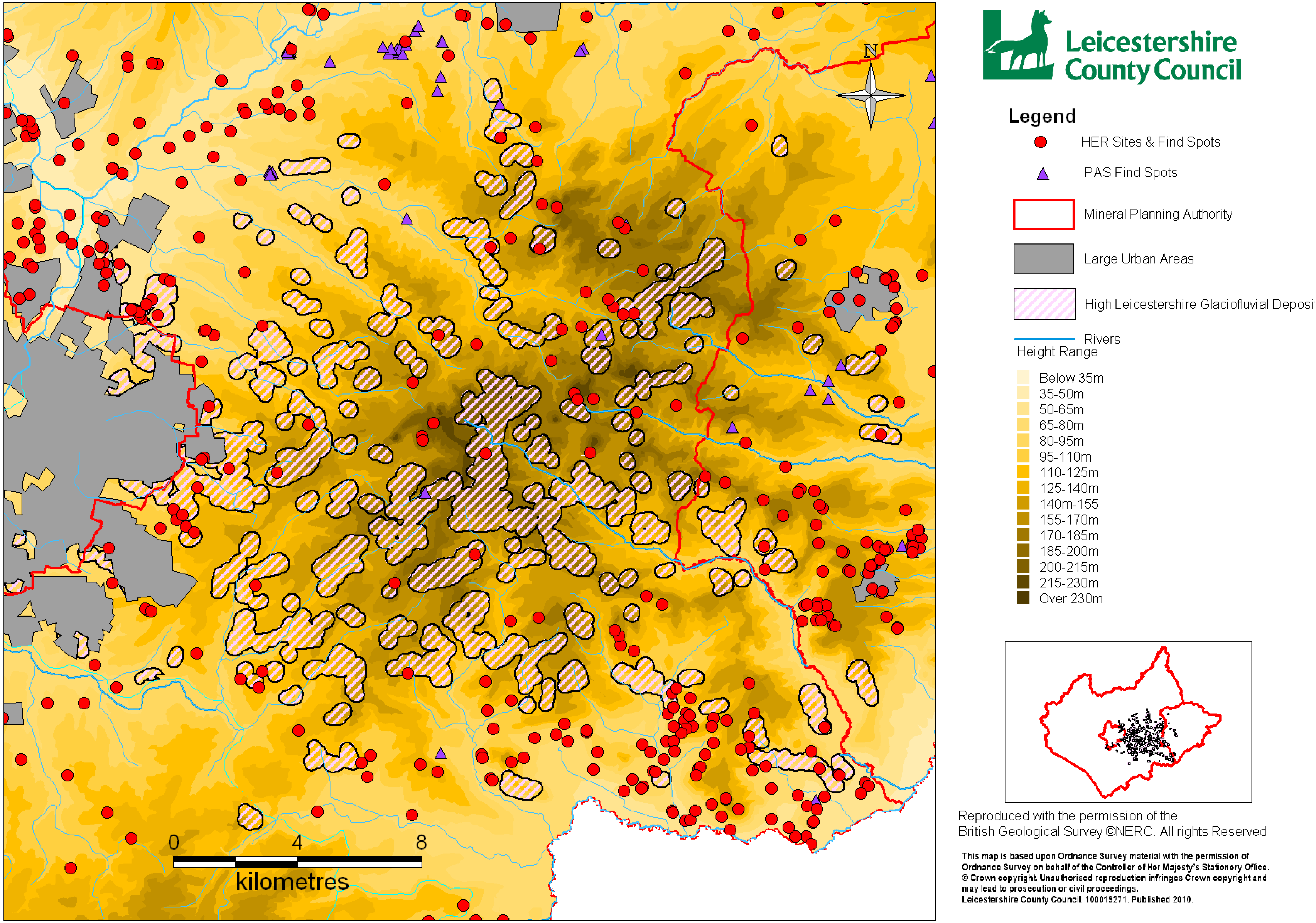
Appendix 3: Distribution Maps by Period of HER and PAS Records for the Glaciofluvial Sands and Gravels Sub Areas



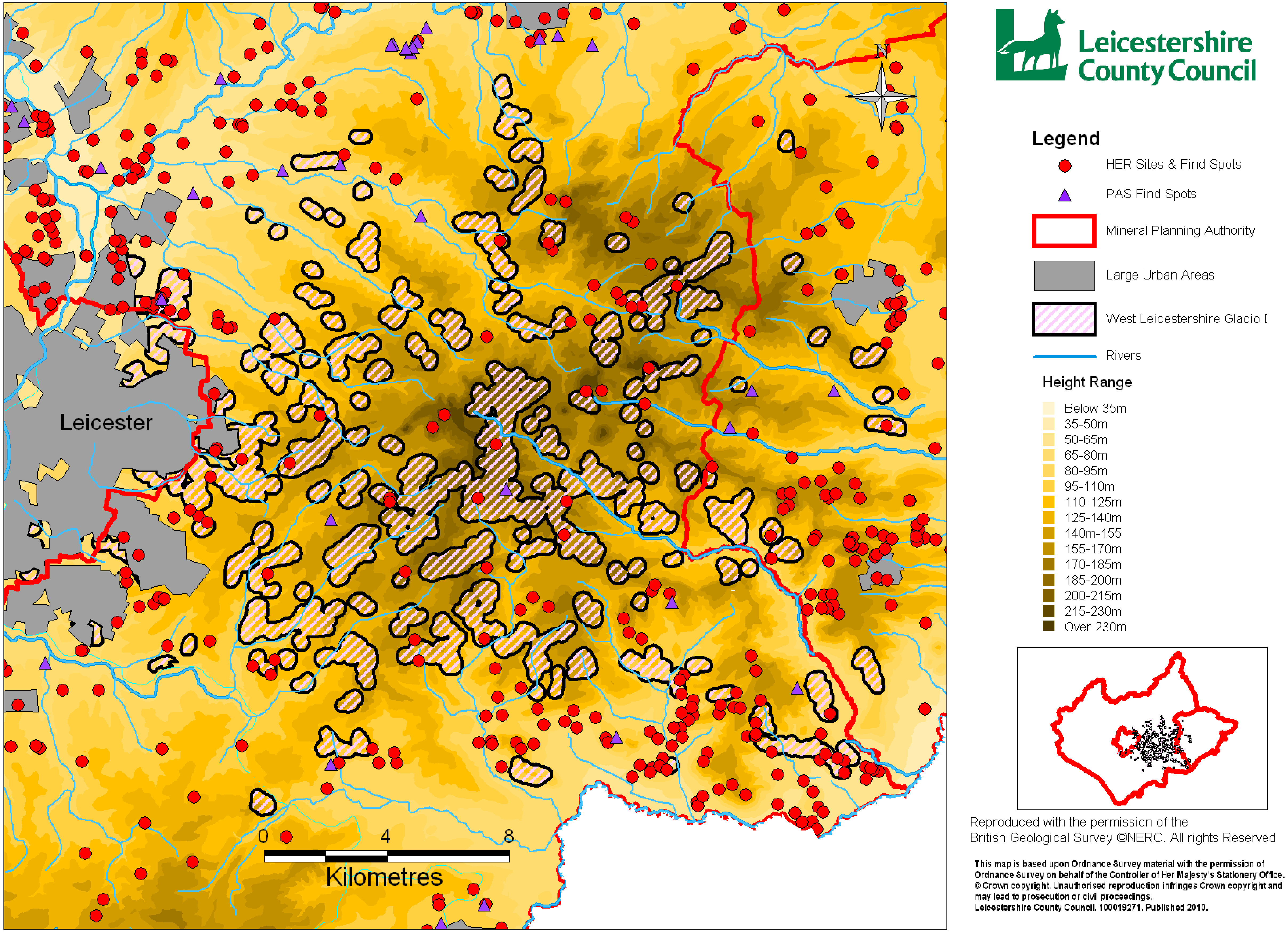
High Leicestershire ARA Sub Area Palaeolithic Sites and Findspots



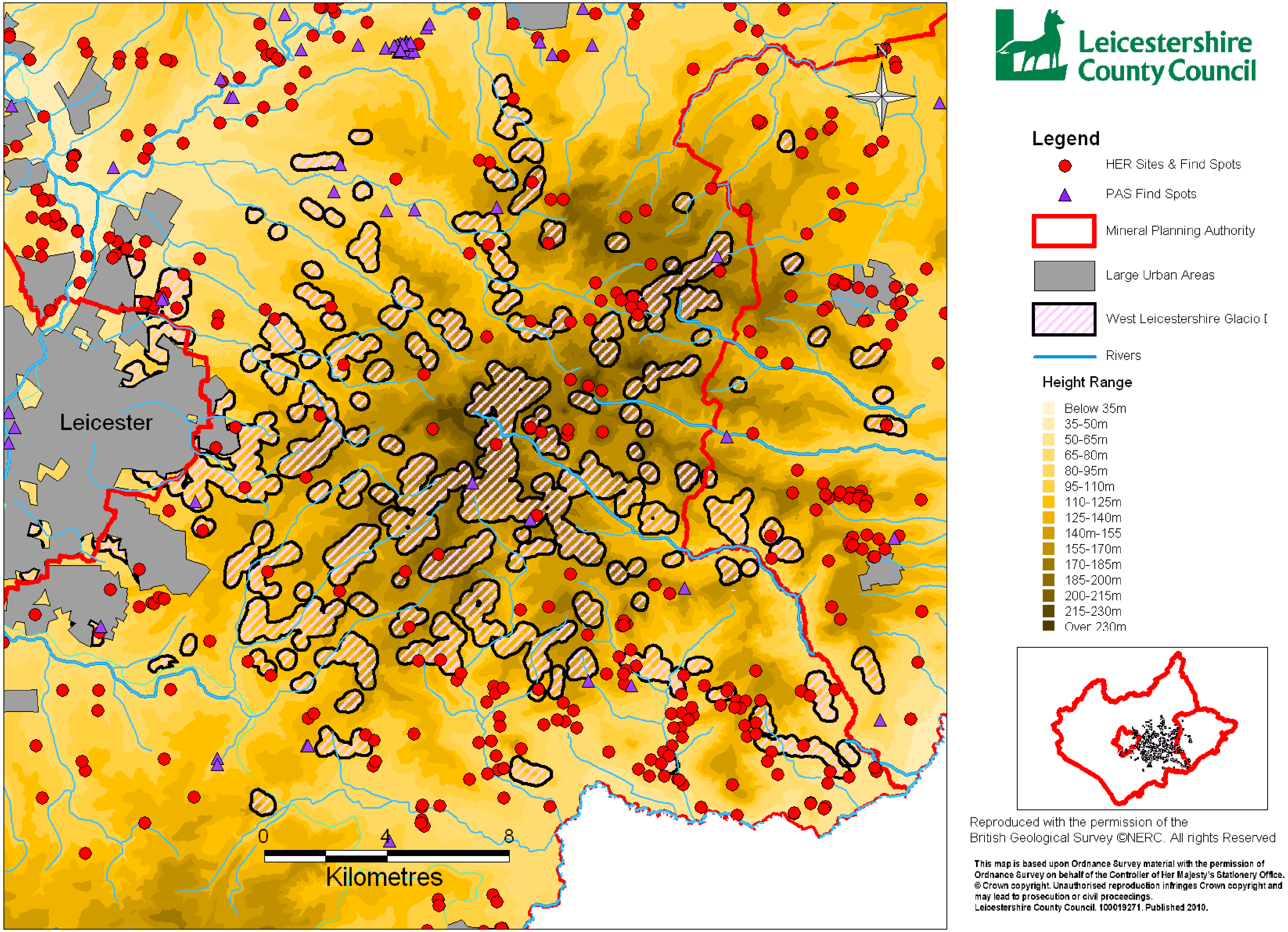
High Leicestershire ARA Sub Area Mesolithic Sites and Findspots



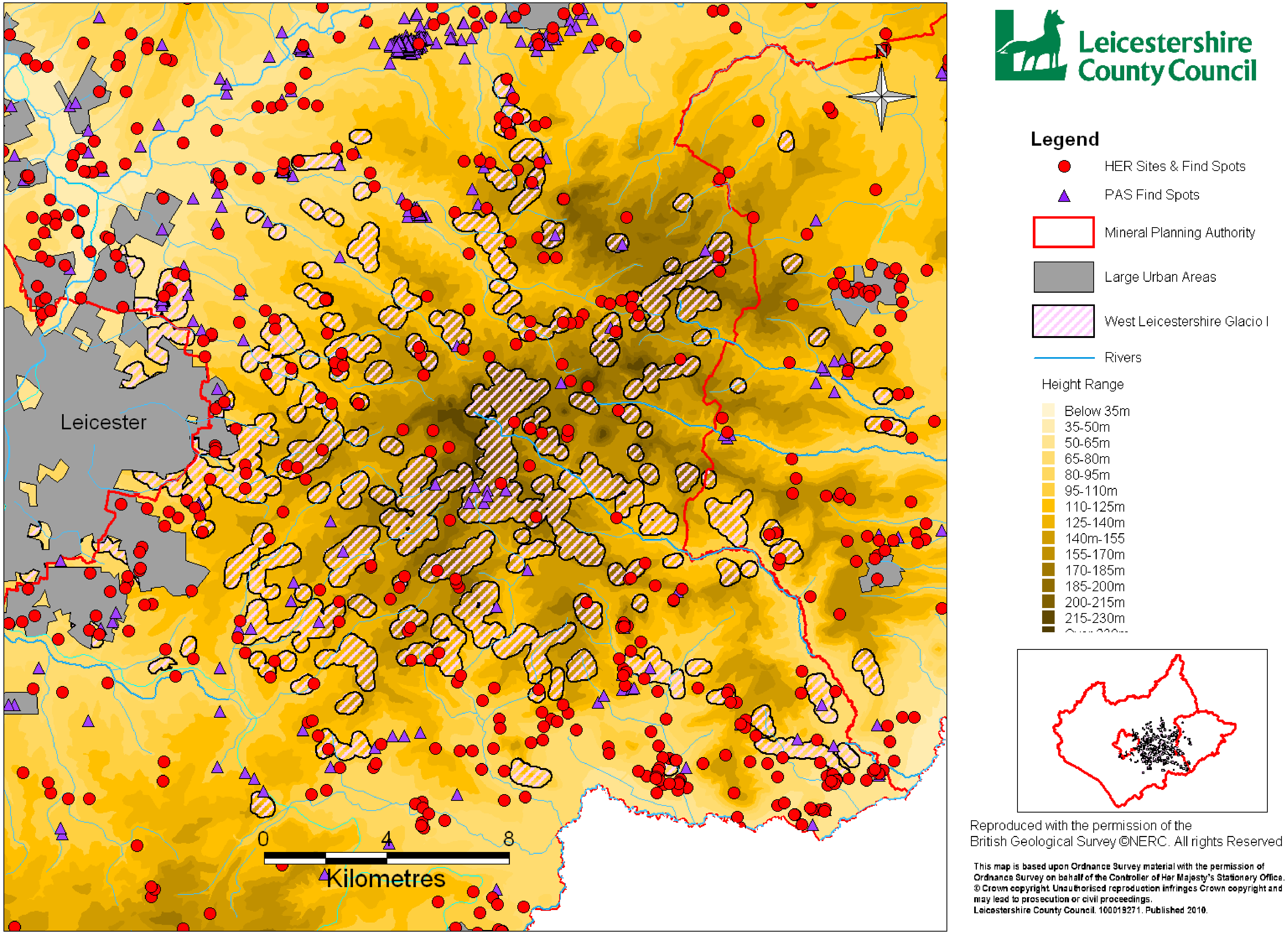
High Leicestershire ARA Sub Area Neolithic Sites and Findspots



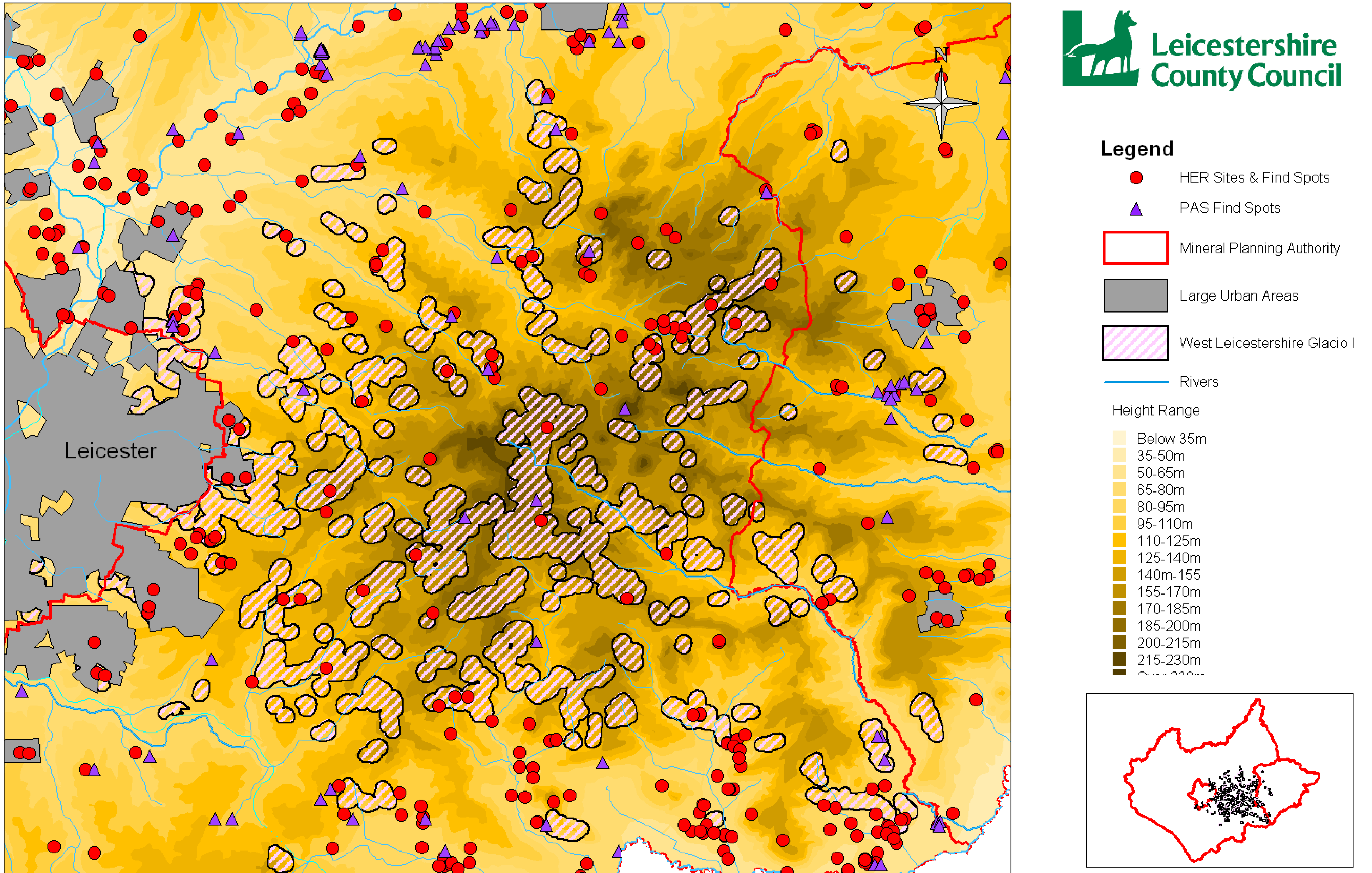
High Leicestershire ARA Sub Area Bronze Age Sites and Find Spots



High Leicestershire ARA Sub Area Iron Age Sites and Findspots



High Leicestershire ARA Sub Area Roman Sites and Findspots



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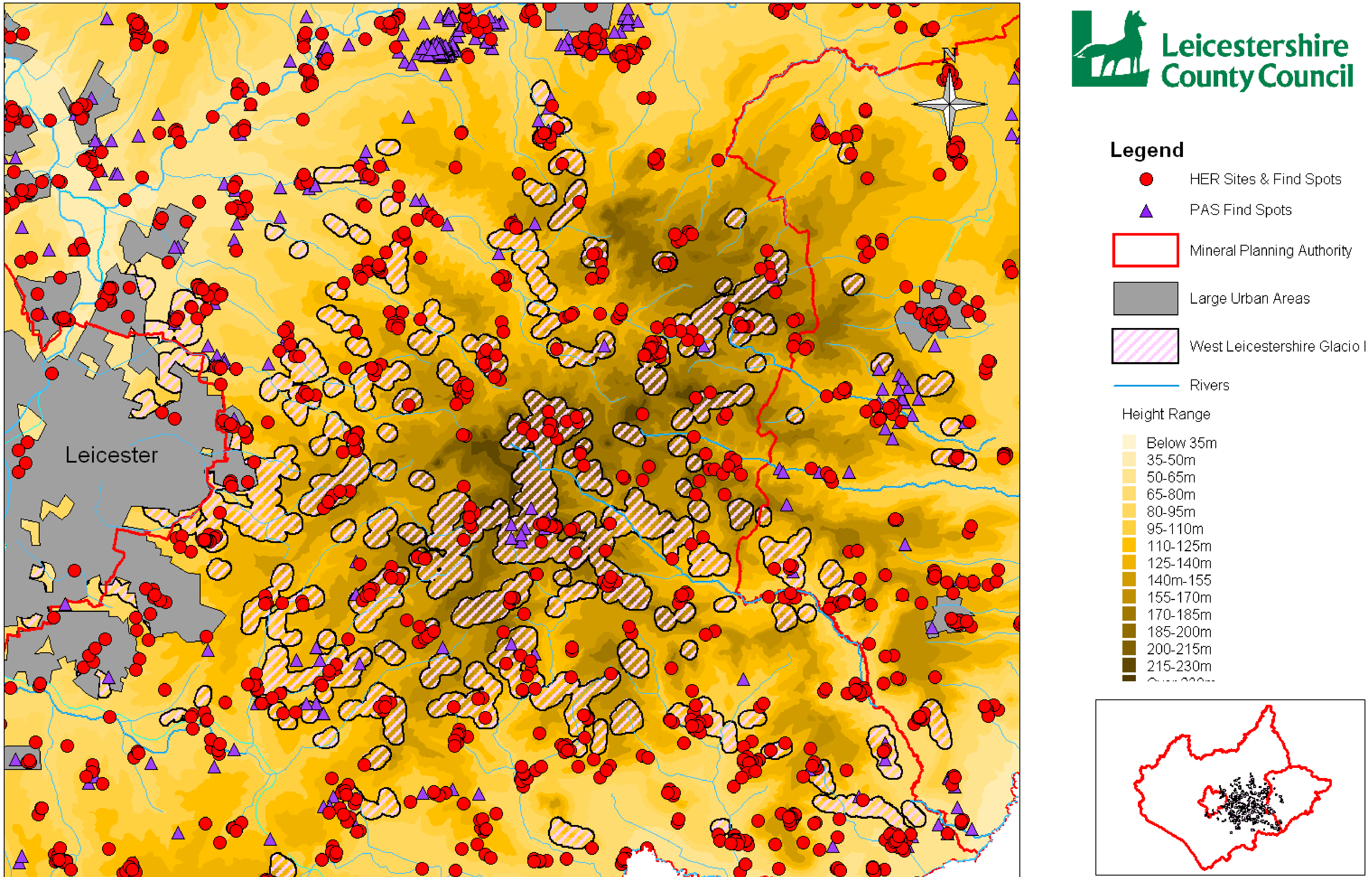

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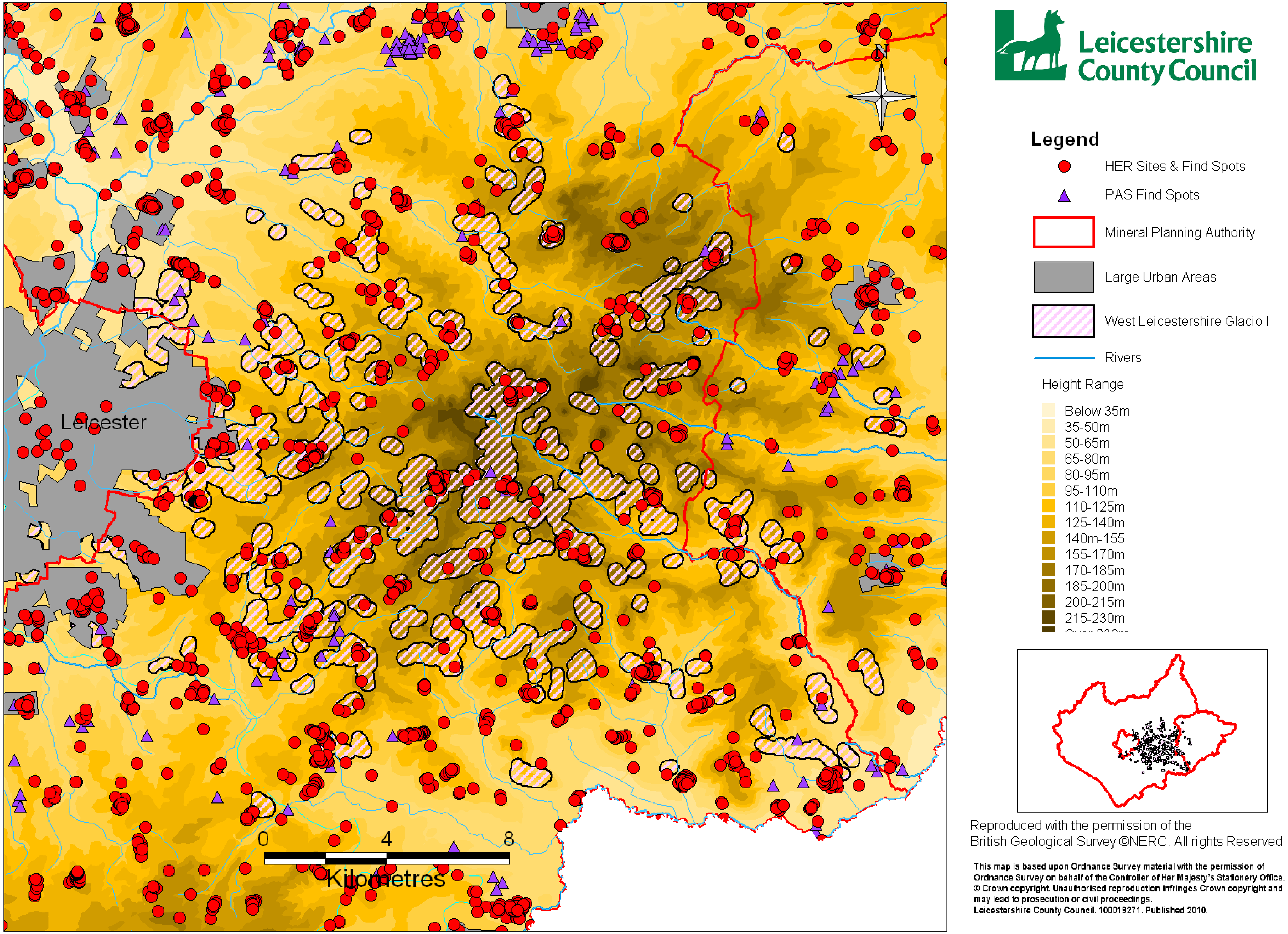
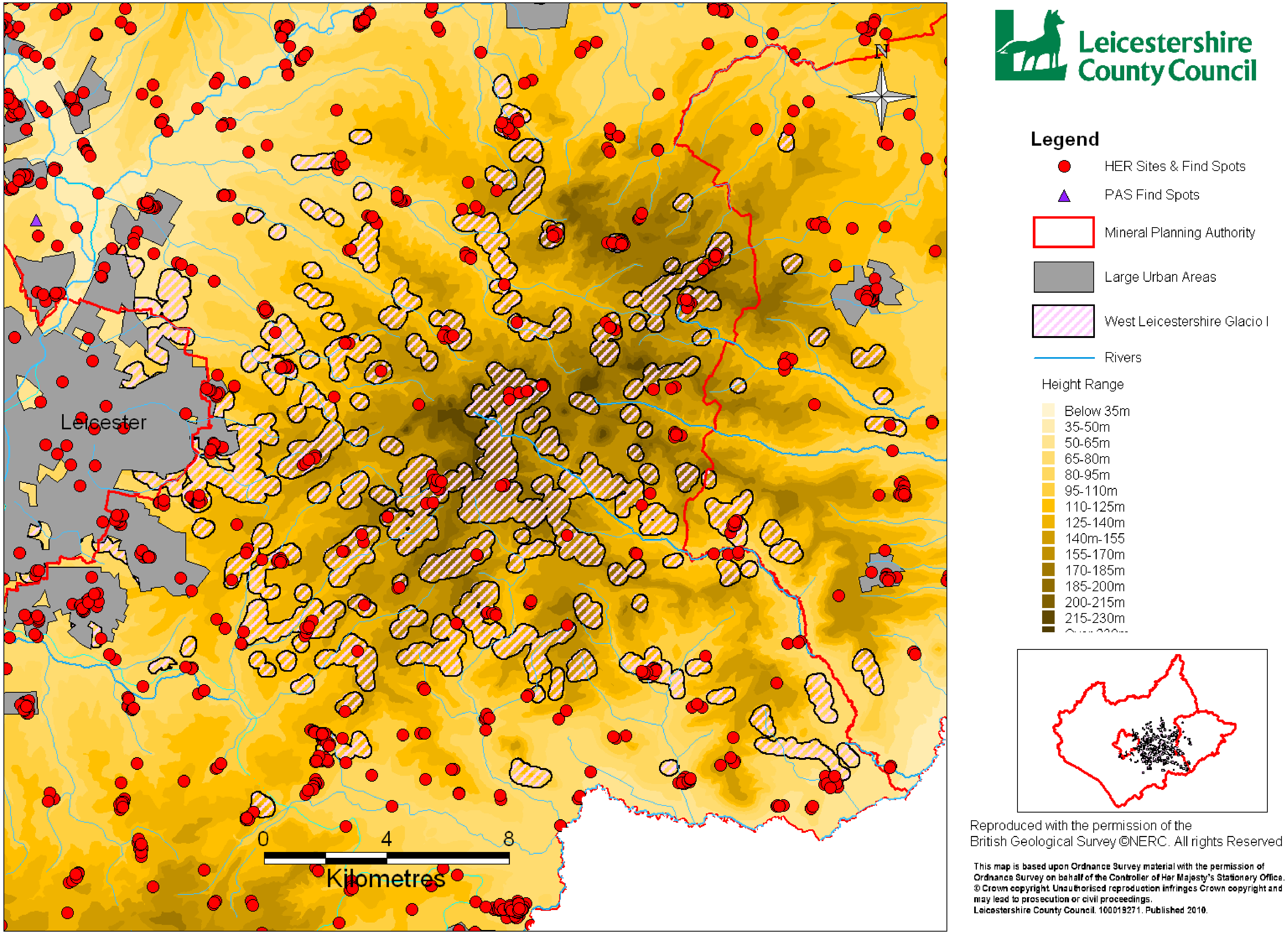
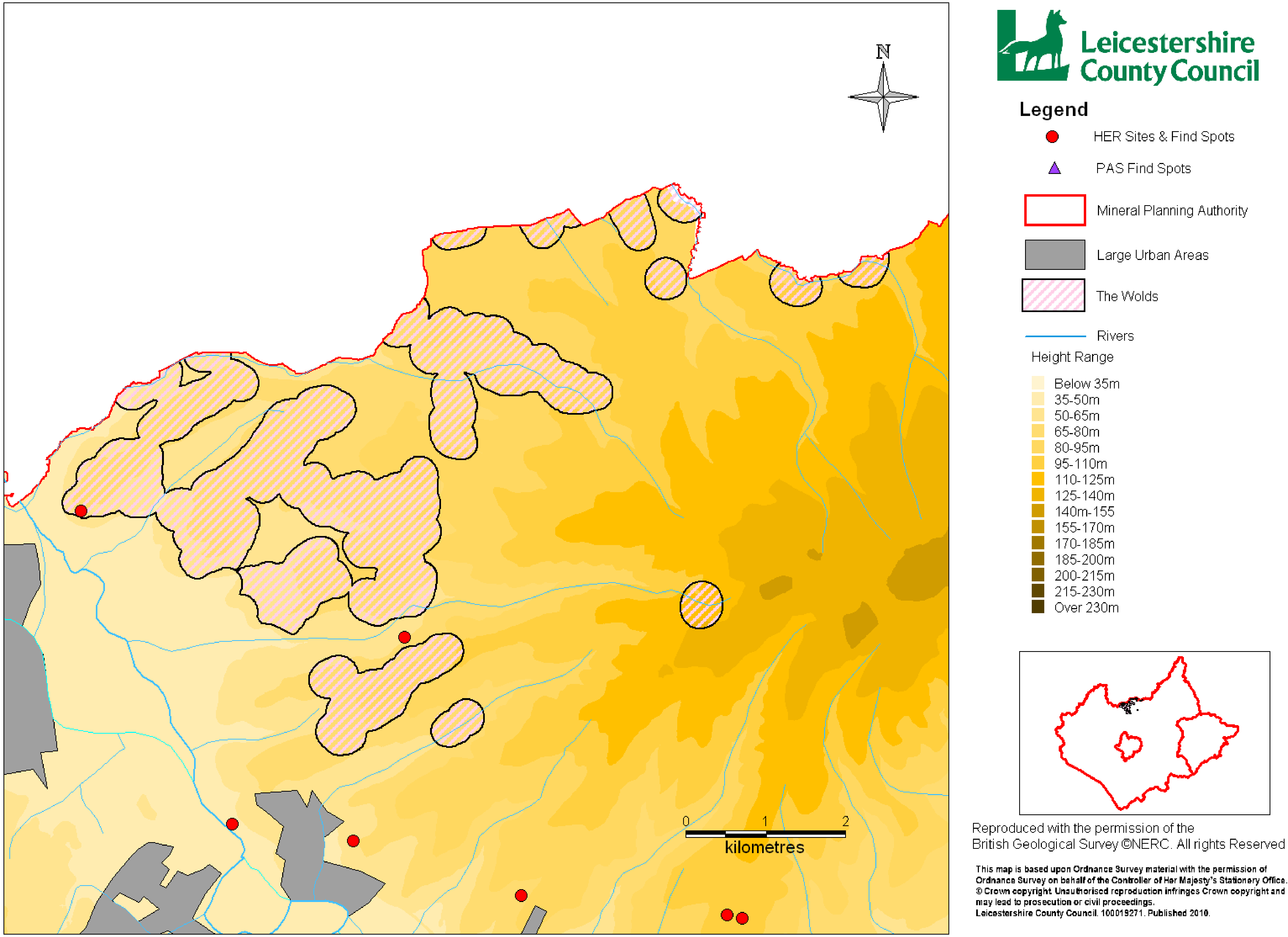


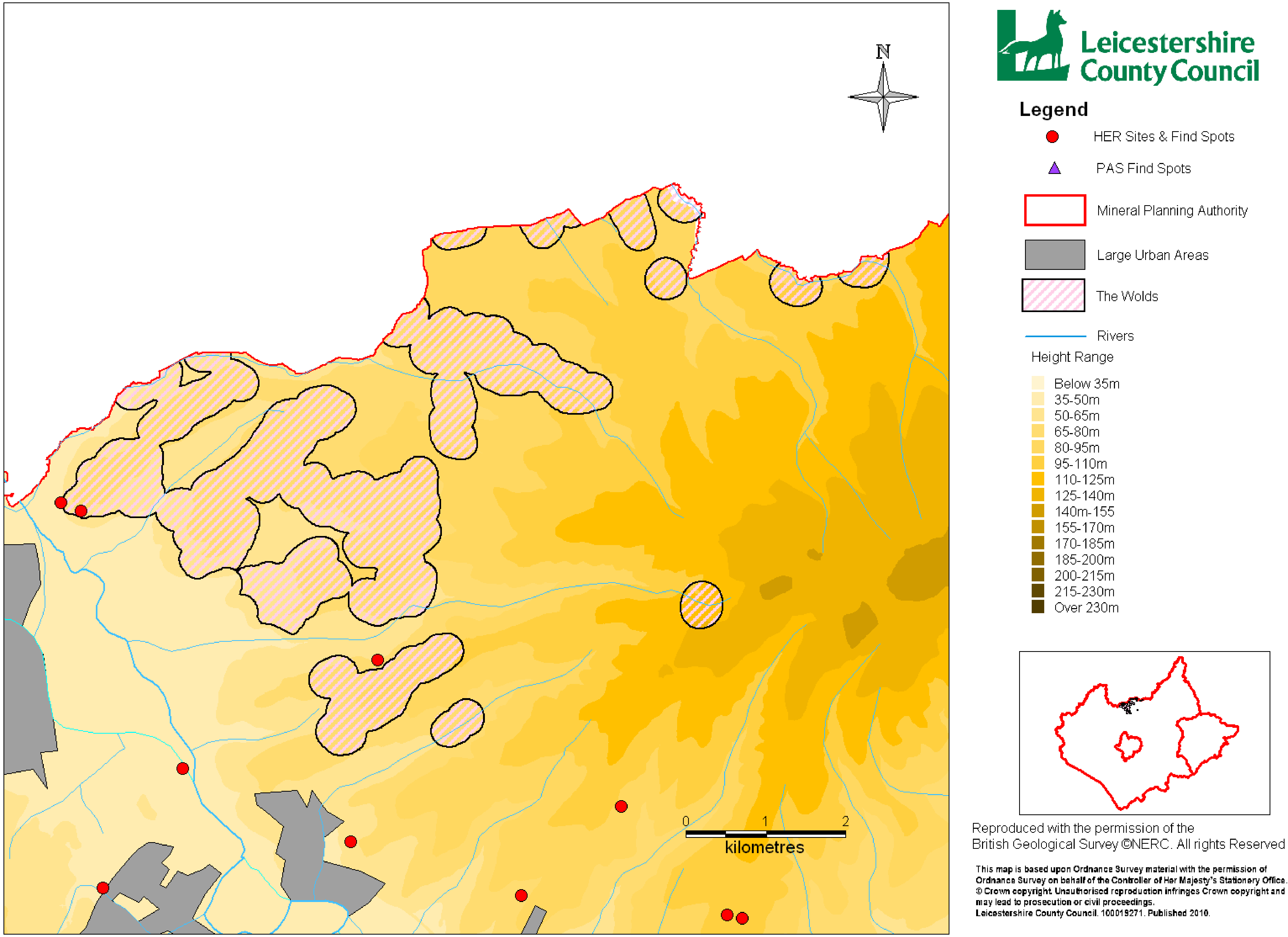
High Leicestershire ARA Sub Area Post-Medieval Sites and Findspots



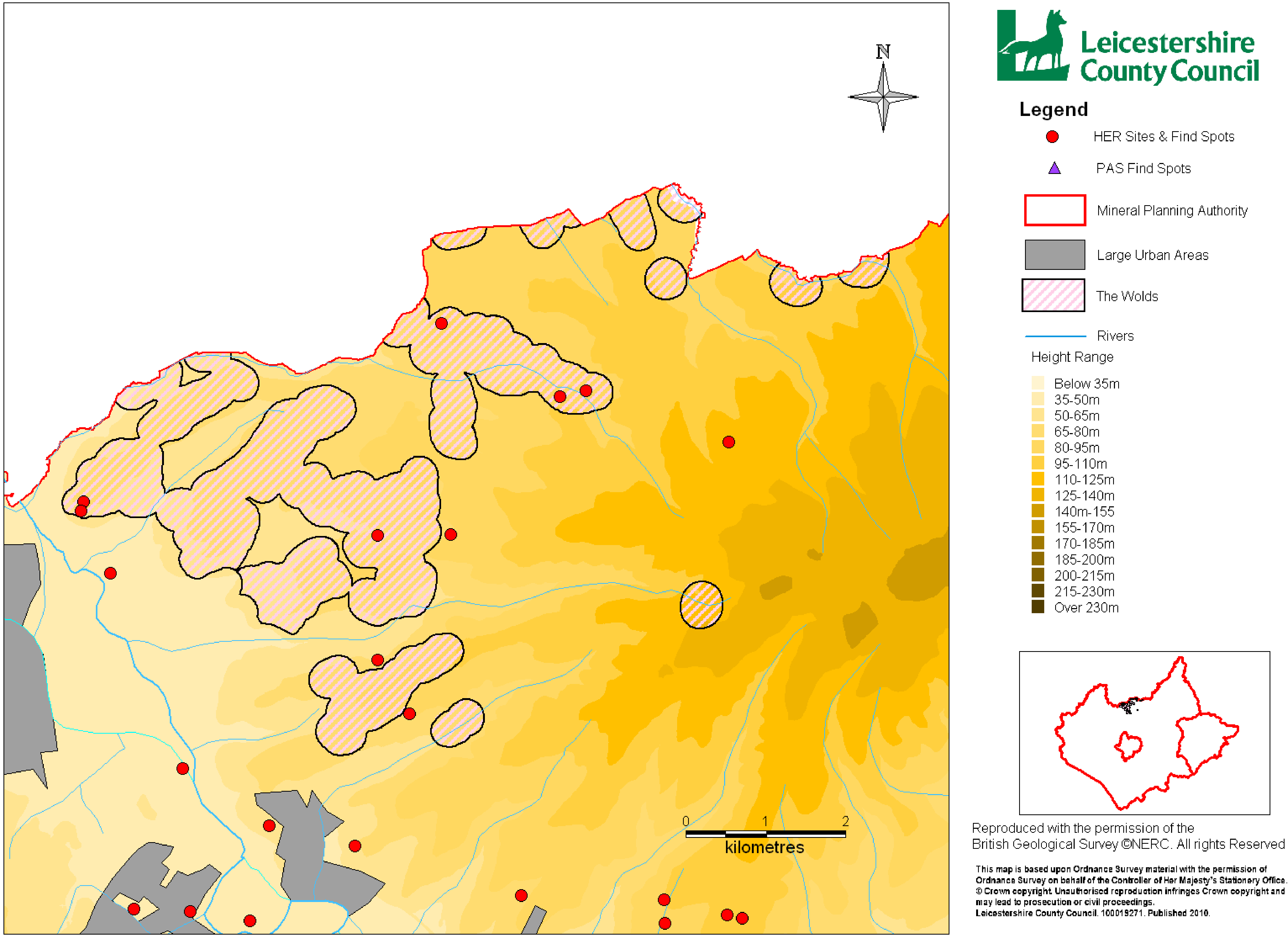
High Leicestershire ARA Sub Area Modern Sites and Findspots



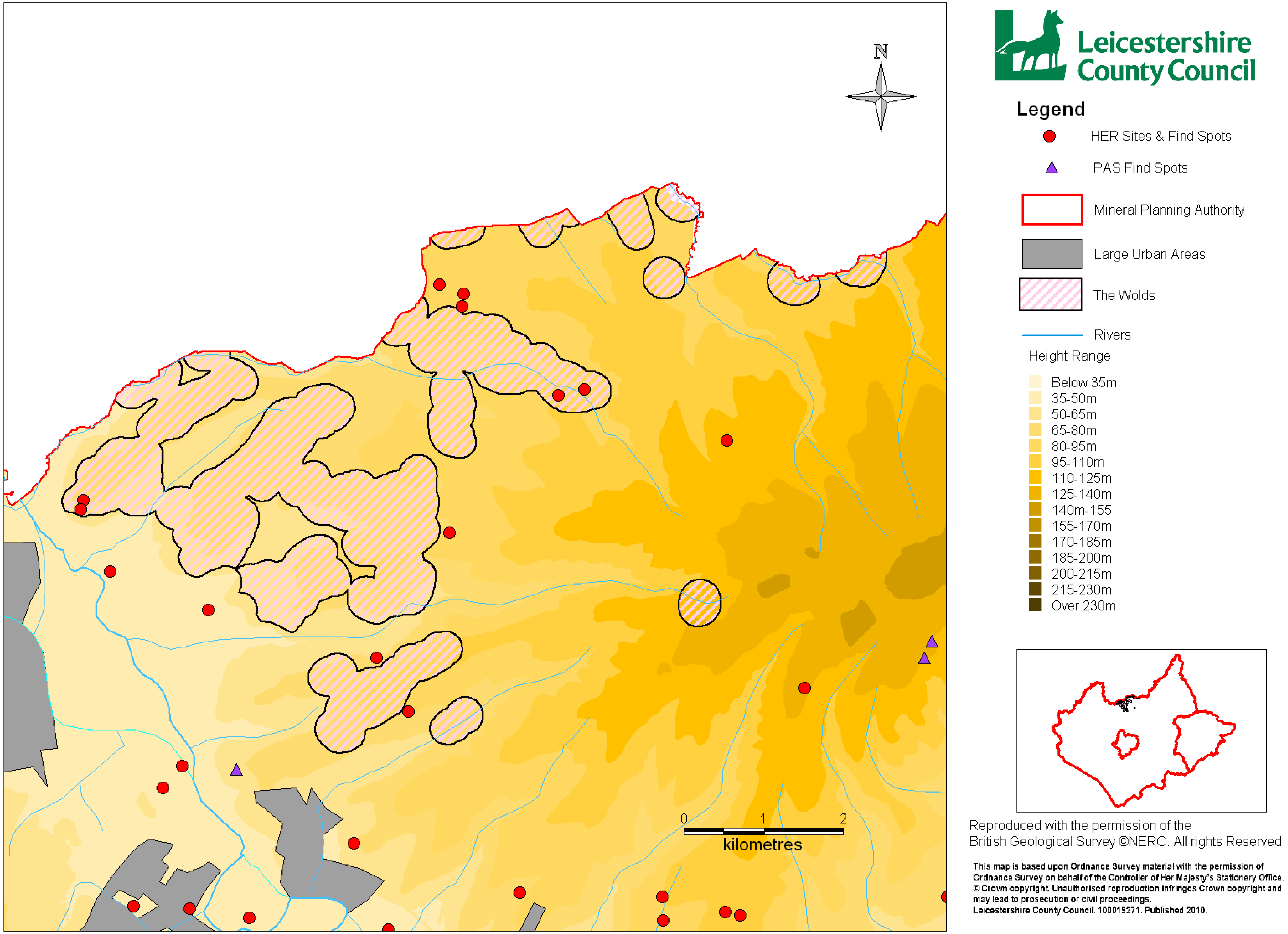
The Wolds ARA Sub Area Palaeolithic Sites and Findspots



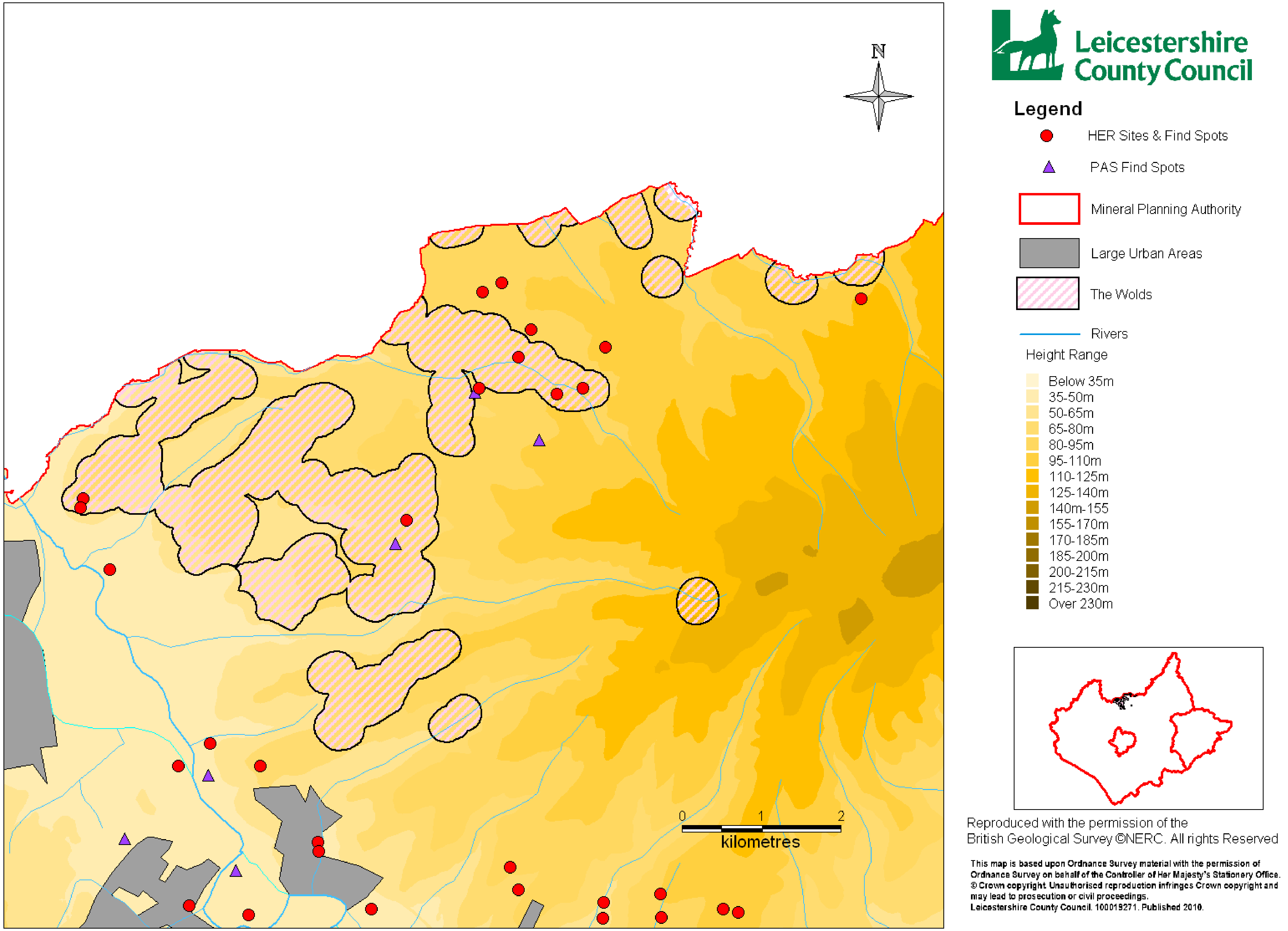
The Wolds ARA Sub Area Mesolithic Sites and Findspots



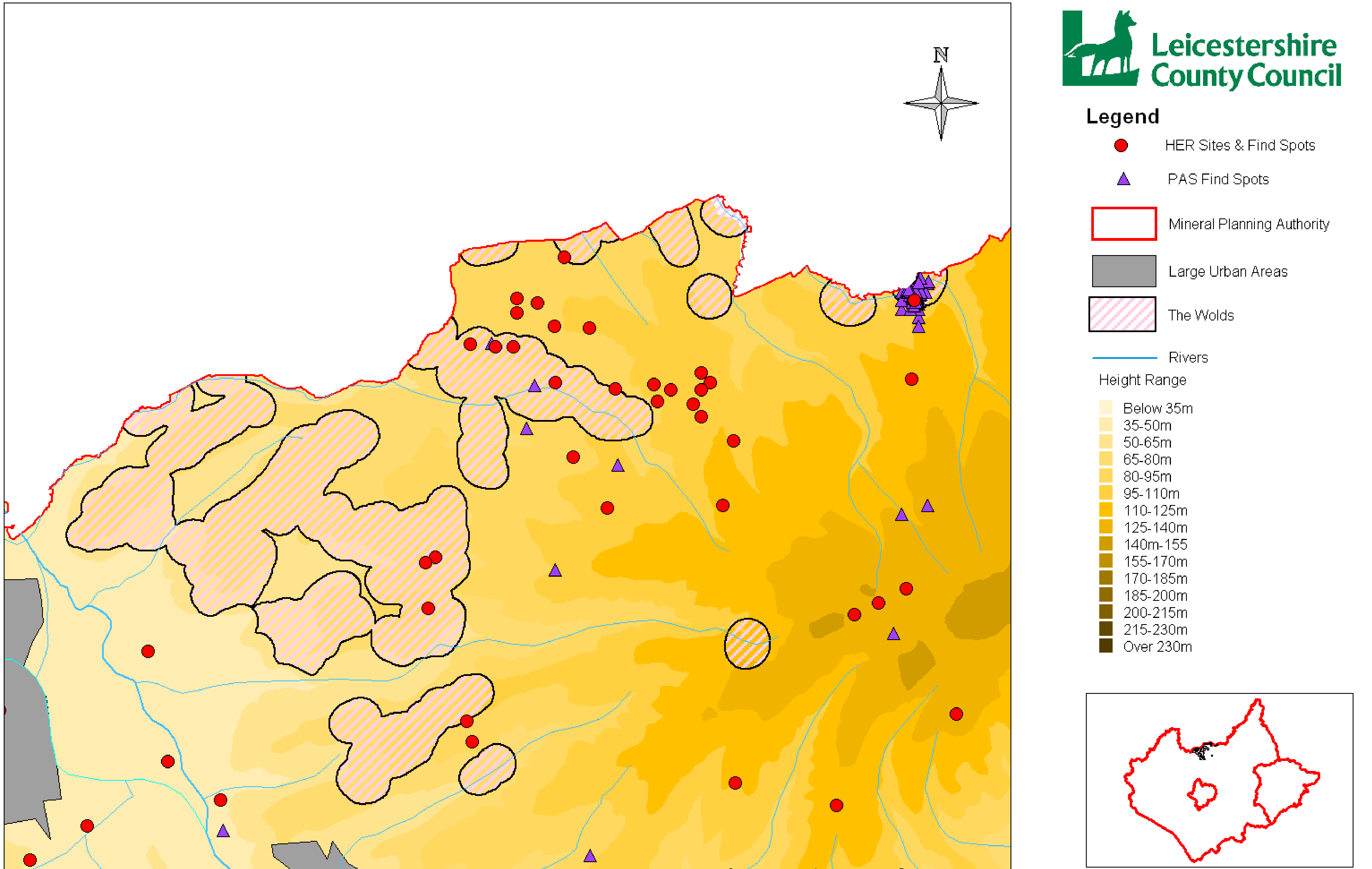
The Wolds ARA Sub Area Neolithic Sites and Findspots



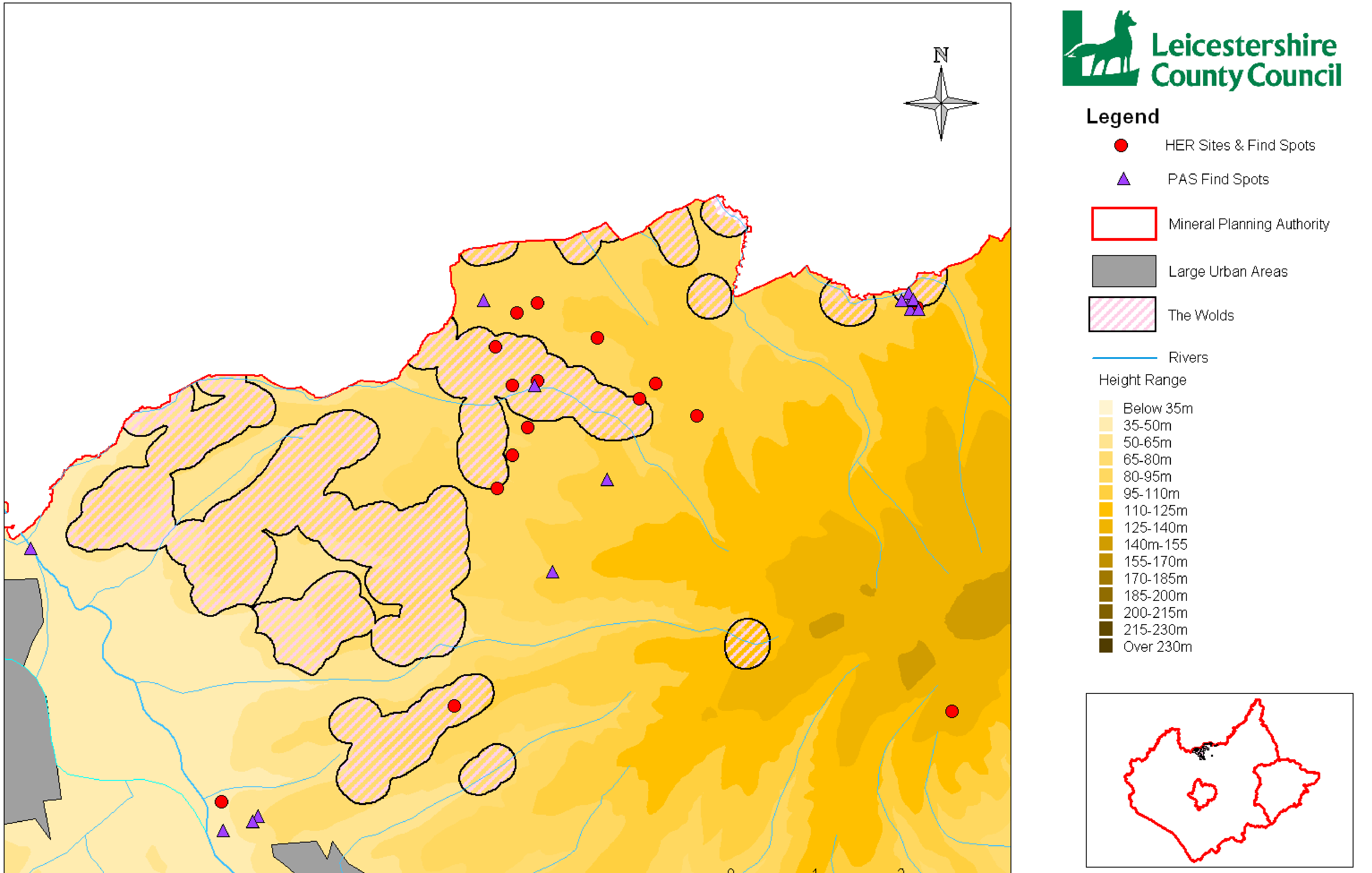
The Wolds ARA Sub Area Bronze Age Sites and Findspots



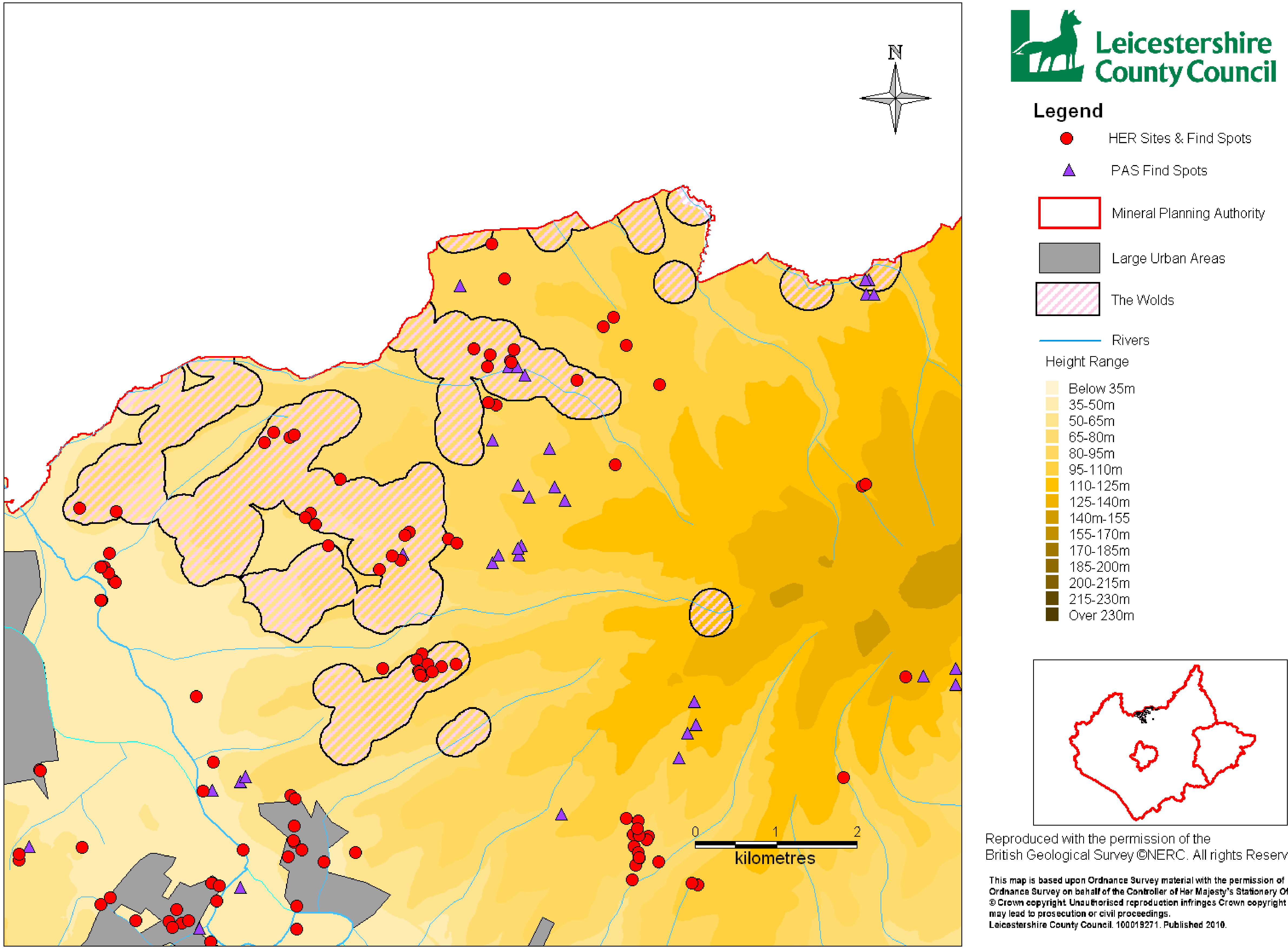
The Wolds ARA Sub Area Iron Age Sites and Findspots



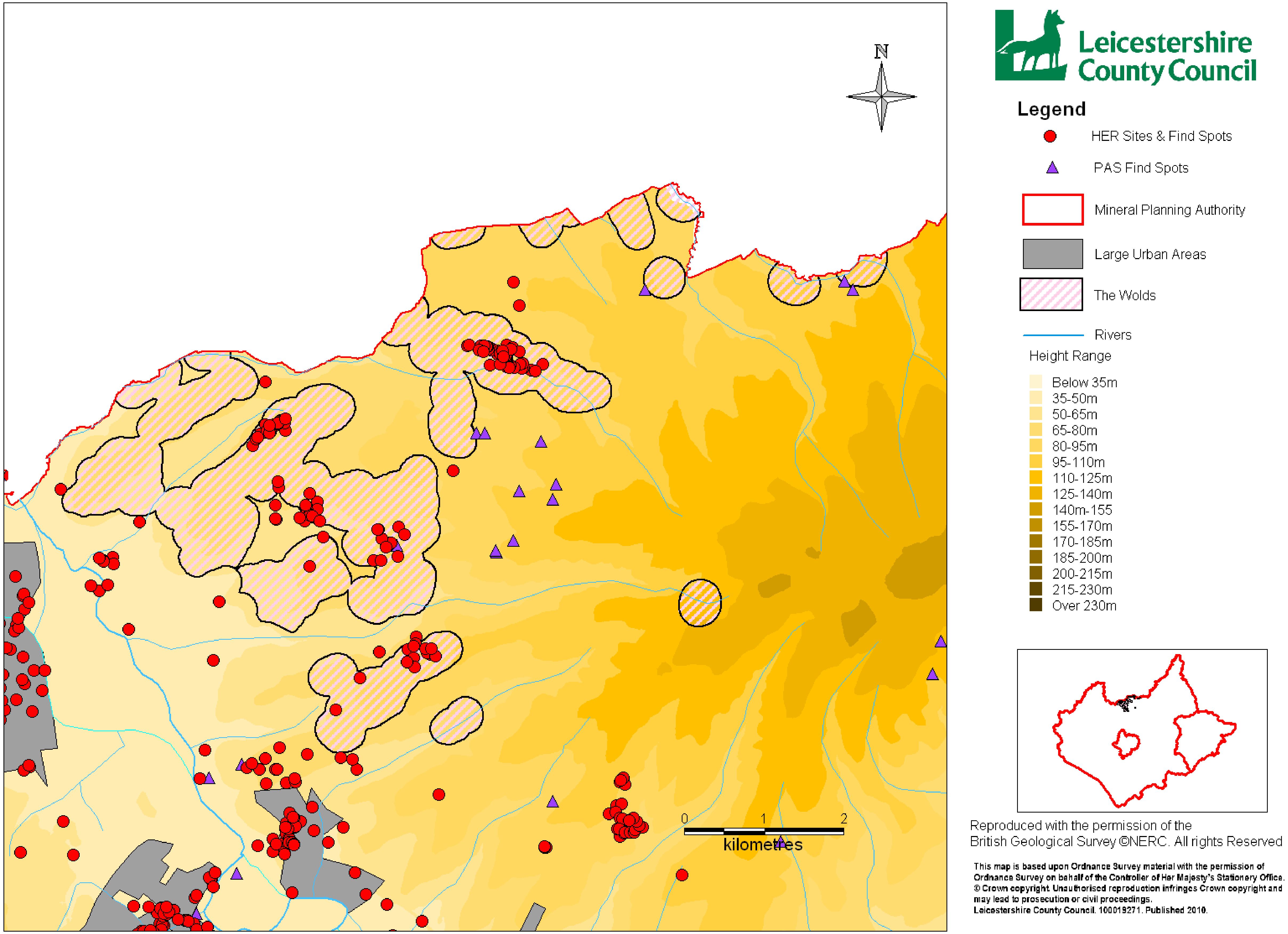
The Wolds ARA Sub Area Roman Sites and Findspots



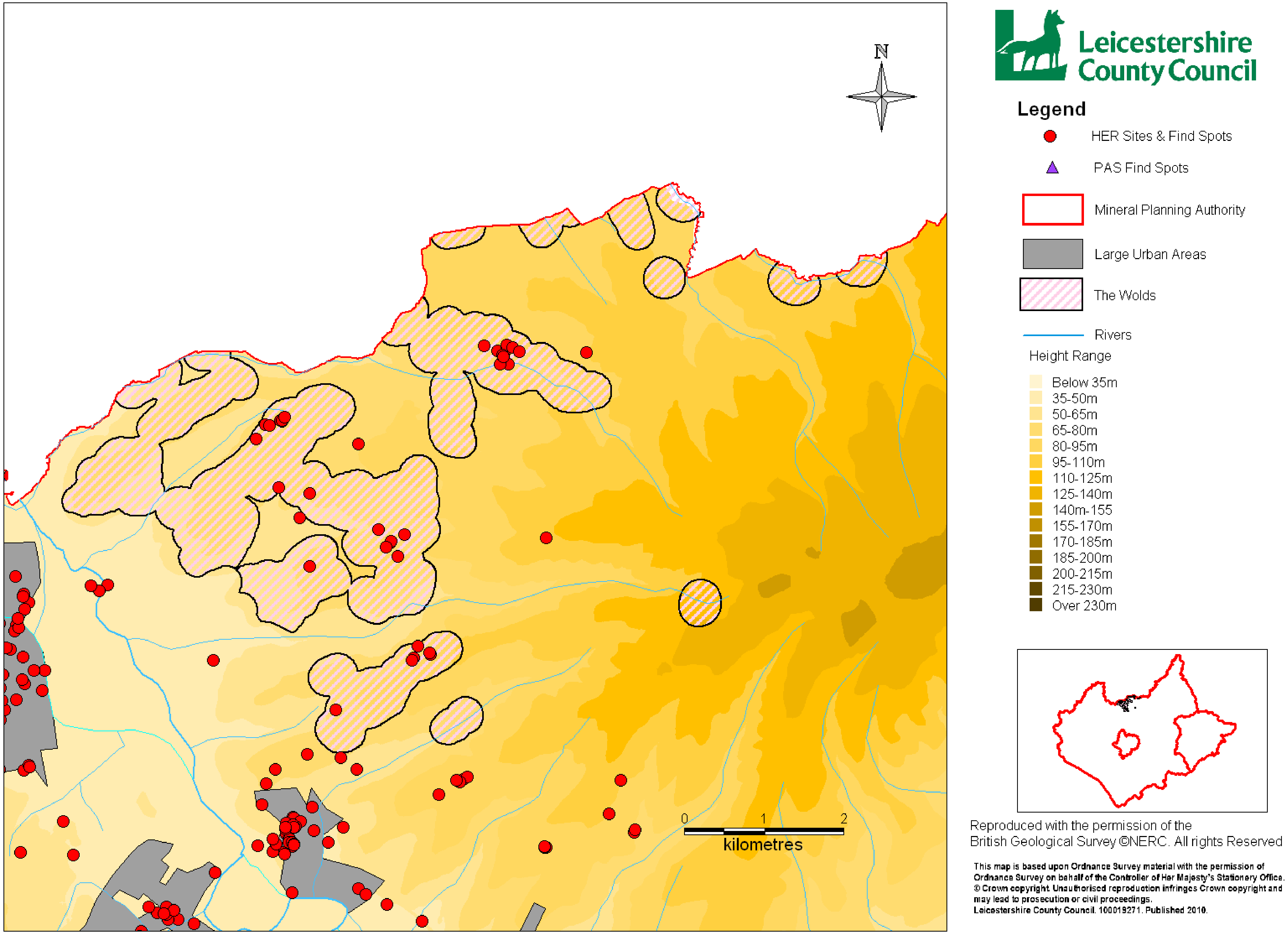
The Wolds ARA Sub Area Anglo-Saxon Sites and Findspots



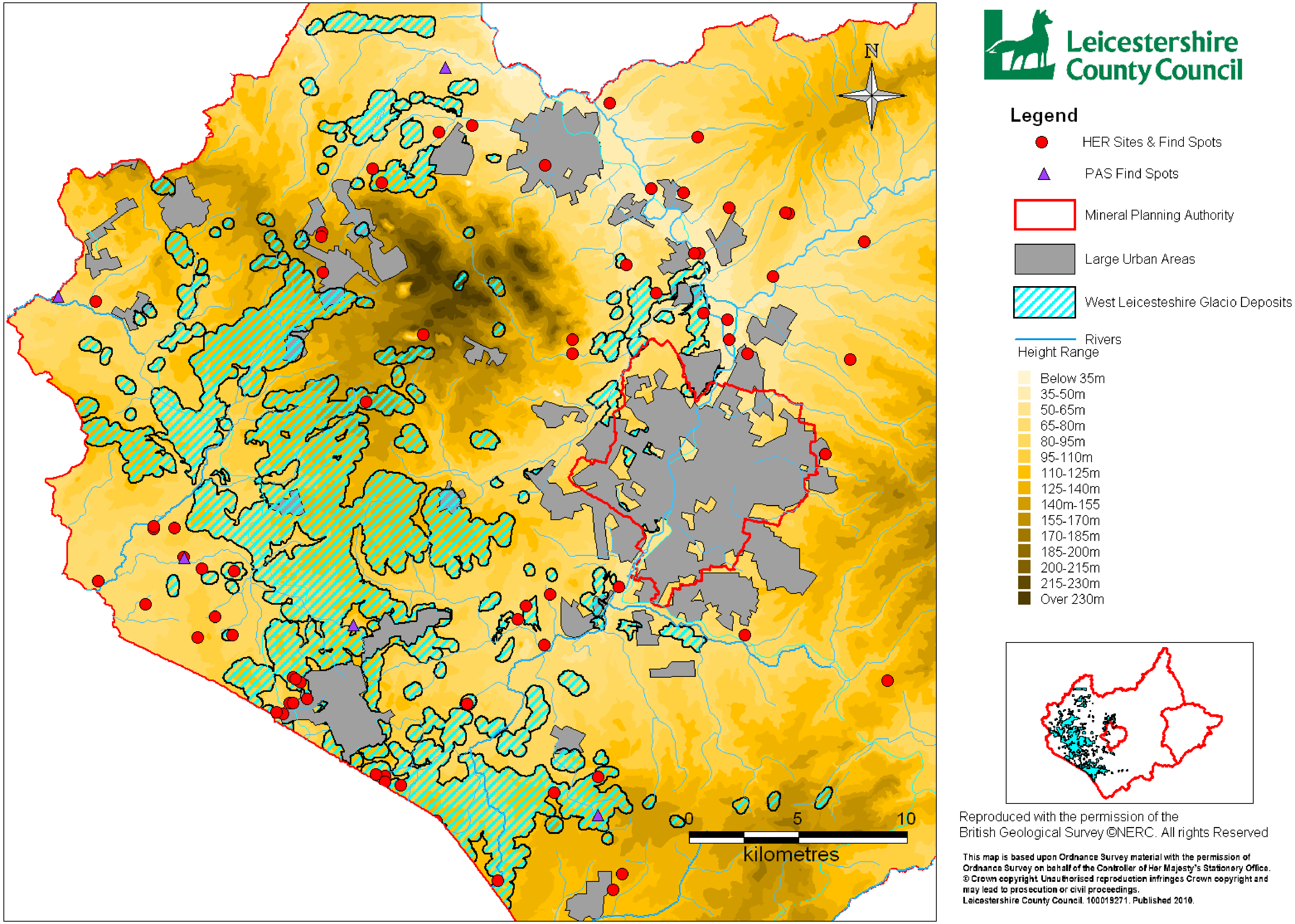
The Wolds ARA Sub Area Medieval Sites and Findspots



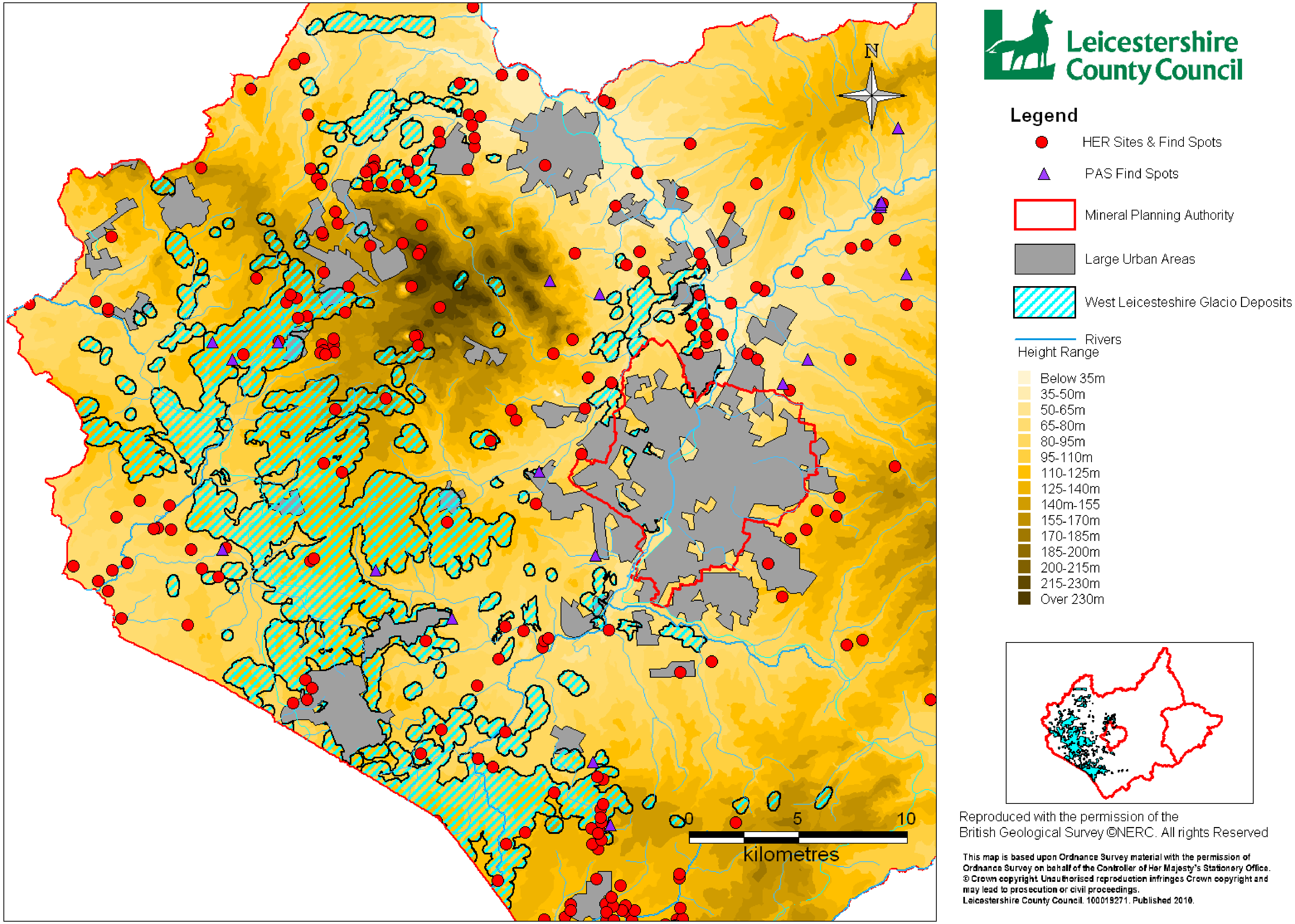
The Wolds ARA Sub Area Post Medieval Sites and Findspots



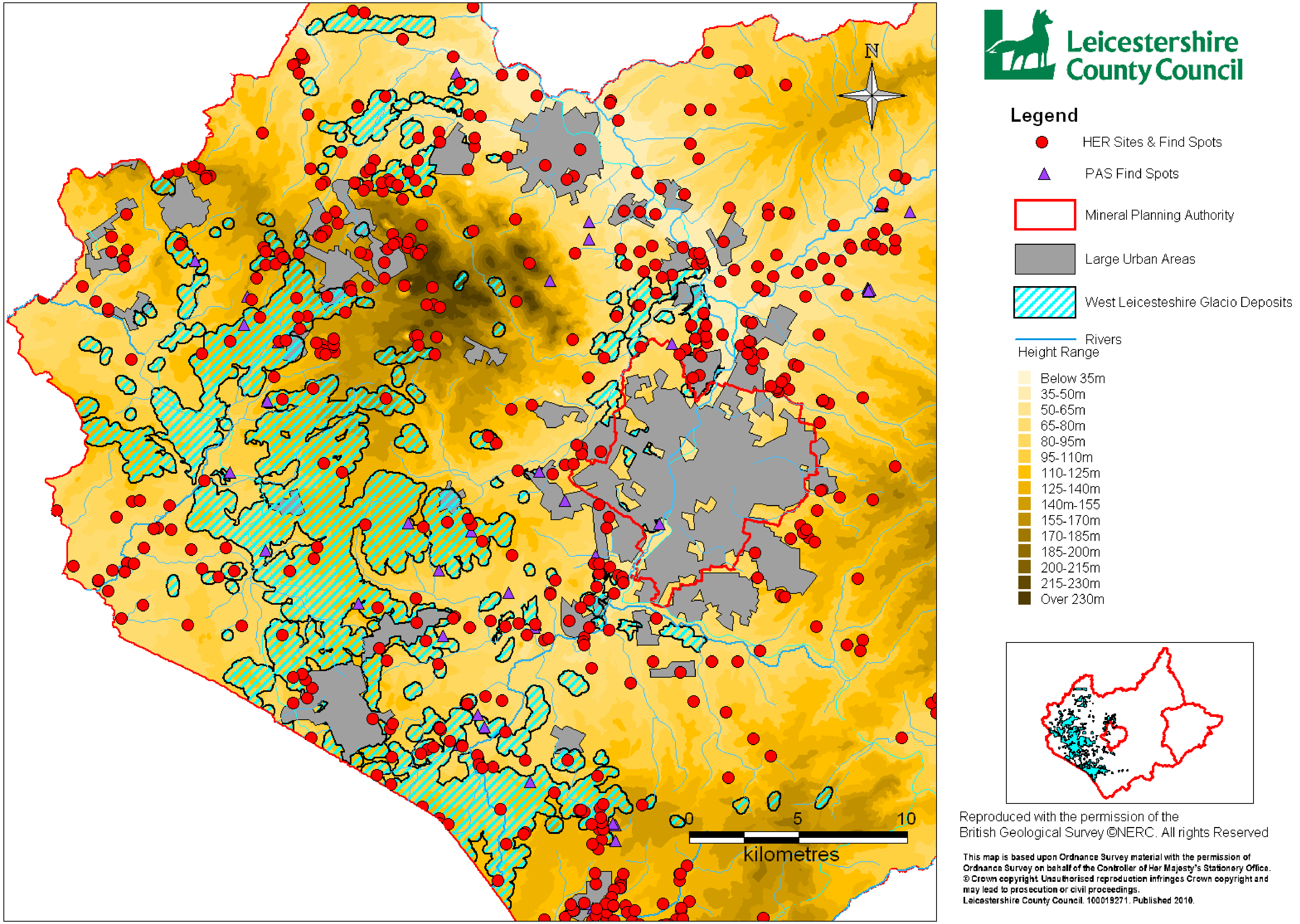
The Wolds ARA Sub Area Modern Sites and Findspots



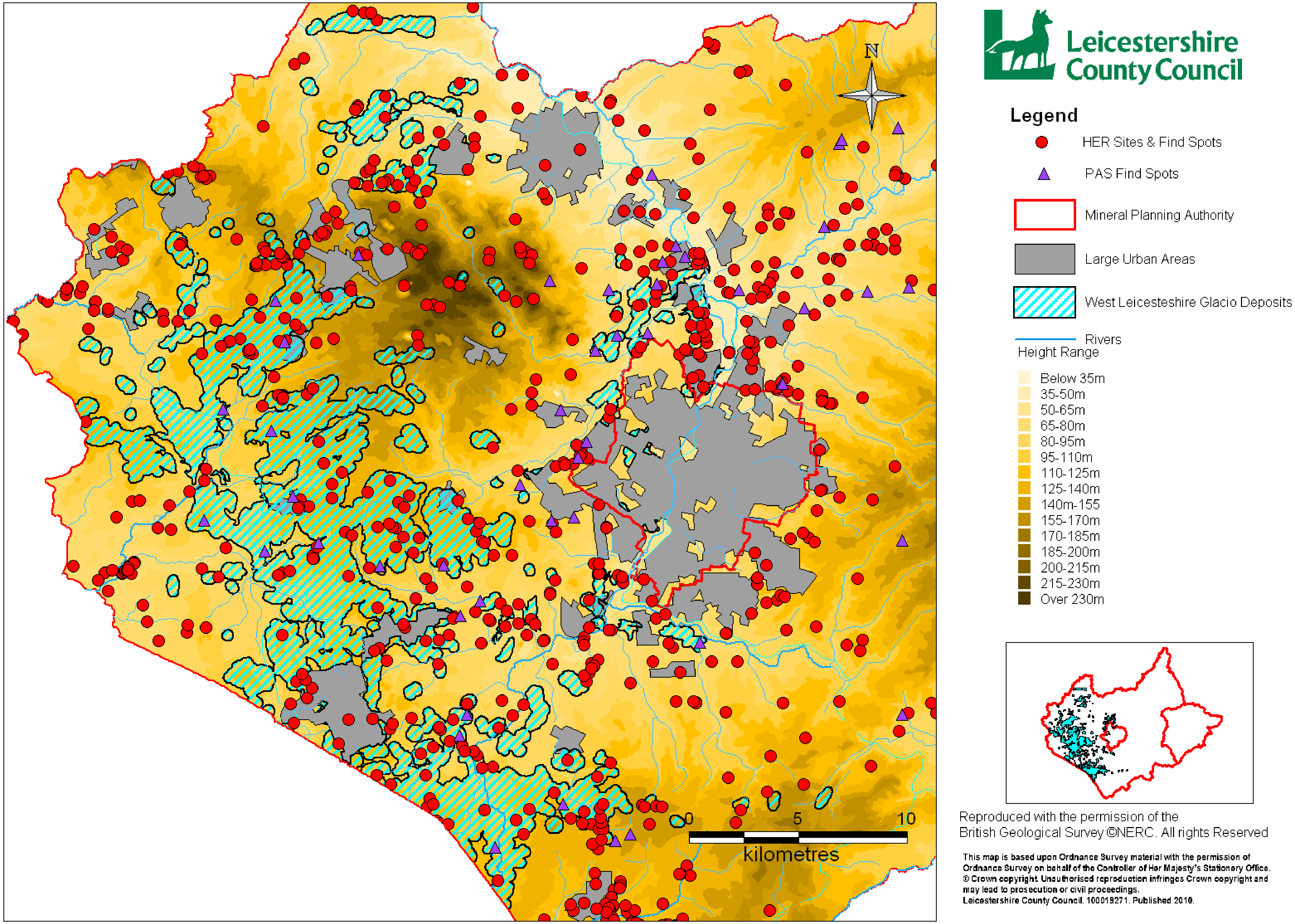
West Leicestershire Glacio Deposits ARA Sub Area Palaeolithic Sites and Findspots



West Leicestershire Glacio Deposits ARA Sub Area Mesolithic Sites and Findspots



West Leicestershire Glacio Deposits ARA Sub Area Neolithic Sites and Findspots



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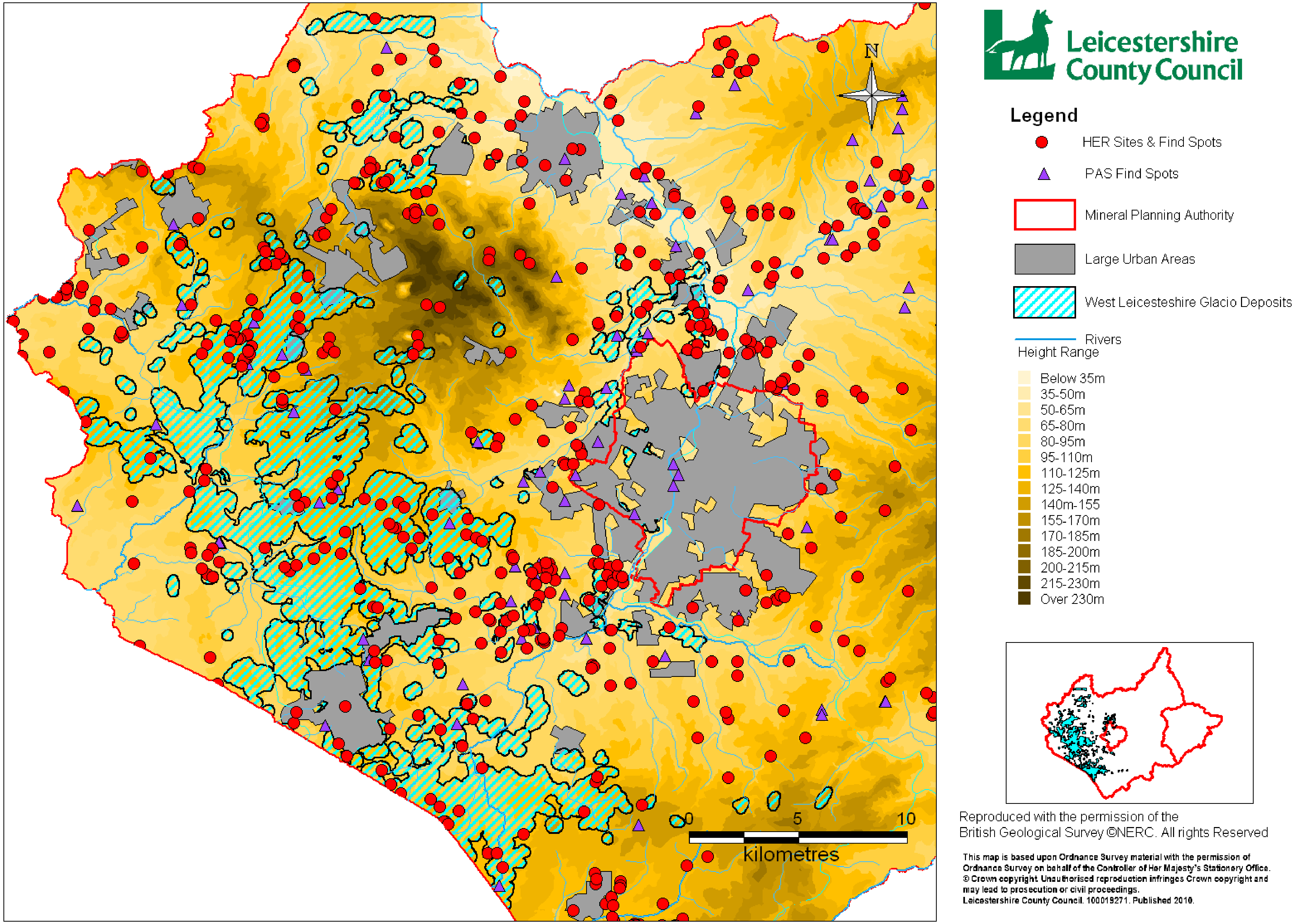
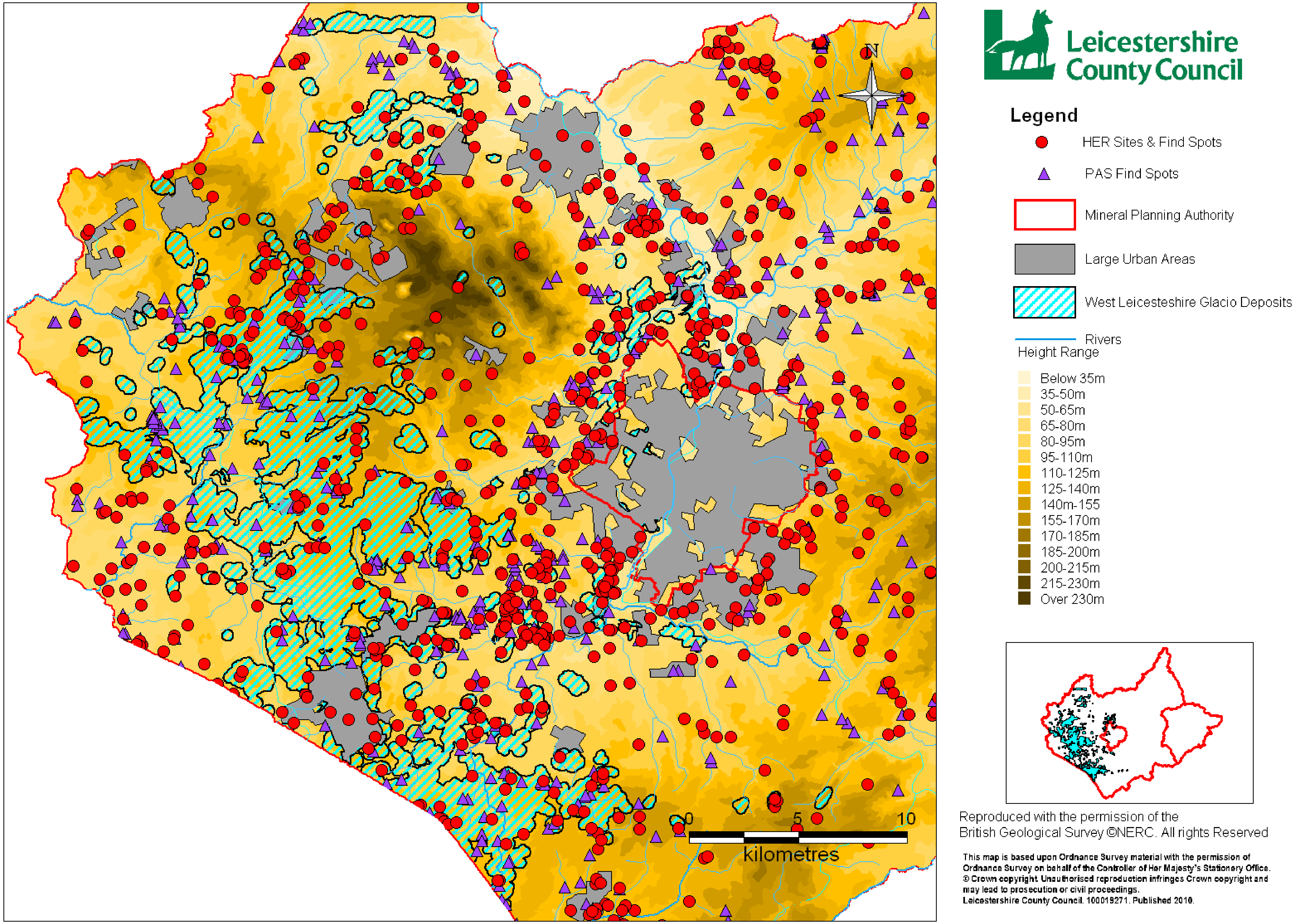
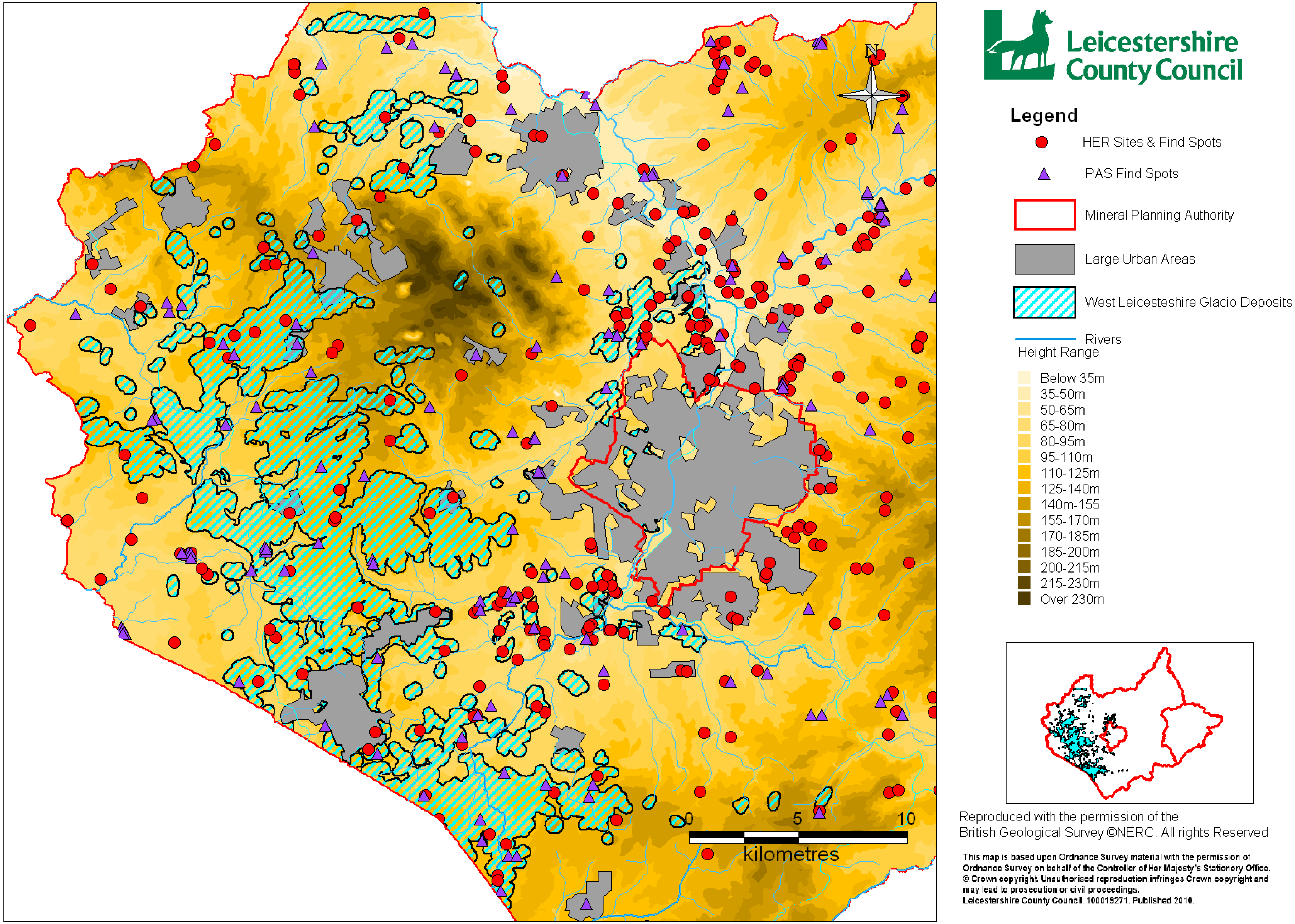


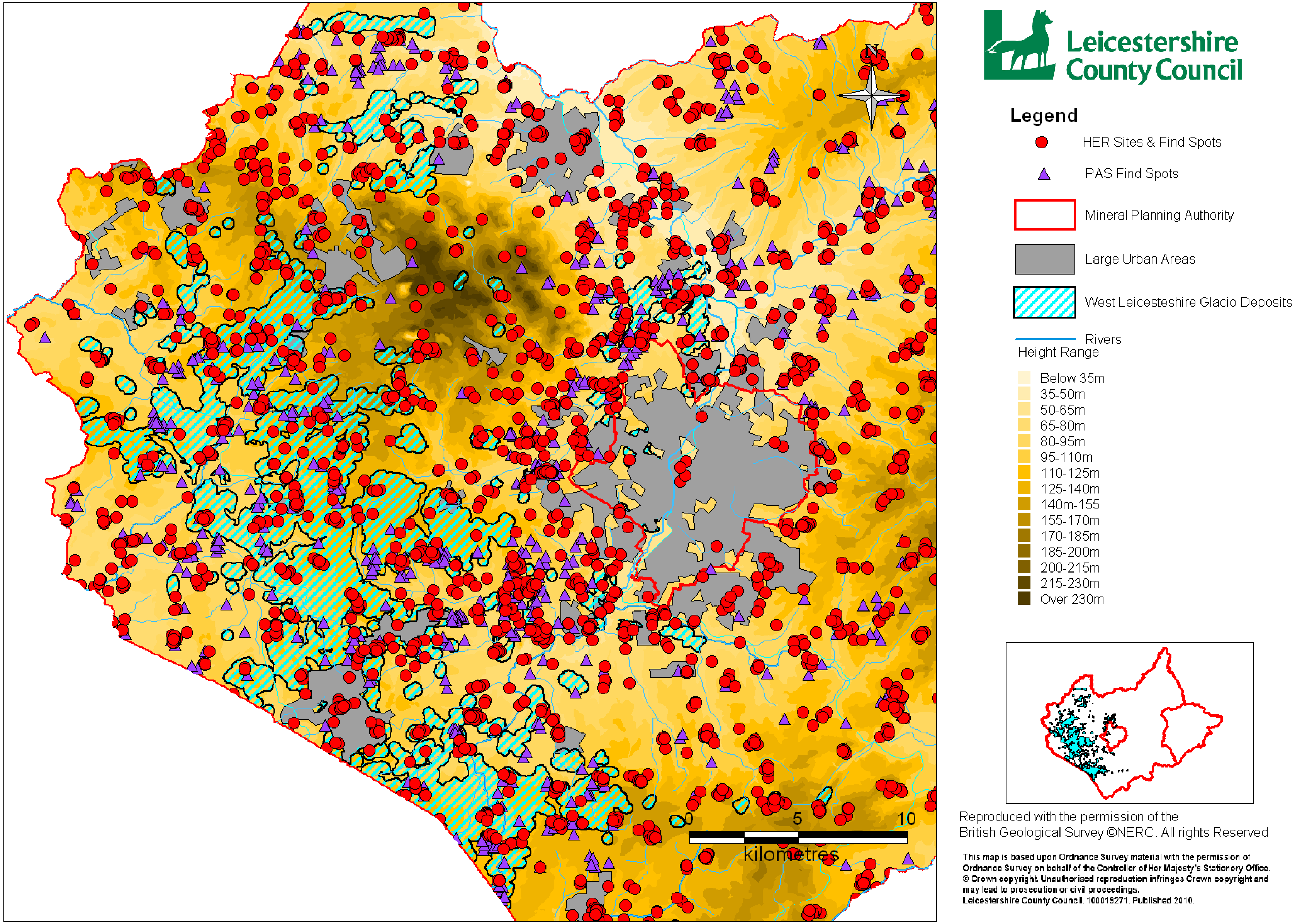
West Leicestershire Glacio Deposits ARA Sub Area Iron Age Sites and Findspots



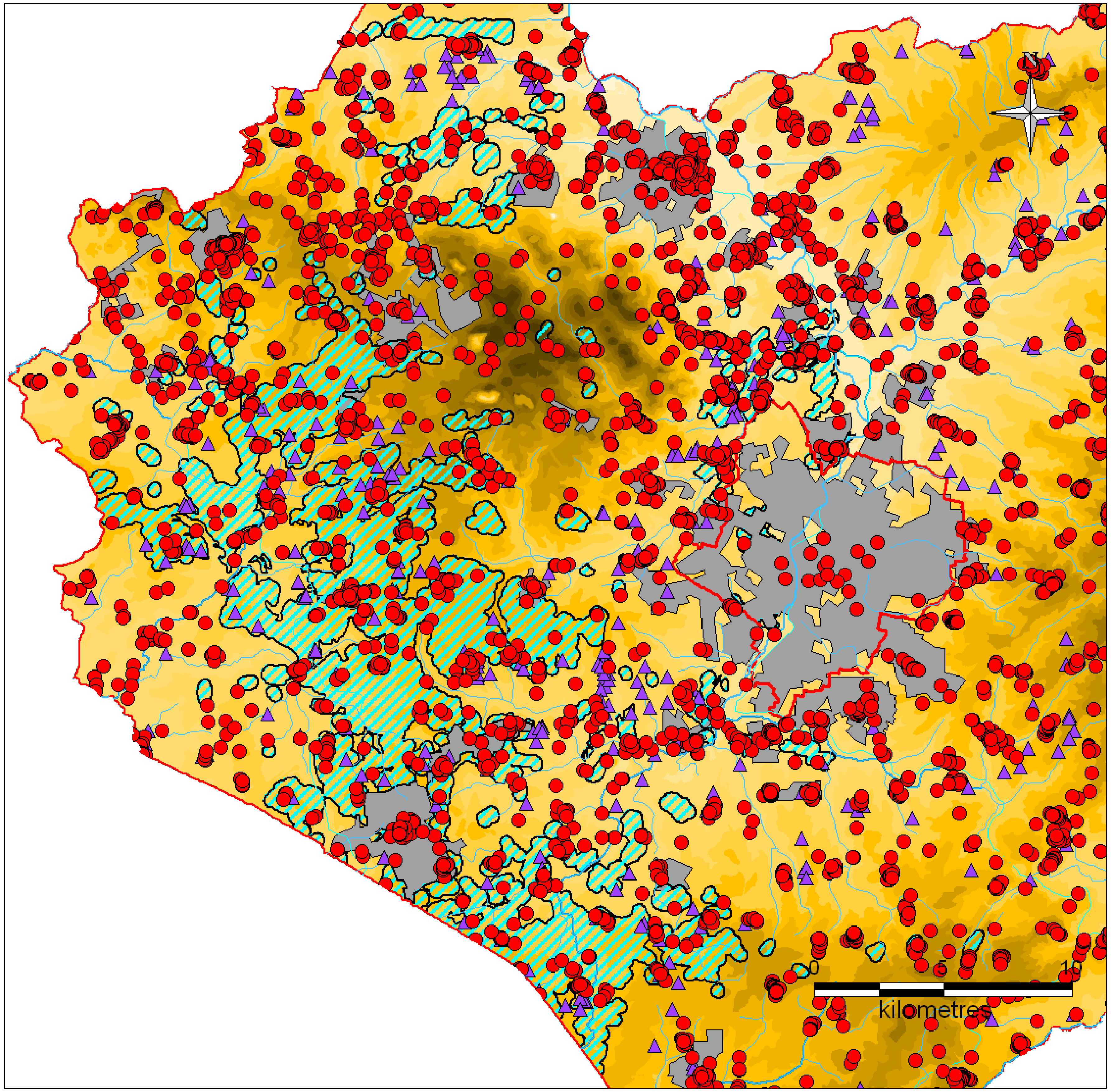
West Leicestershire Glacio Deposits ARA Sub Area Roman Sites and Findspots



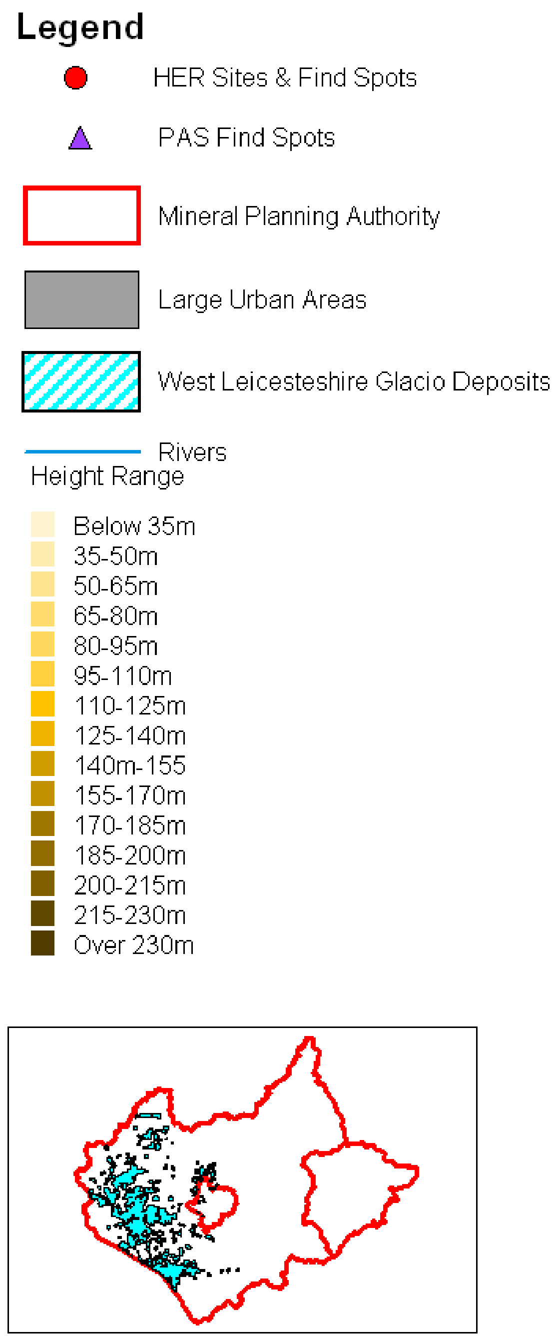
West Leicestershire Glacio Deposits ARA Sub Area Anglo-Saxon Sites and Findspots



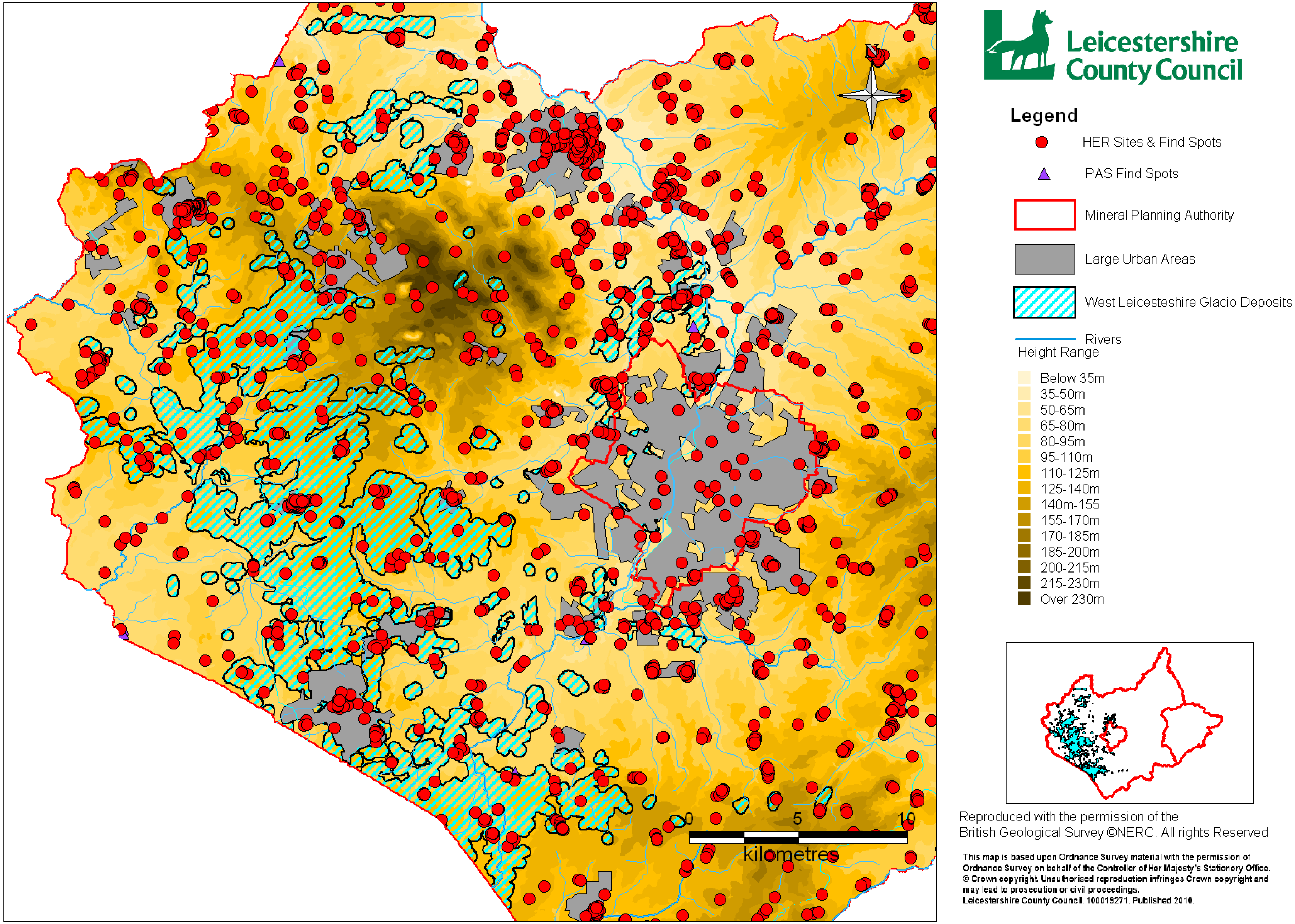
West Leicestershire Glacio Deposits ARA Sub Area Medieval Sites and Findspots



Leicestershire County Council

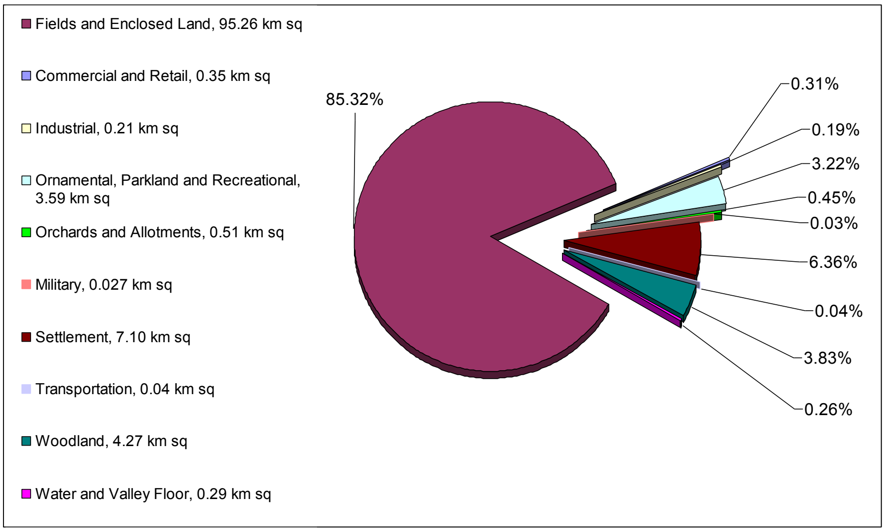


West Leicestershire Glacio Deposits ARA Sub Area Post-Medieval Sites and Findspots

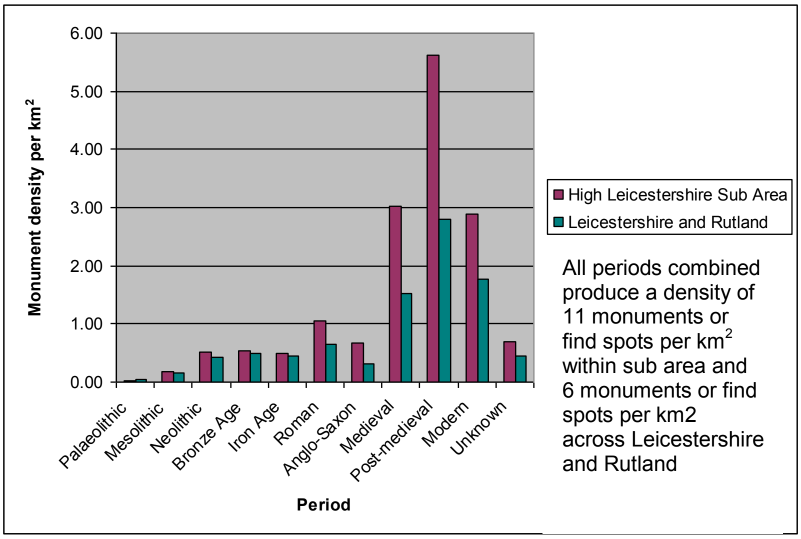


West Leicestershire Glacio Deposits ARA Sub Area Modern Sites and Findspots

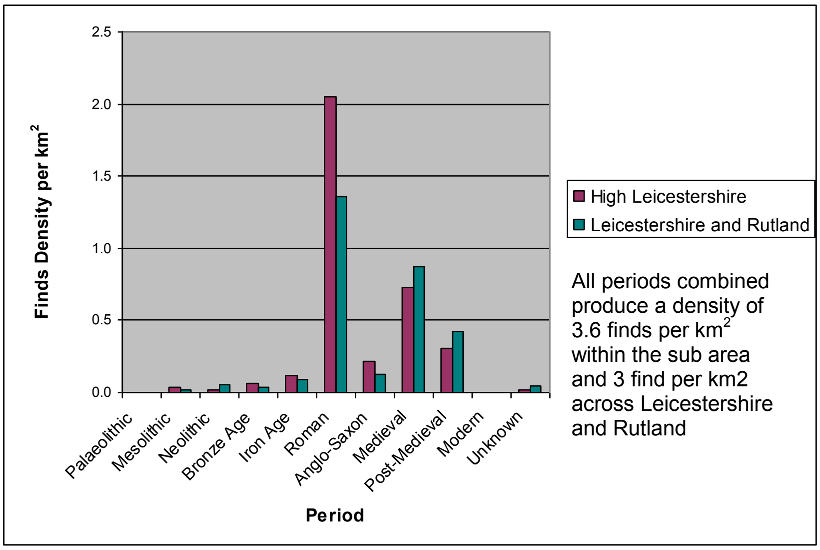
Appendix 4: HLC, HER and PAS Density and Distribution Information for the Glaciofluvial Sands and Gravels Sub Areas



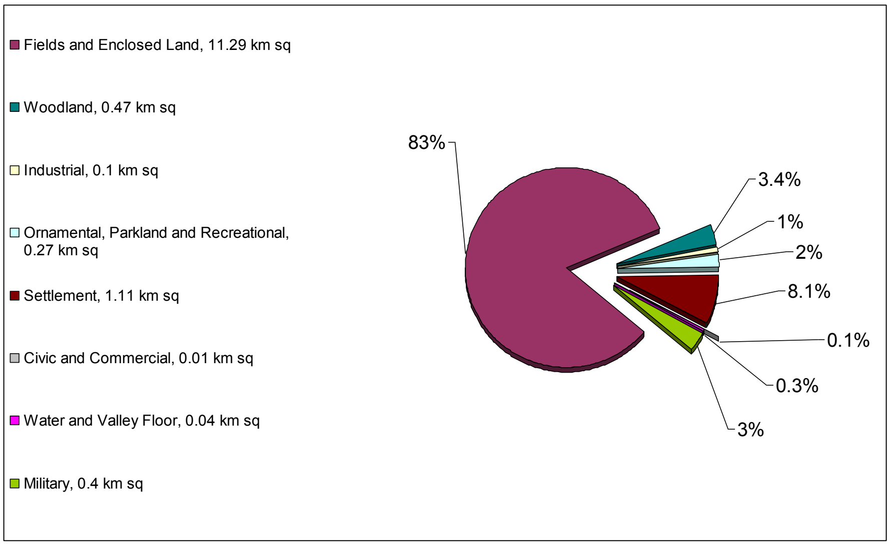
HLC Broad Types within the High Leicestershire ARA sub area



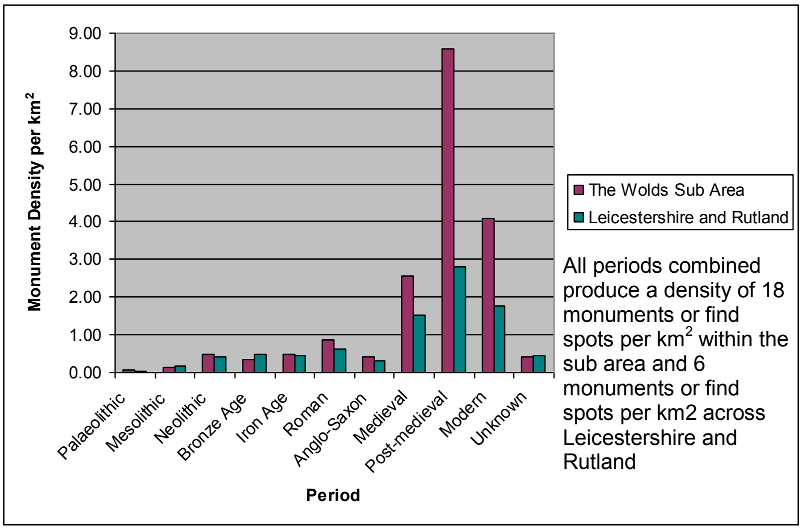
Density of monuments and find spots recorded on HER for High Leicestershire compared to the whole project area



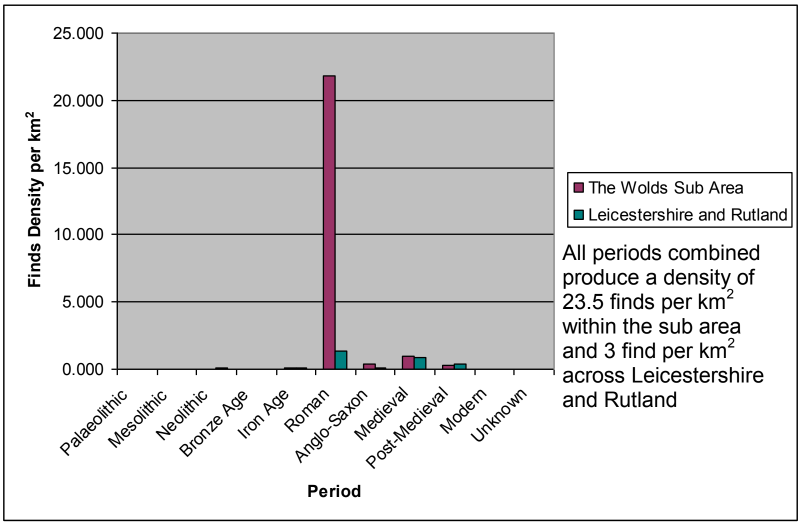
Density of find spots recorded through PAS for High Leicestershire and the whole project area



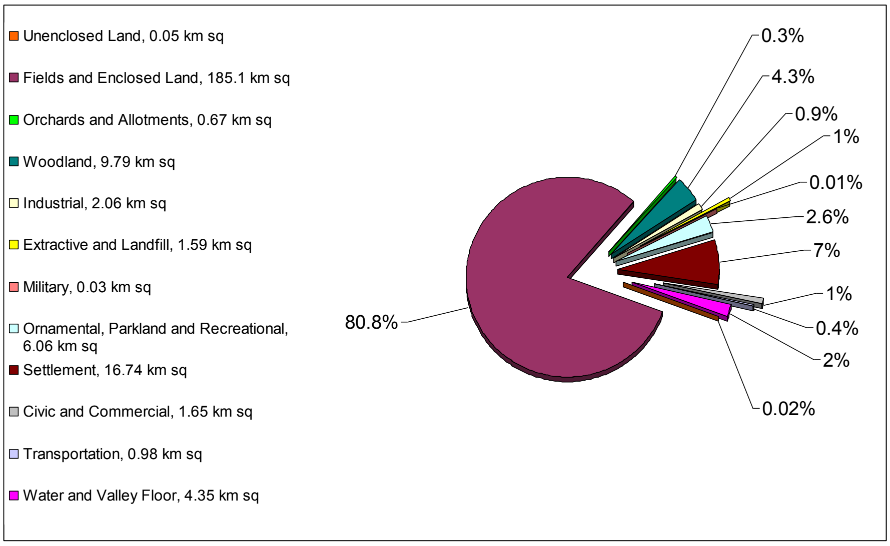
HLC Broad Types within the Wolds ARA Sub Area



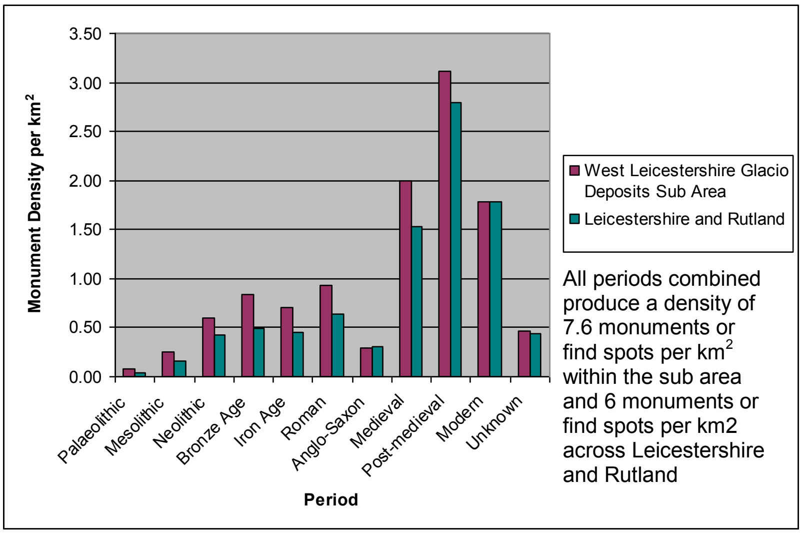
Density of monuments and find spots recorded on HER for the Wolds Sub Area compared with the whole project area



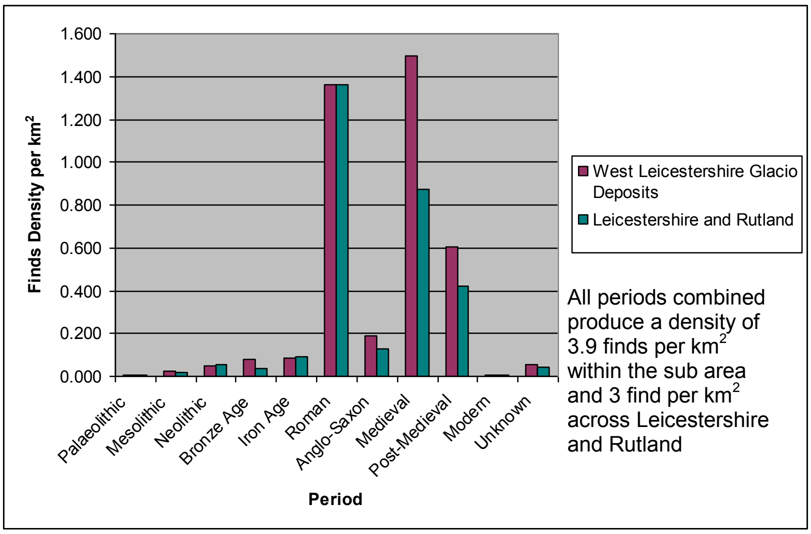
Density of find spots recorded through PAS comparing the Wolds sub area compared with the whole project area



HLC Broad Types within the West Leicestershire Glaciofluvial Deposits ARA sub area

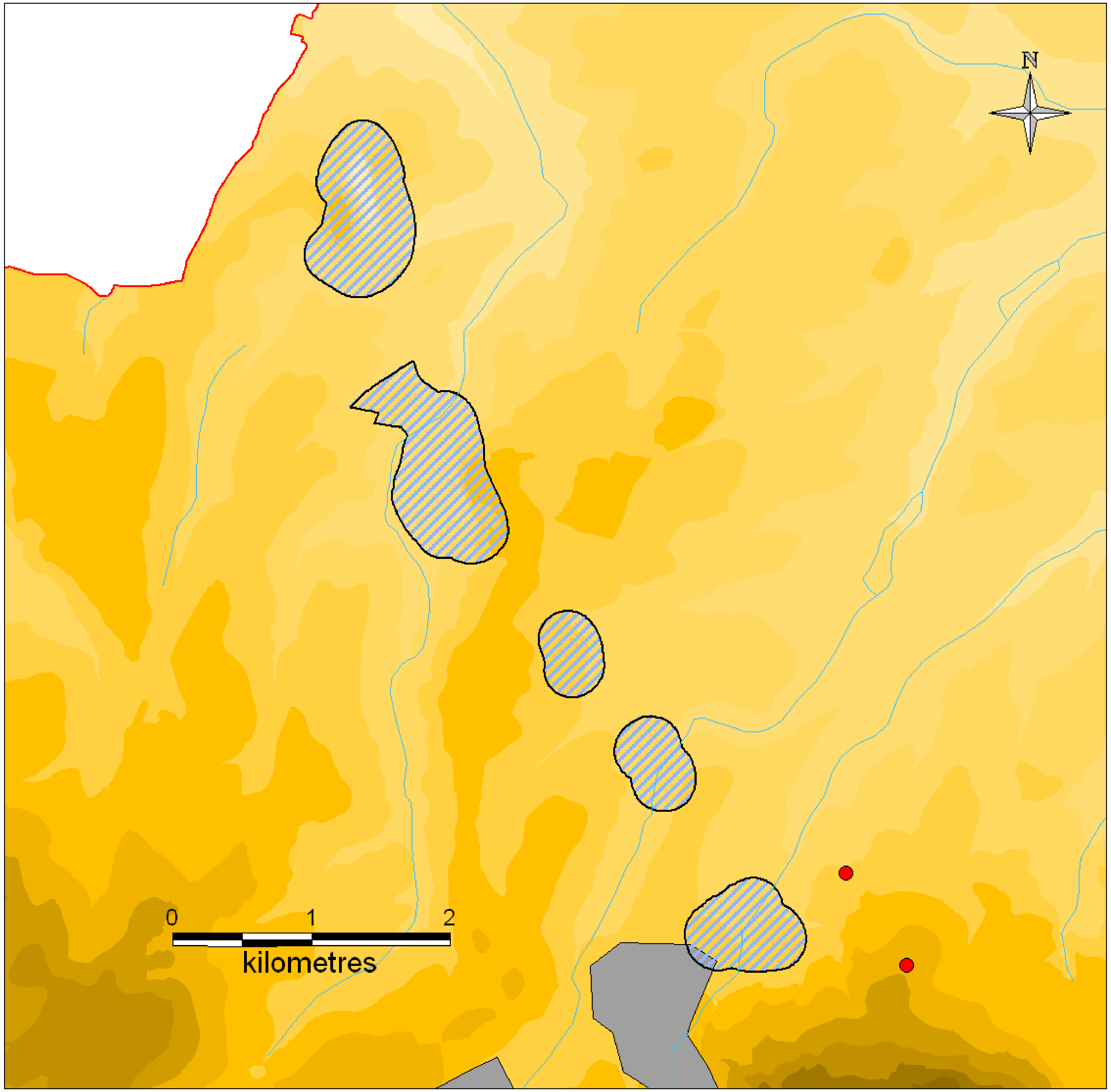


Density of monuments and find spots recorded on HER for the West Leicestershire Glaciofluvial Deposits Sub Area compared with the whole project area



Density of find spots recorded through PAS comparing the West Leicestershire Glaciofluvial Deposits sub area compared with the whole project area

Appendix 5: Distribution Maps by Period of HER and PAS Records for the Leicestershire and Rutland Limestone Sub Areas



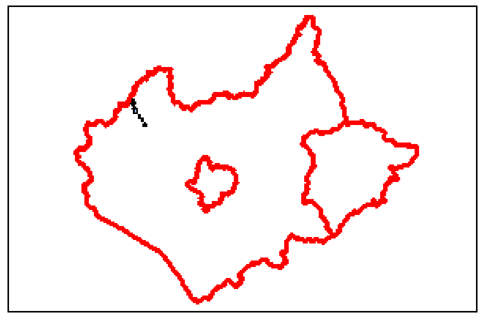
Leicestershire County Council

Legend

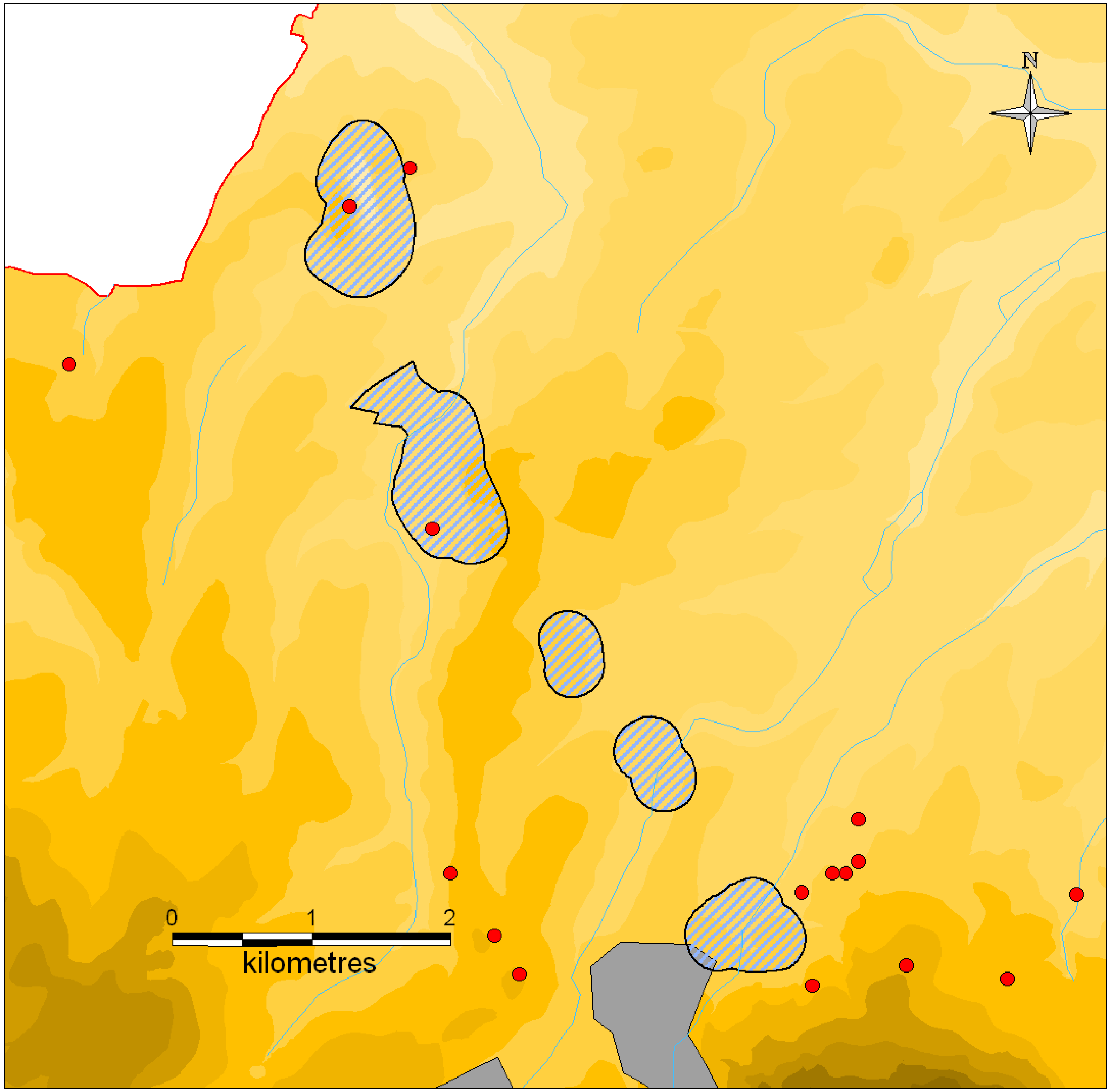
- HER Sites & Find Spots
- PAS Find Spots
- Mineral Planning Authority
- Large Urban Areas
- Carboniferous Limestone
- Rivers

Height Range

- Below 35m
- 35-50m
- 50-65m
- 65-80m
- 80-95m
- 95-110m
- 110-125m
- 125-140m
- 140m-155
- 155-170m
- 170-185m
- 185-200m
- 200-215m
- 215-230m
- Over 230m



Carboniferous Limestone ARA Sub Area Palaeolithic Sites and Findspots



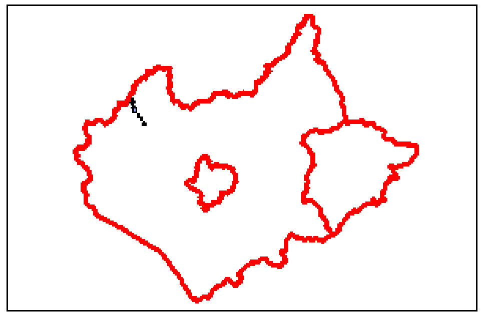
Leicestershire County Council

Legend

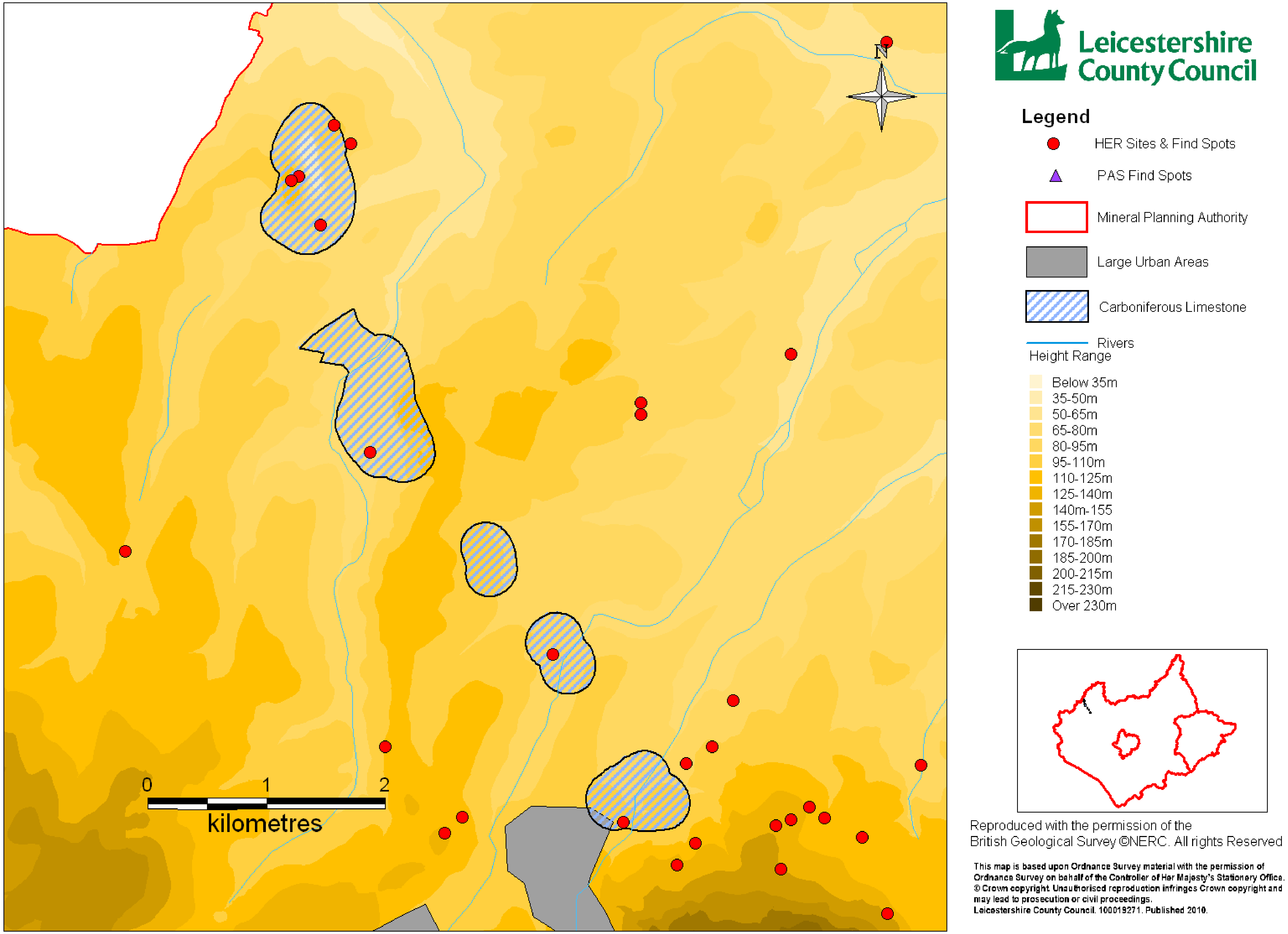
HER Sites & Find Spots
PAS Find Spots
Mineral Planning Authority
Large Urban Areas
Carboniferous Limestone
Rivers

Height Range

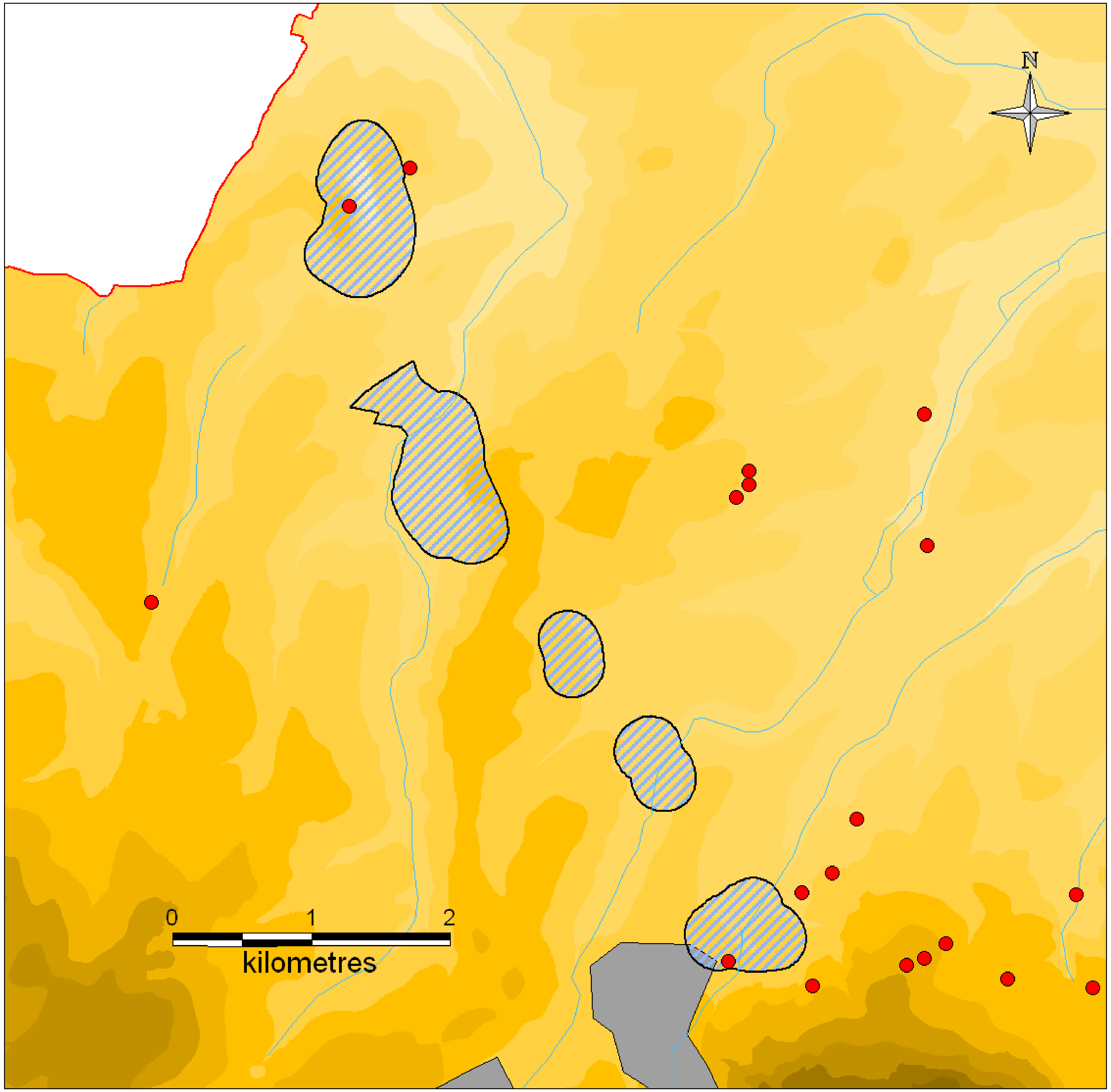
Below 35m
35-50m
50-65m
65-80m
80-95m
95-110m
110-125m
125-140m
140m-155
155-170m
170-185m
185-200m
200-215m
215-230m
Over 230m



Carboniferous Limestone ARA Sub Area Mesolithic Sites and Findspots



Carboniferous Limestone ARA Sub Area Neolithic Sites and Findspots



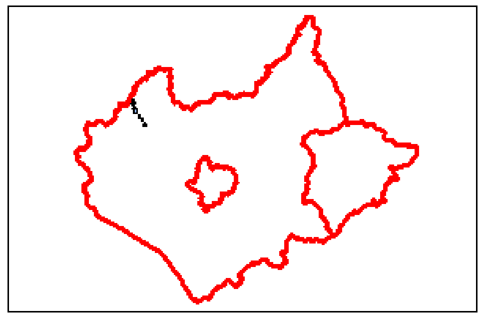
Leicestershire County Council

Legend

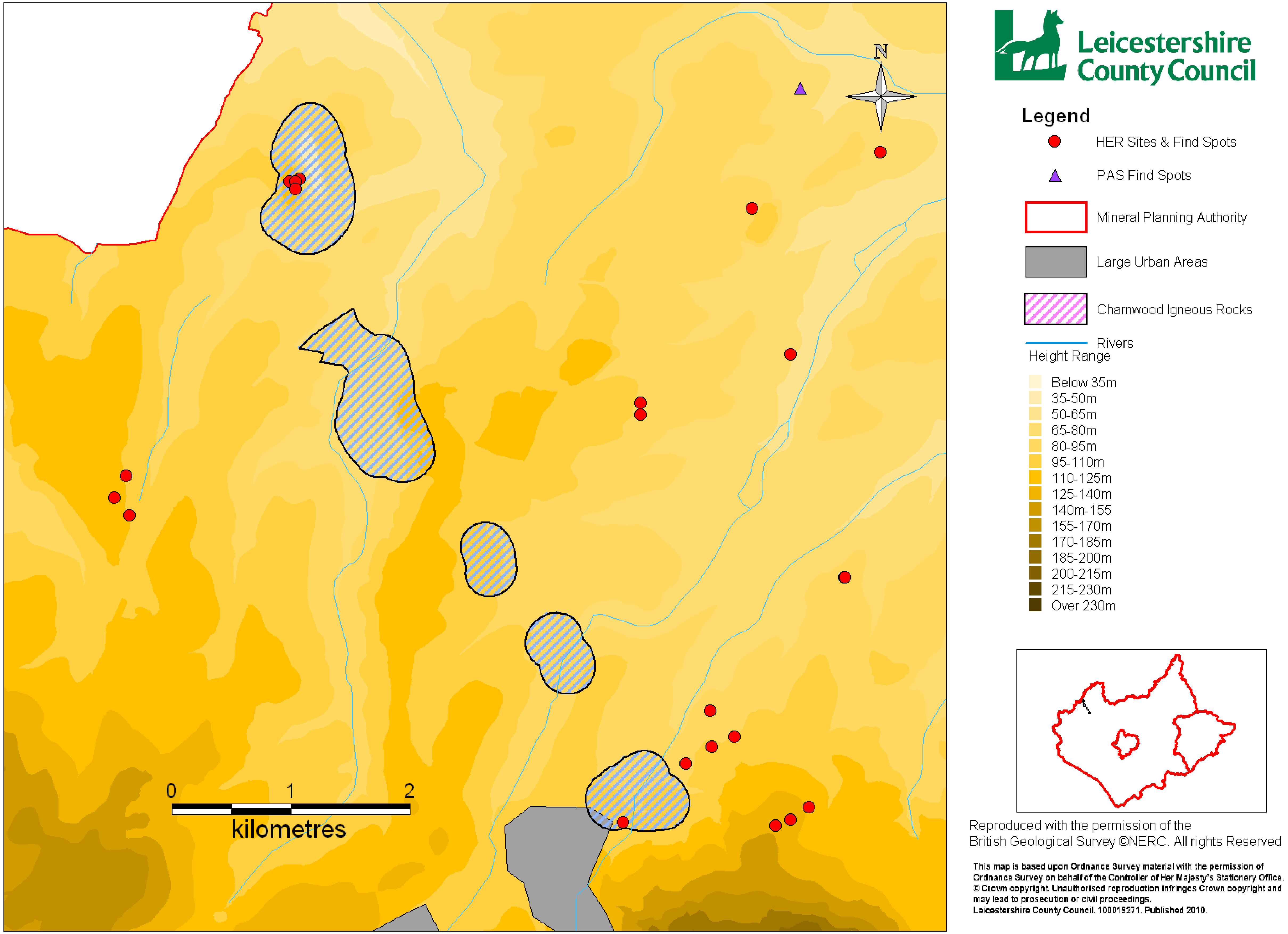
- HER Sites & Find Spots
- PAS Find Spots
- Mineral Planning Authority
- Large Urban Areas
- Carboniferous Limestone
- Rivers

Height Range

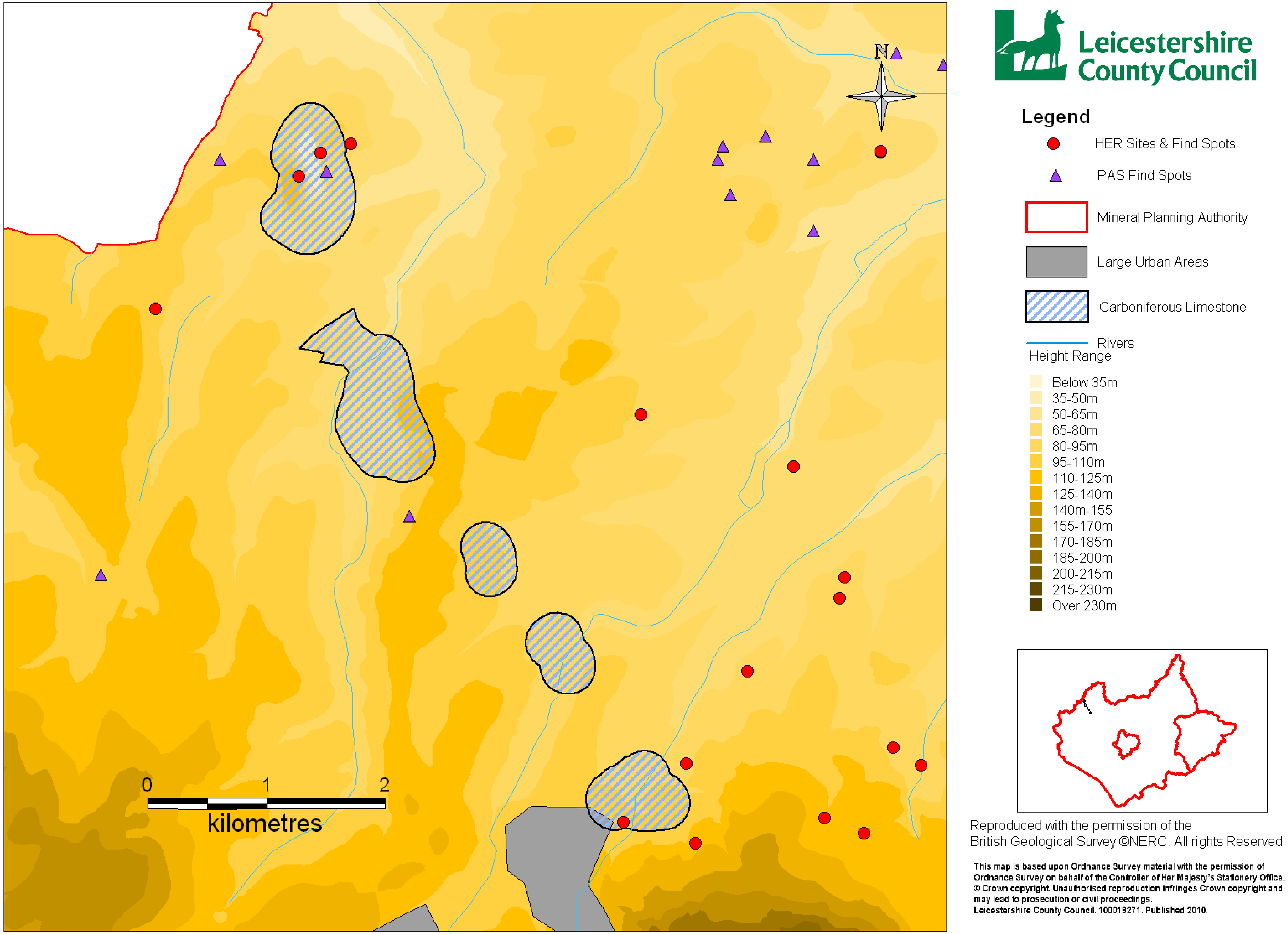
- Below 35m
- 35-50m
- 50-65m
- 65-80m
- 80-95m
- 95-110m
- 110-125m
- 125-140m
- 140m-155
- 155-170m
- 170-185m
- 185-200m
- 200-215m
- 215-230m
- Over 230m



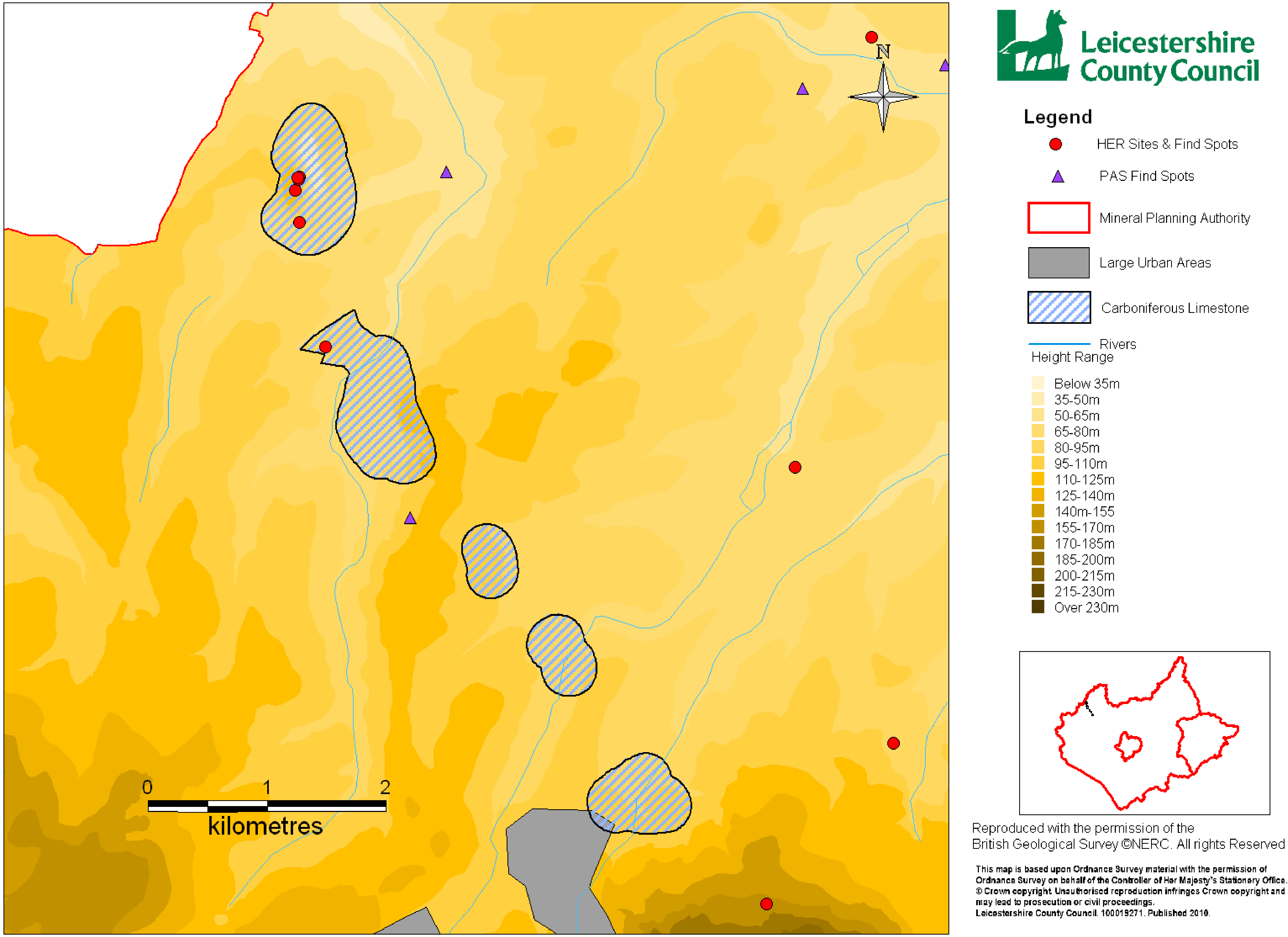
Carboniferous Limestone ARA Sub Area Bronze Age Sites and Findspots



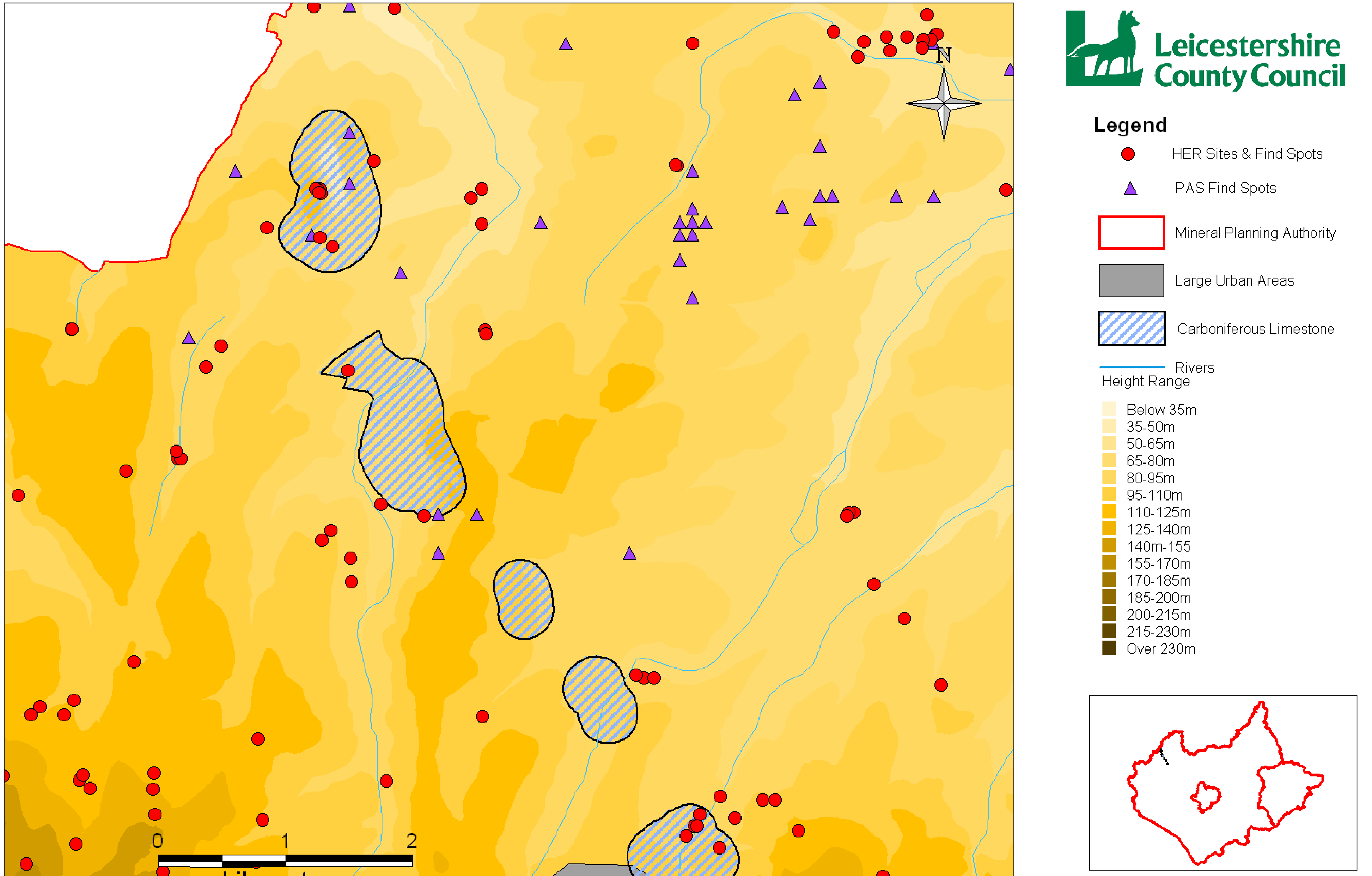
Carboniferous Limestone ARA Sub Area Iron Age Sites and Findspots



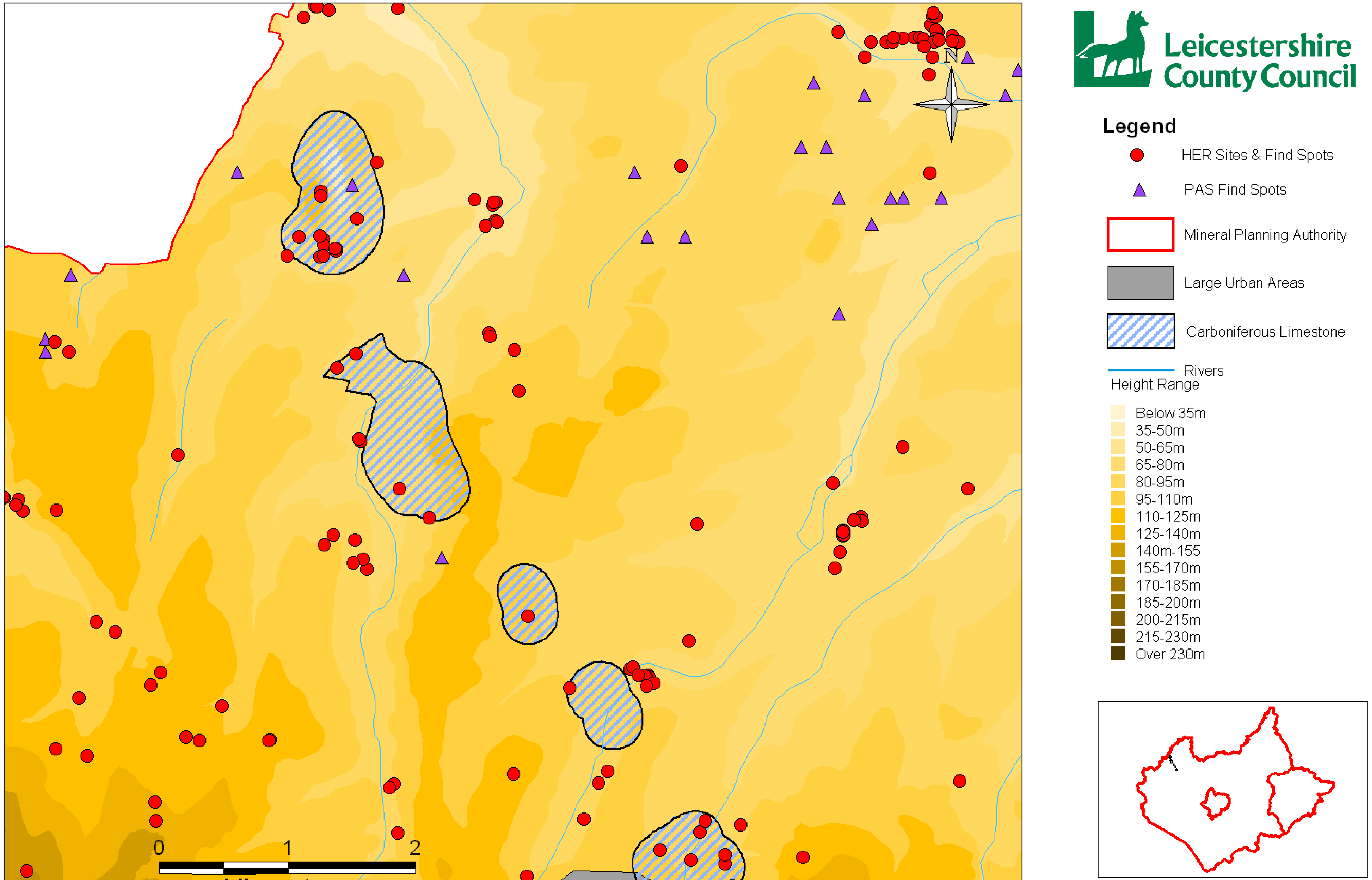
Carboniferous Limestone ARA Sub Area Roman Sites and Findspots



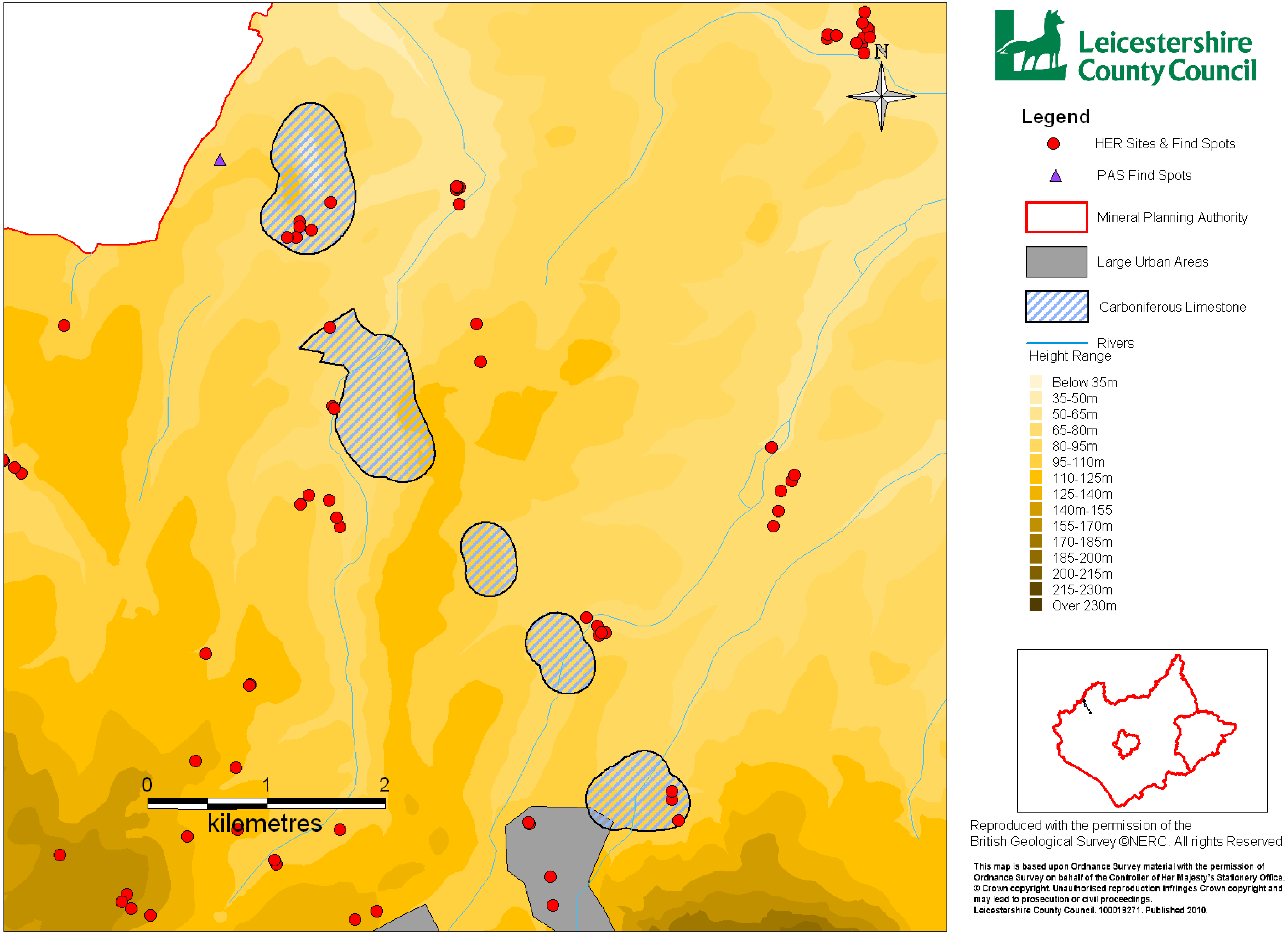
Carboniferous Limestone ARA Sub Area Anglo-Saxon Sites and Findspots



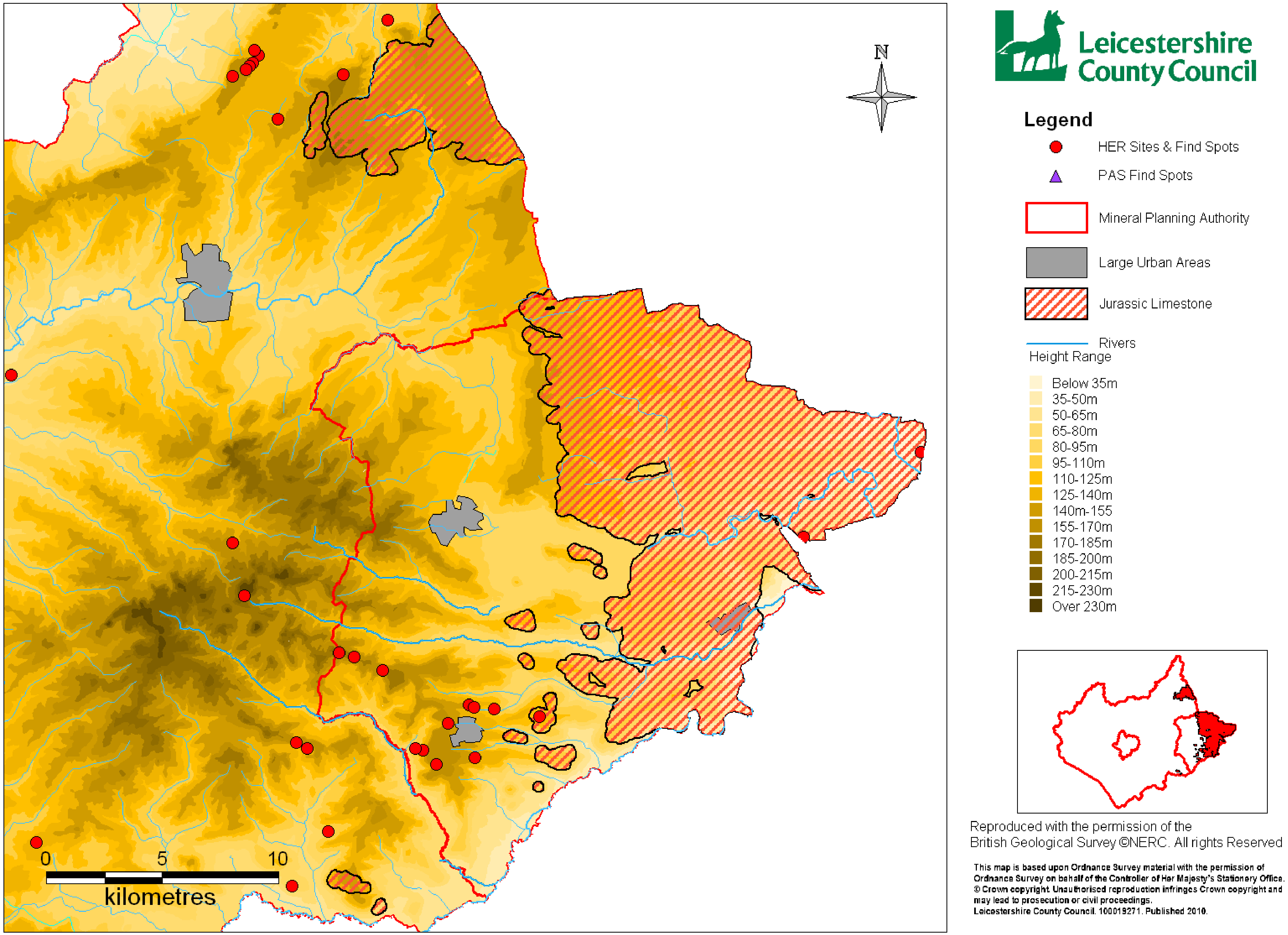
Carboniferous Limestone ARA Sub Area Mesolithic Sites and Findspots



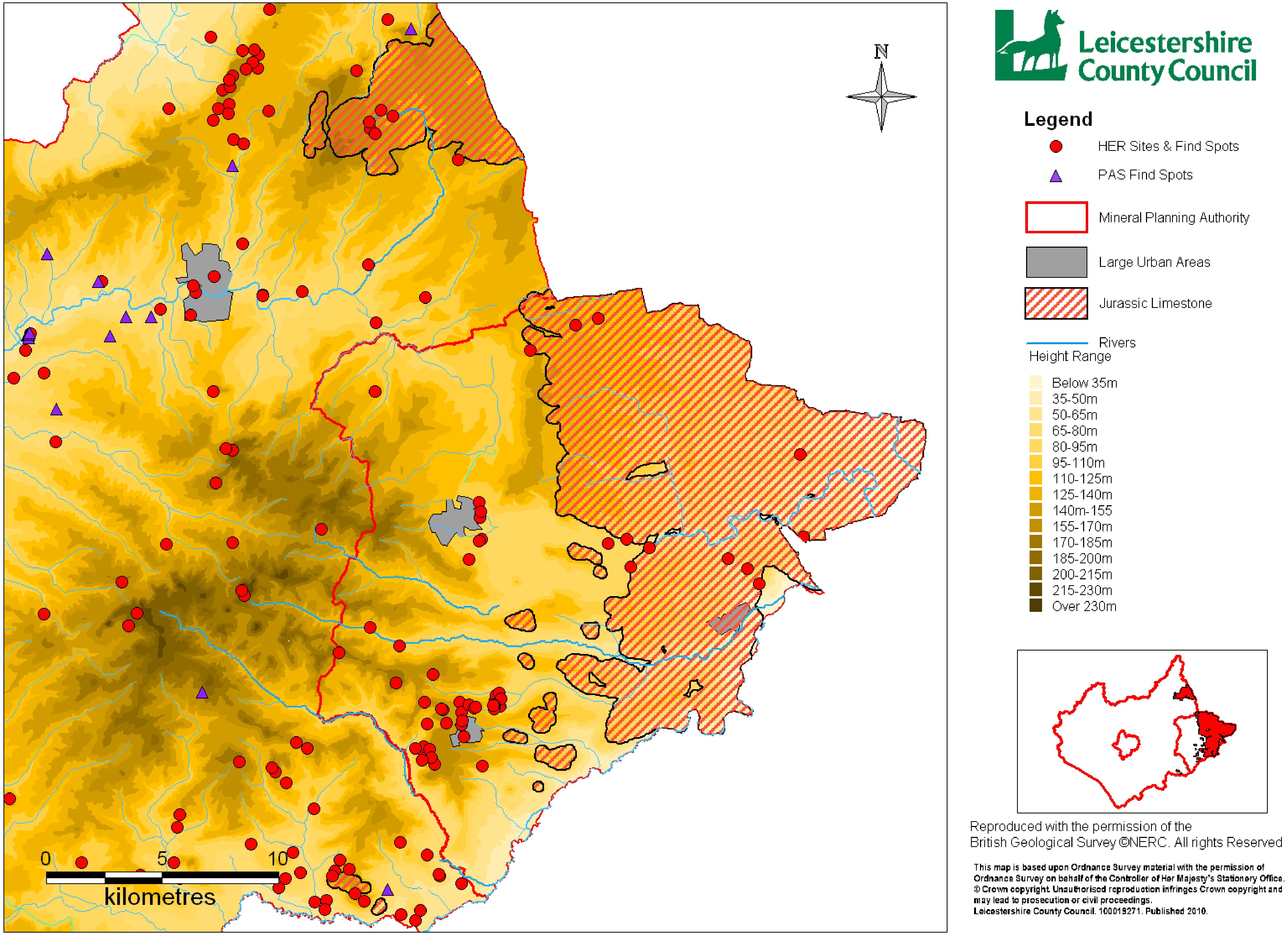
Carboniferous Limestone ARA Sub Area Post-Medieval Sites and Findspots



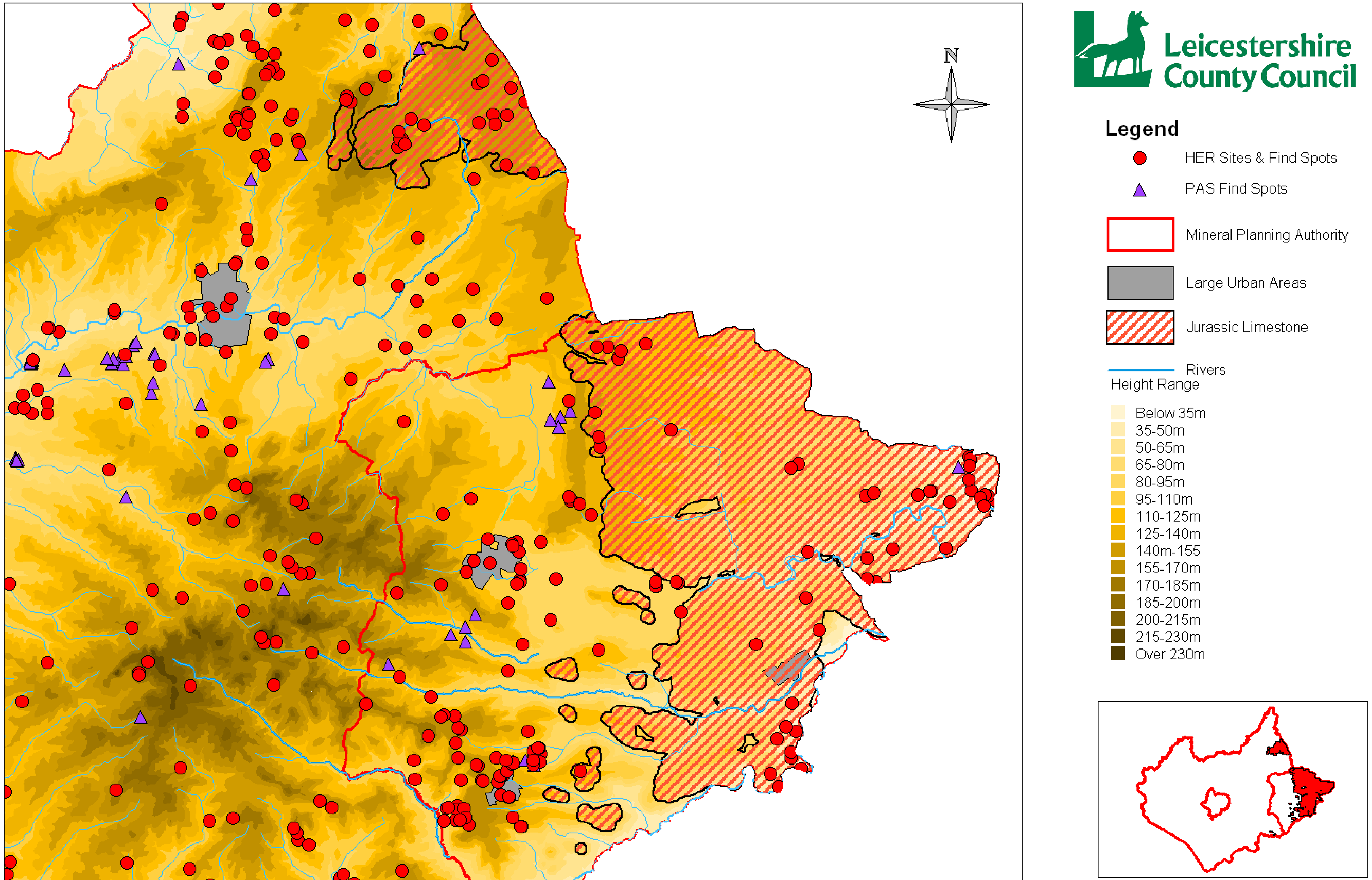
Carboniferous Limestone ARA Sub Area Modern Sites and Findspots



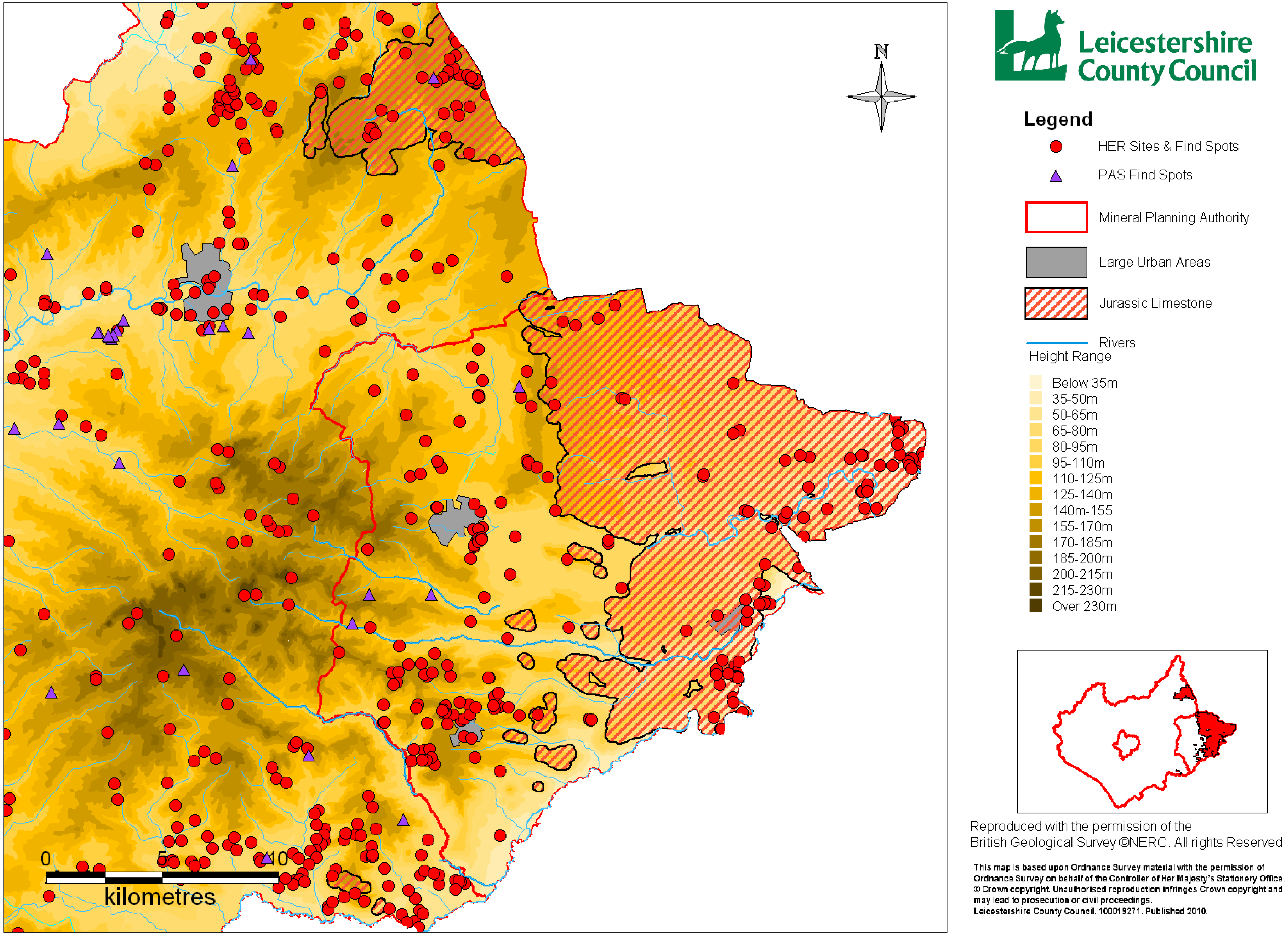
Jurassic Limestone ARA Sub Area Palaeolithic Sites and Findspots



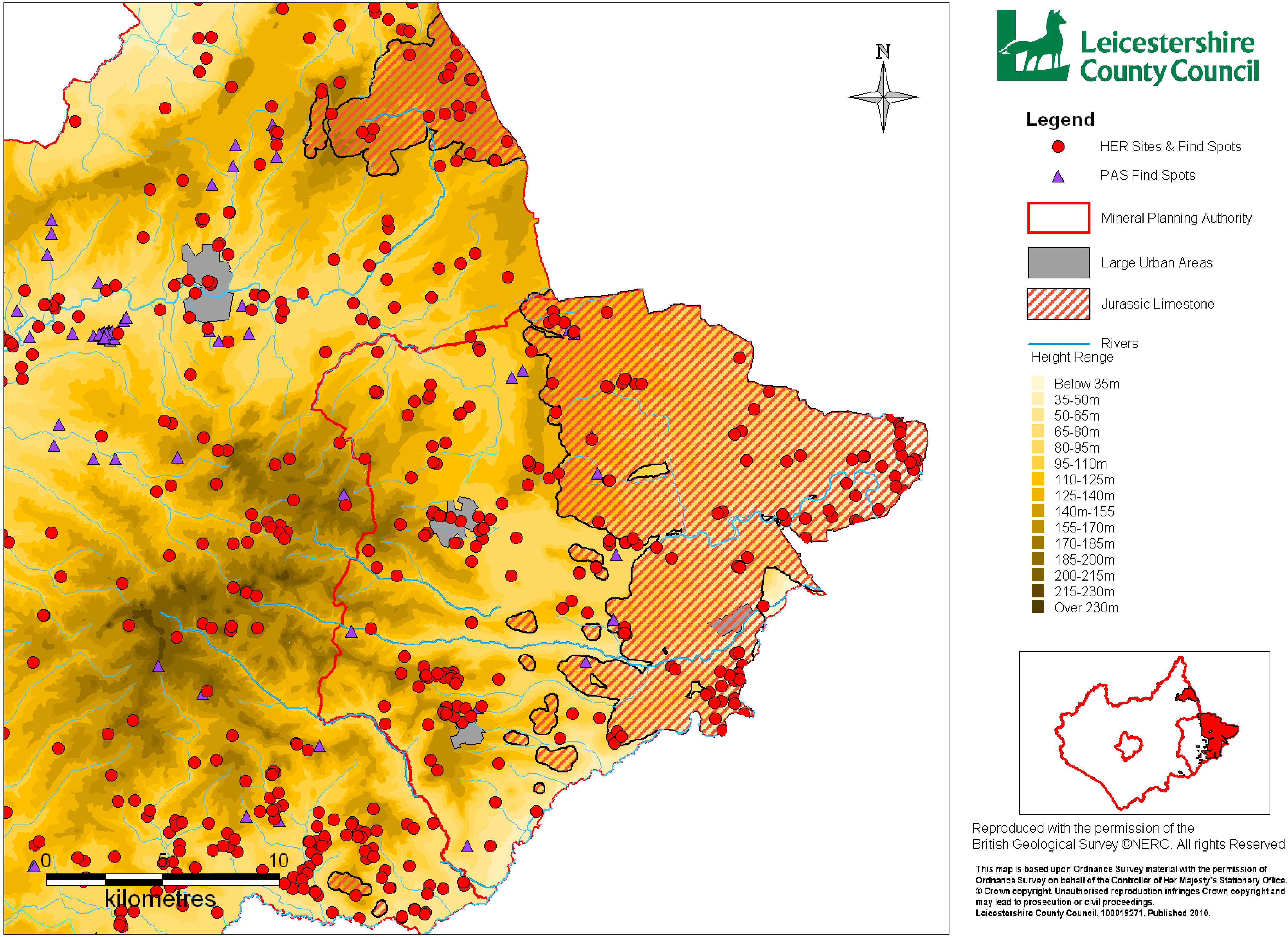
Jurassic Limestone ARA Sub Area Mesolithic Sites and Findspots



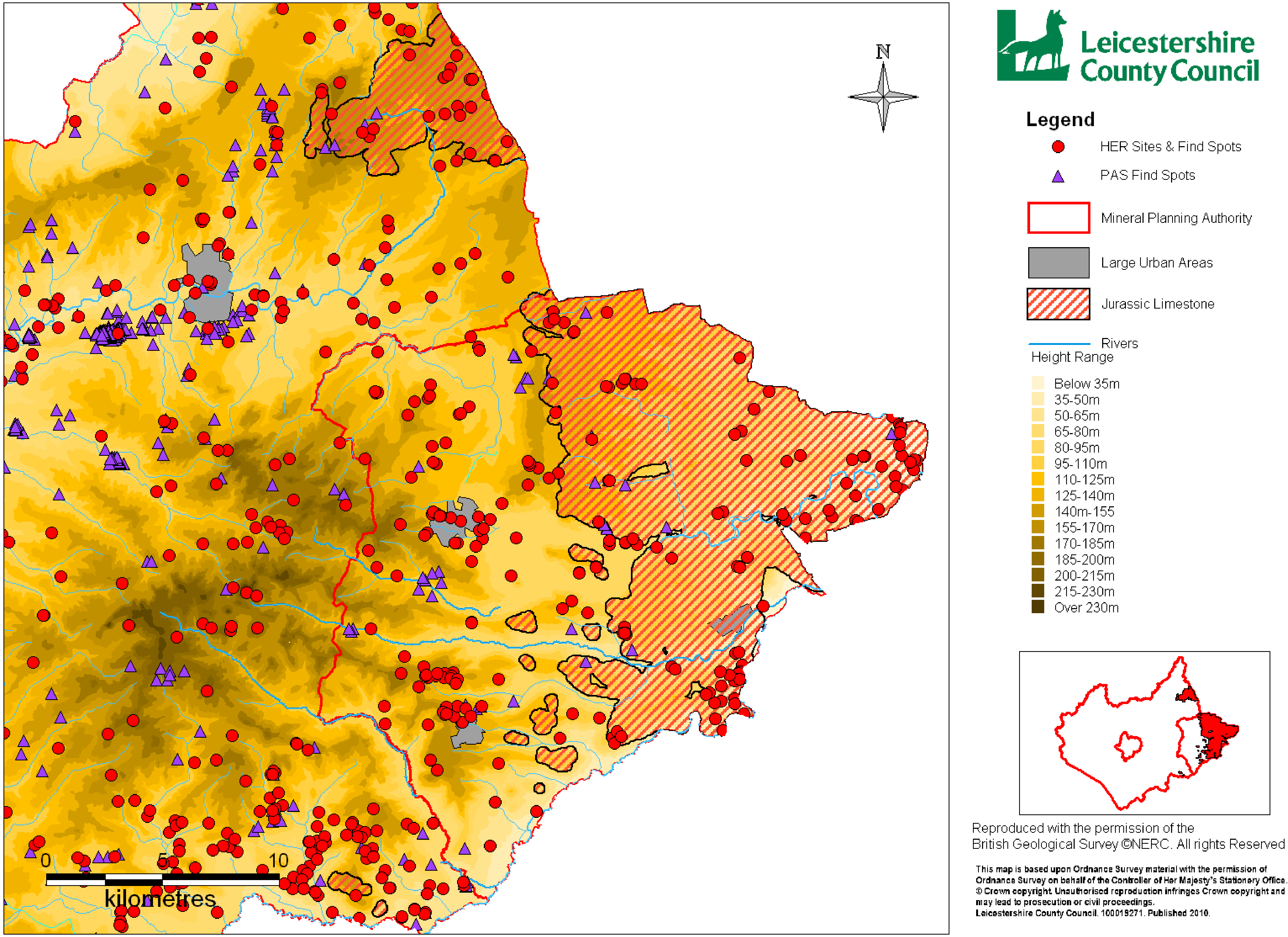
Jurassic Limestone ARA Sub Area Neolithic Sites and Findspots



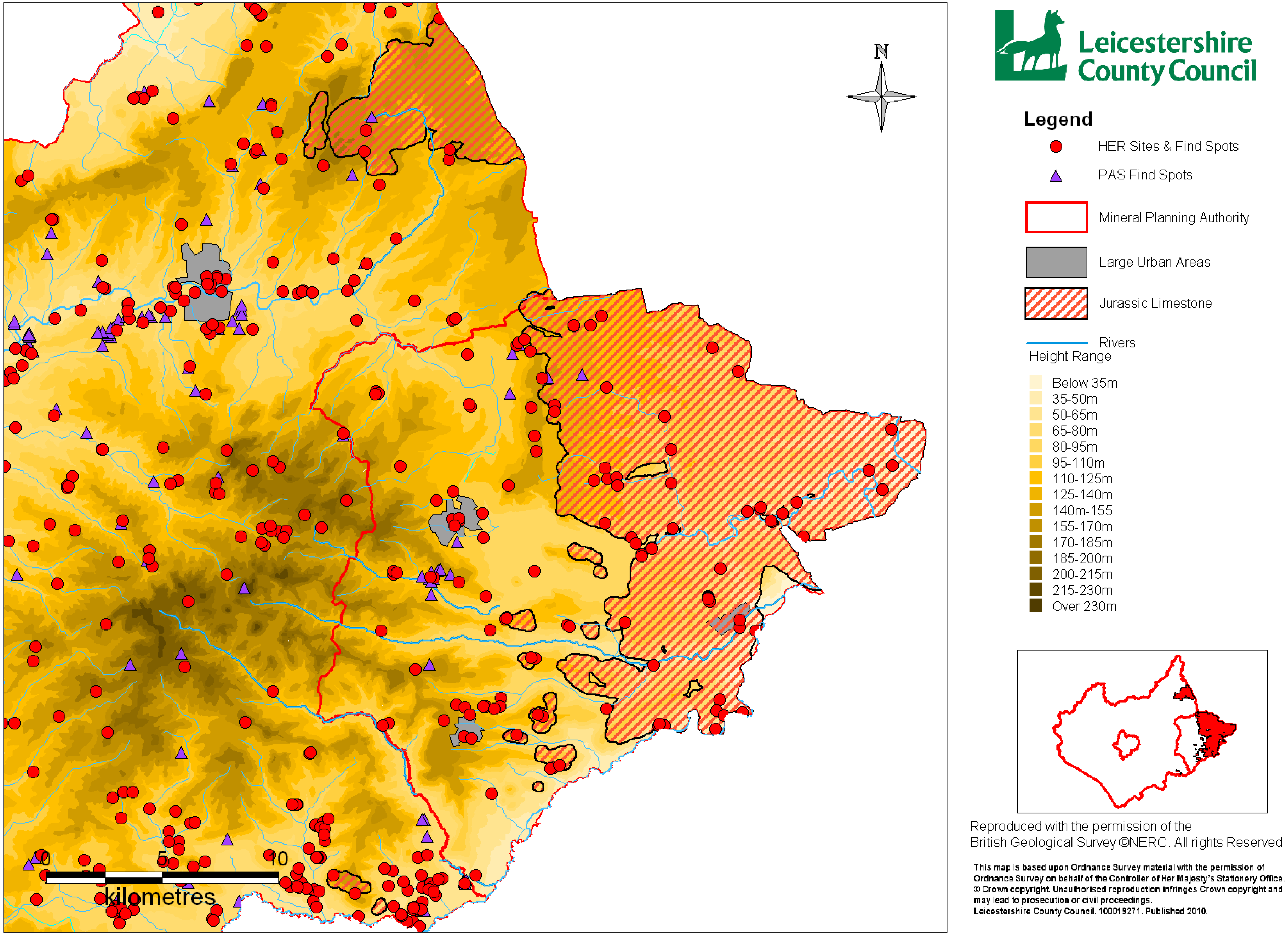
Jurassic Limestone ARA Sub Area Bronze Age Sites and Findspots



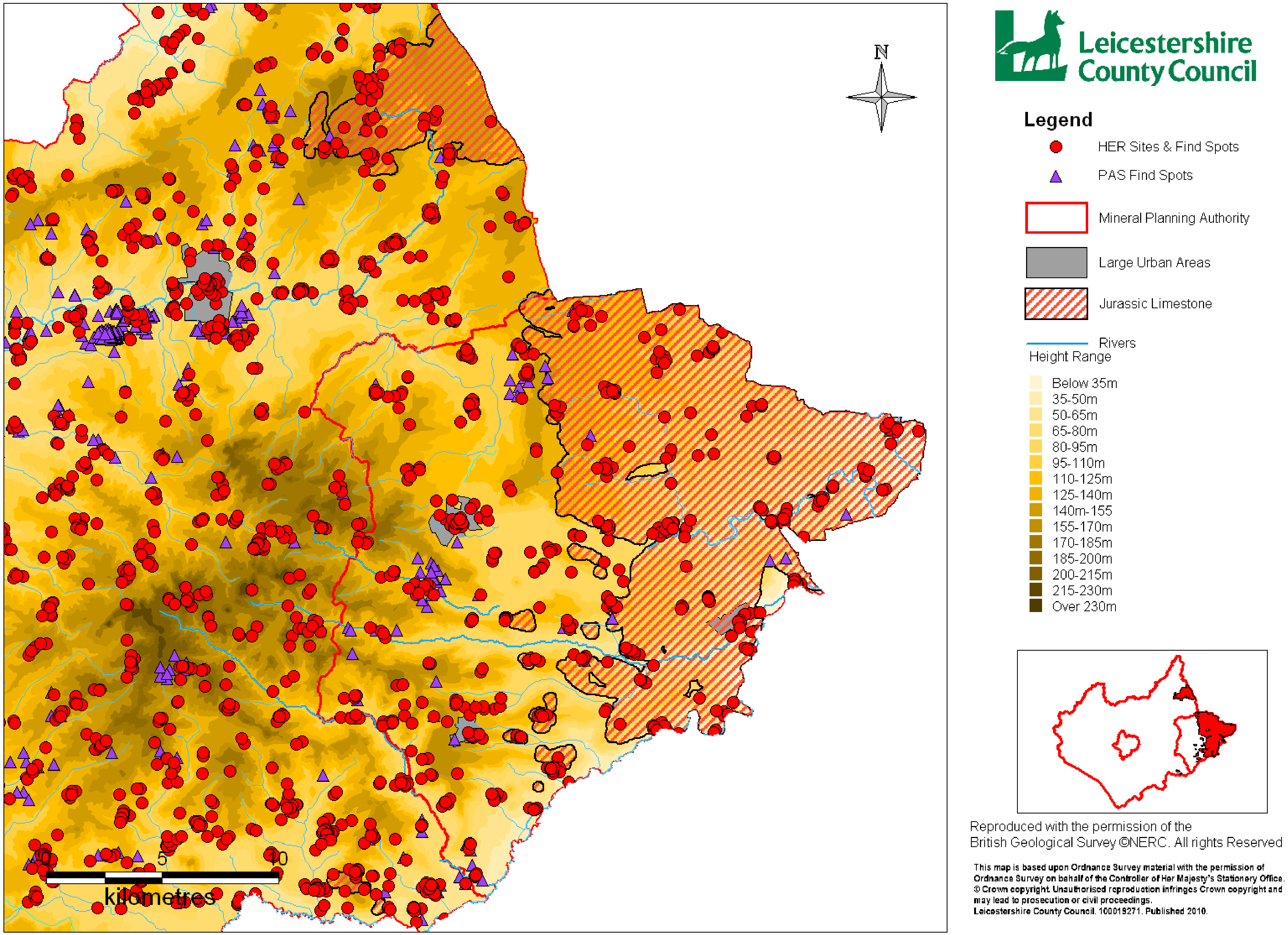
Jurassic Limestone ARA Sub Area Iron Age Sites and Findspots



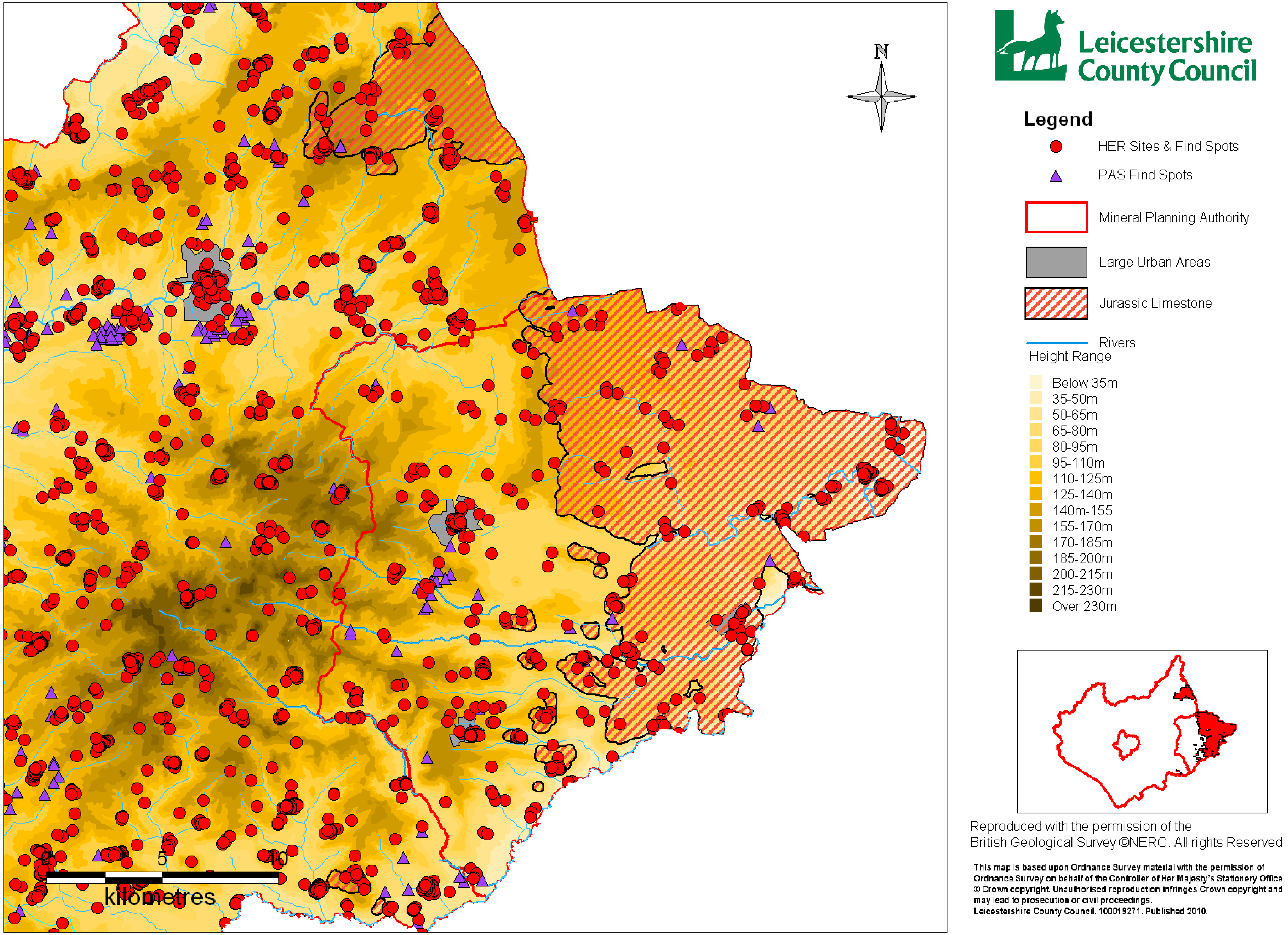
Jurassic Limestone ARA Sub Area Roman Sites and Findspots



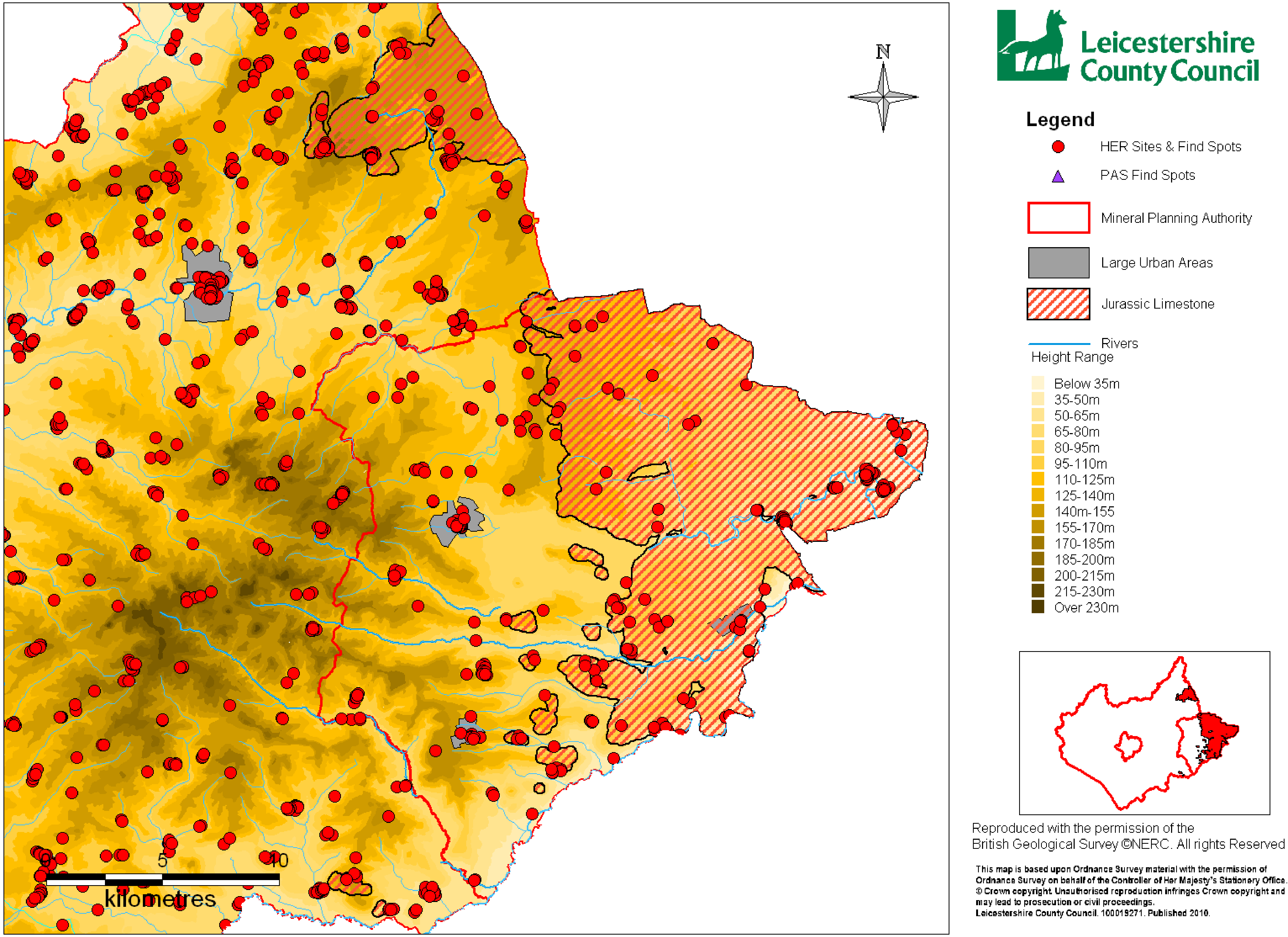
Jurassic Limestone ARA Sub Area Anglo-Saxon



Jurassic Limestone ARA Sub Area Medieval

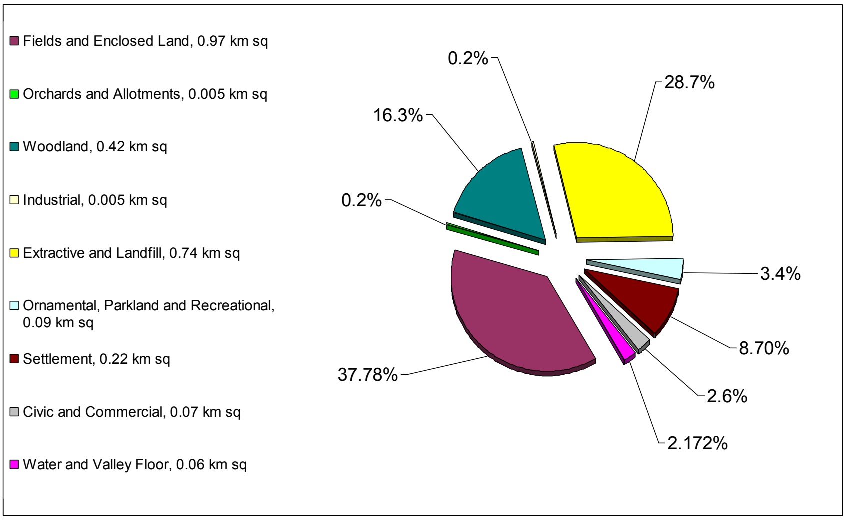


Jurassic Limestone ARA Sub Area Post-Medieval

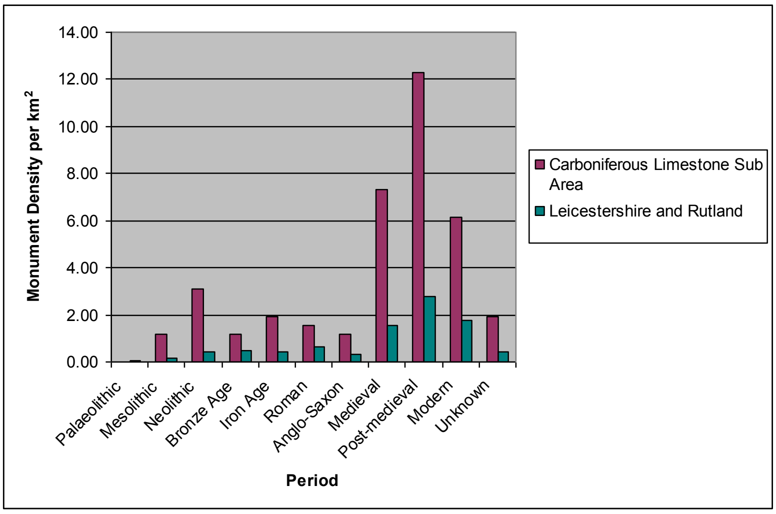


Jurassic Limestone ARA Sub Area Modern

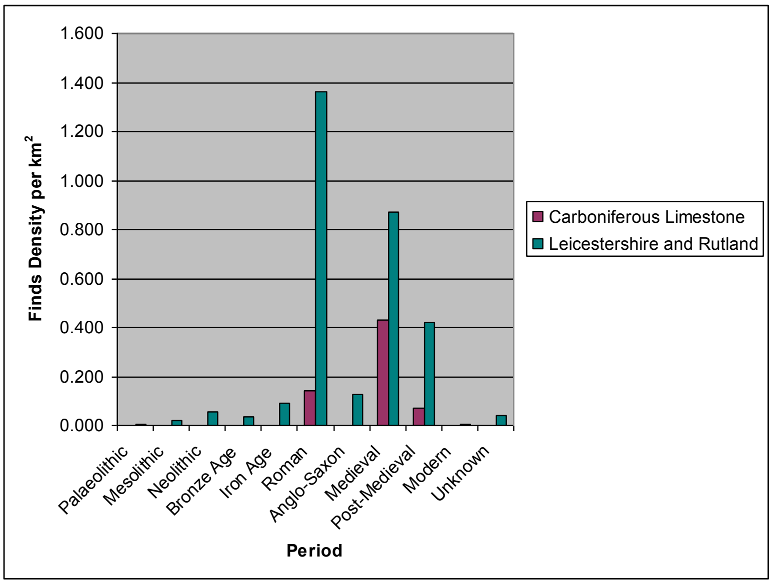
Appendix 6: HLC, HER and PAS Density and Distribution Information for the Glaciofluvial Sands and Gravels Sub Areas



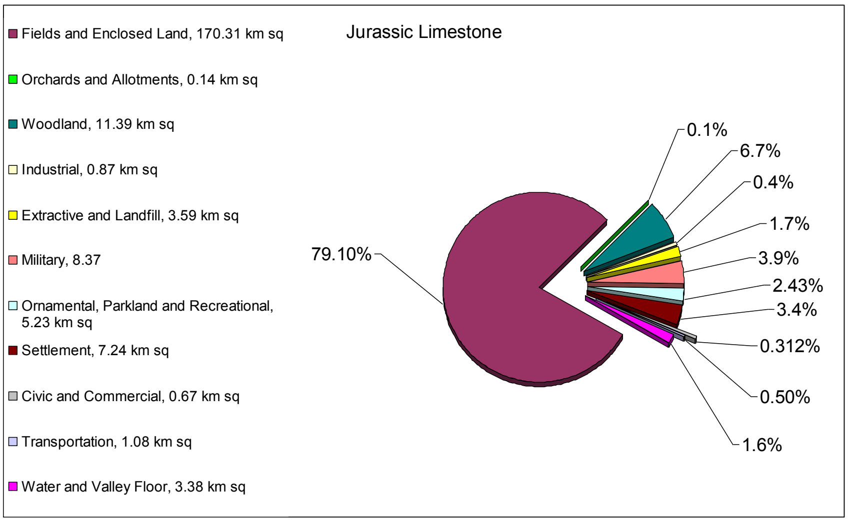
HLC Broad Types within the Carboniferous Limestone ARA sub area



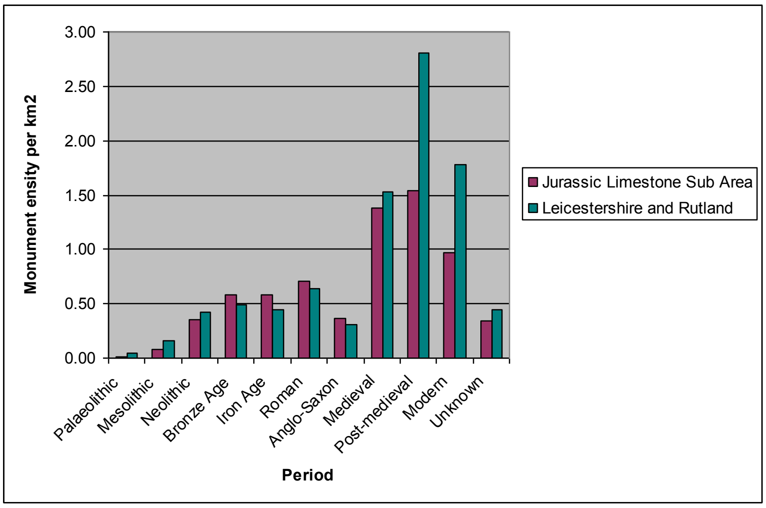
Density of monuments and find spots recorded on HER for the Carboniferous Limestone Sub Area compared with the whole project area



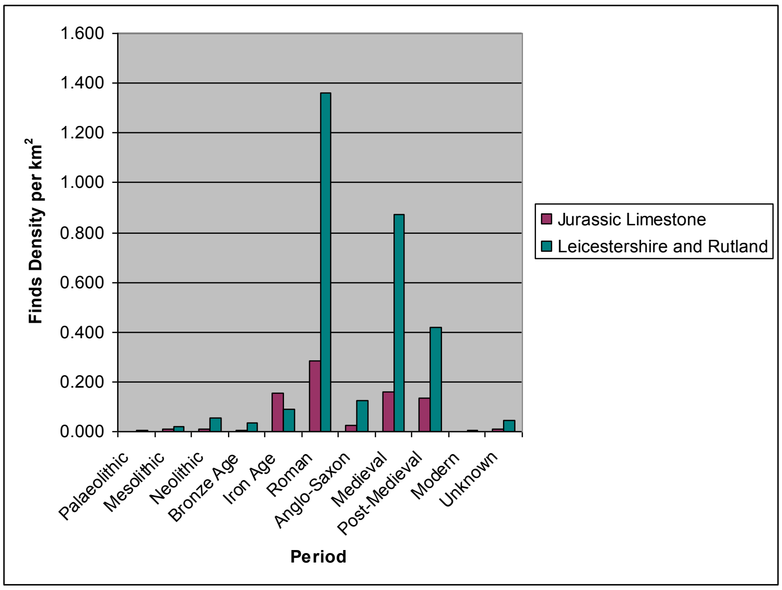
Density of find spots recorded through PAS for the Carboniferous Limestone sub area compared with the whole project area



HLC Broad Types within the Jurassic ARA Sub Area

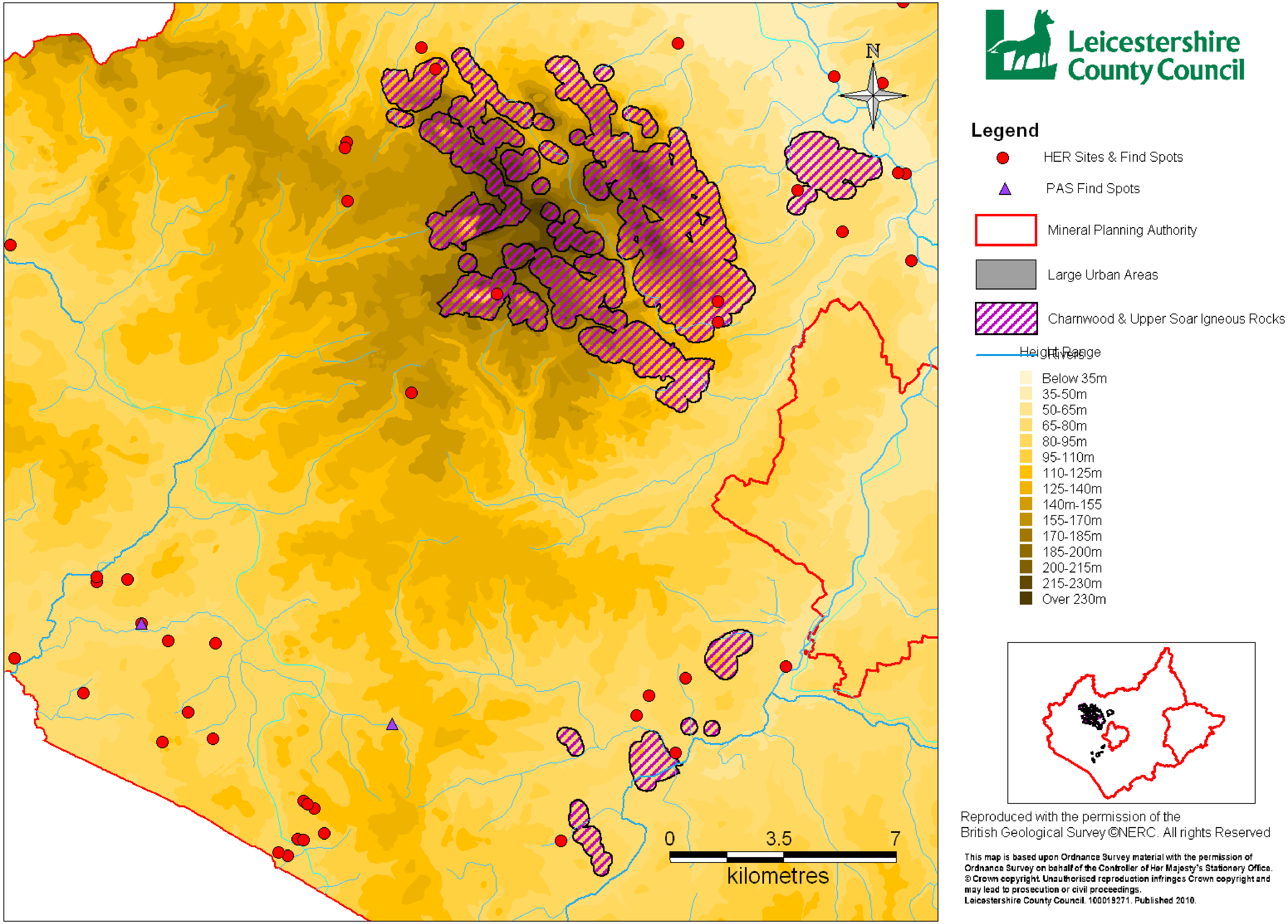


Density of monuments and find spots recorded on HER for the Jurassic Limestone ARA Sub Area compared to the whole project area

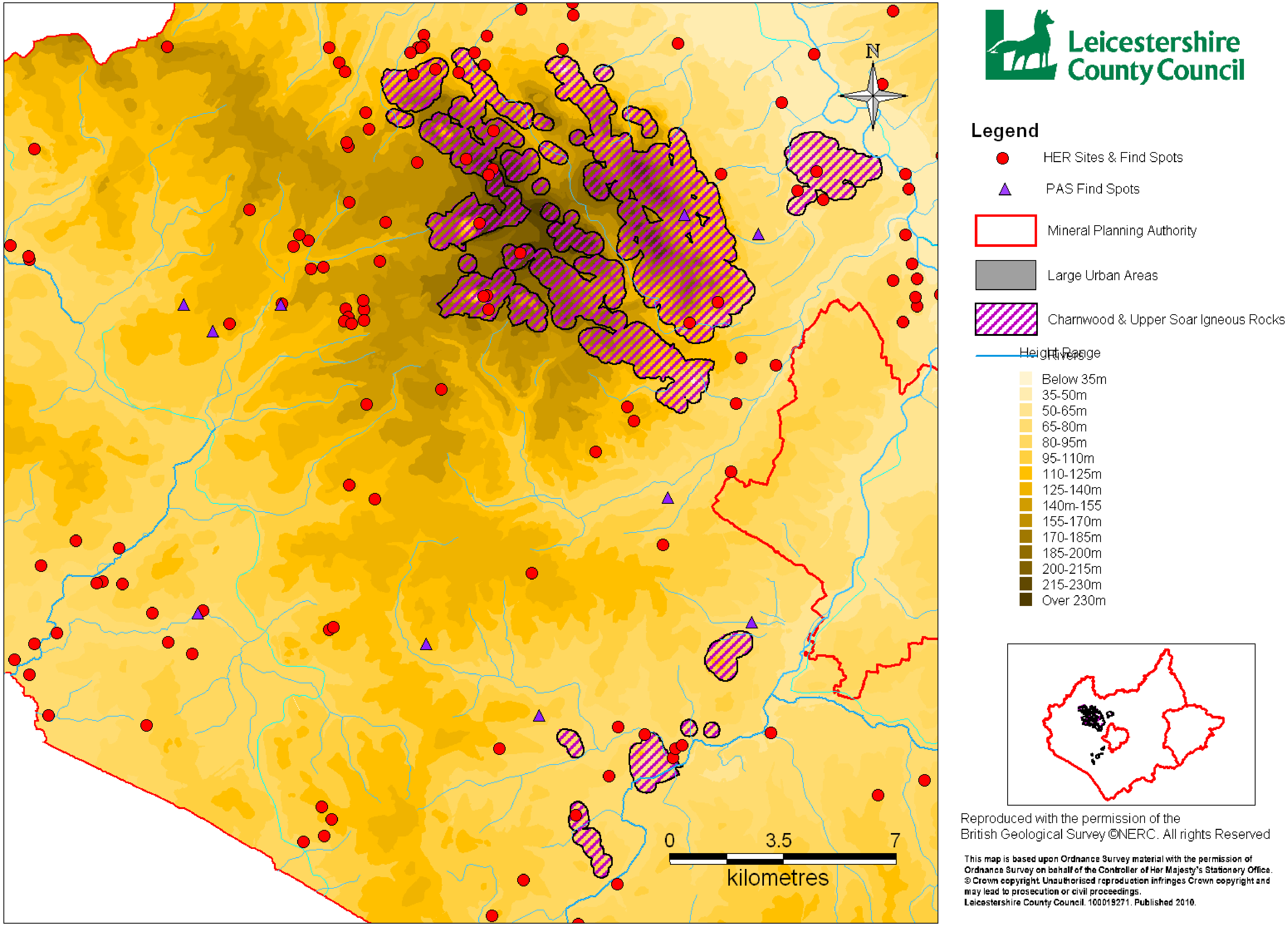


Density of find spots recorded through PAS for the Jurassic Limestone sub area compared to the whole project area

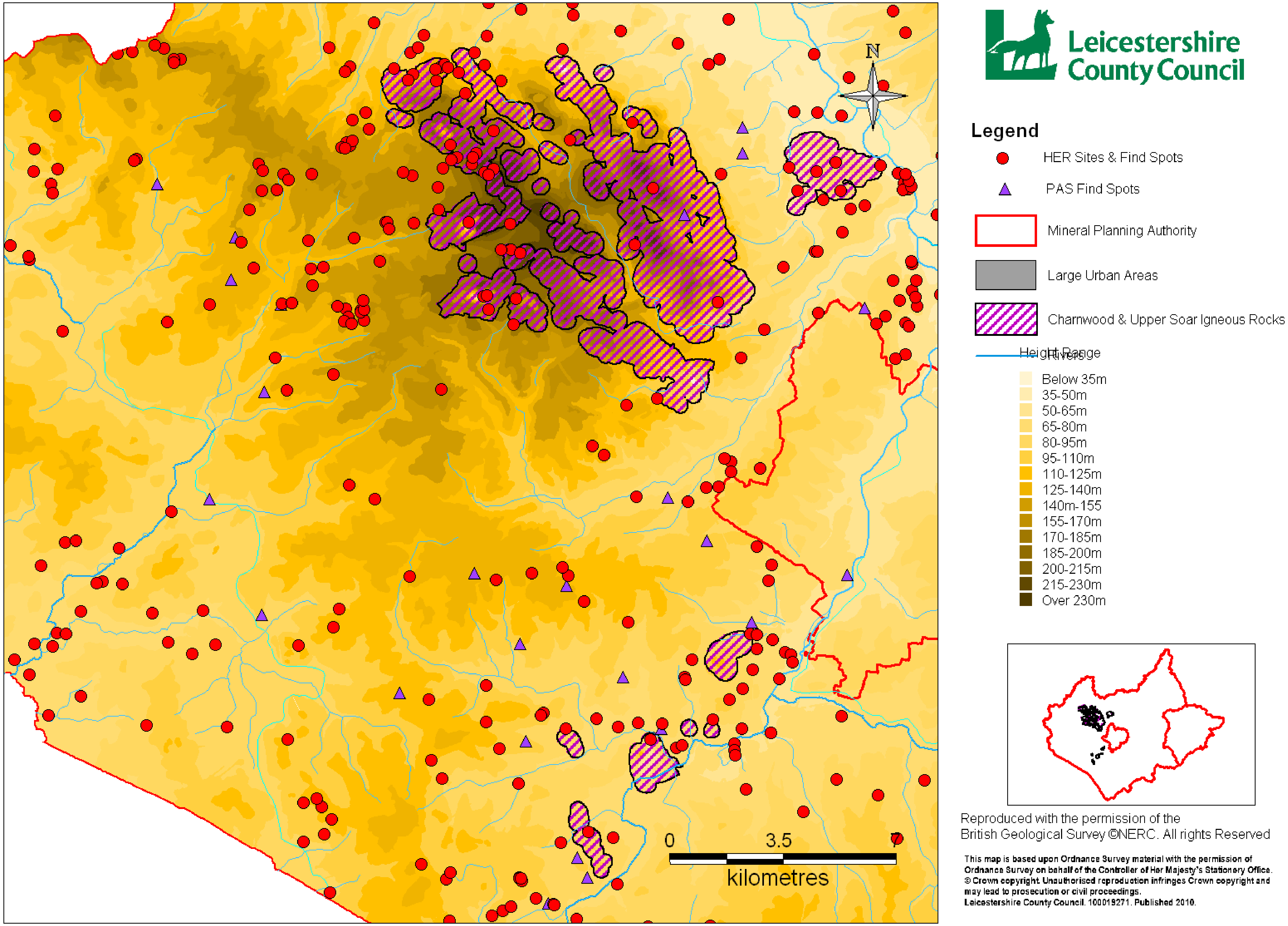
Appendix 7: Distribution Maps by Period of HER and PAS Records for the Charnwood and Igneous Rock Sub Areas



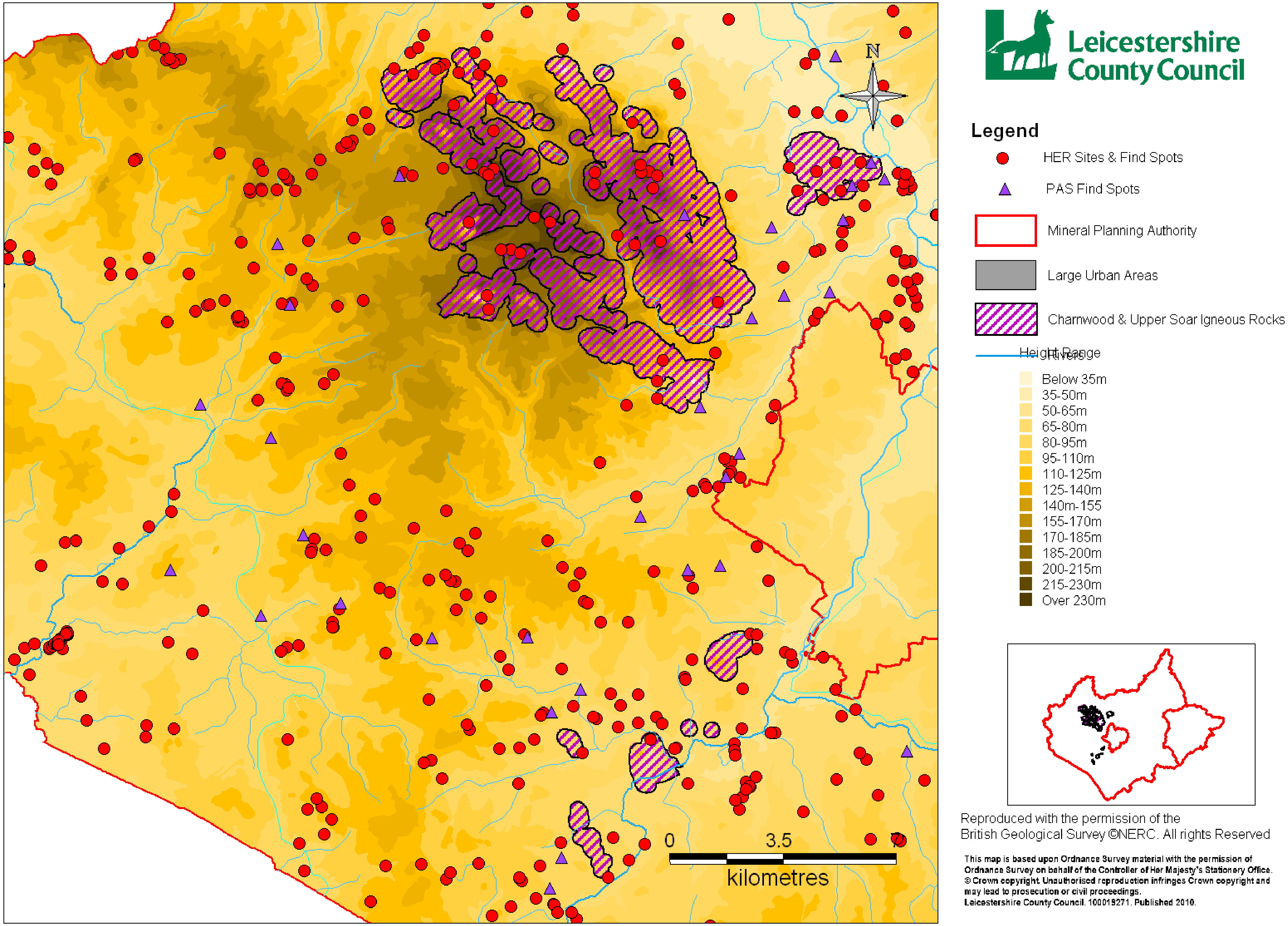
Charnwood & Upper Soar ARA Sub Area Palaeolithic Sites and Findspots



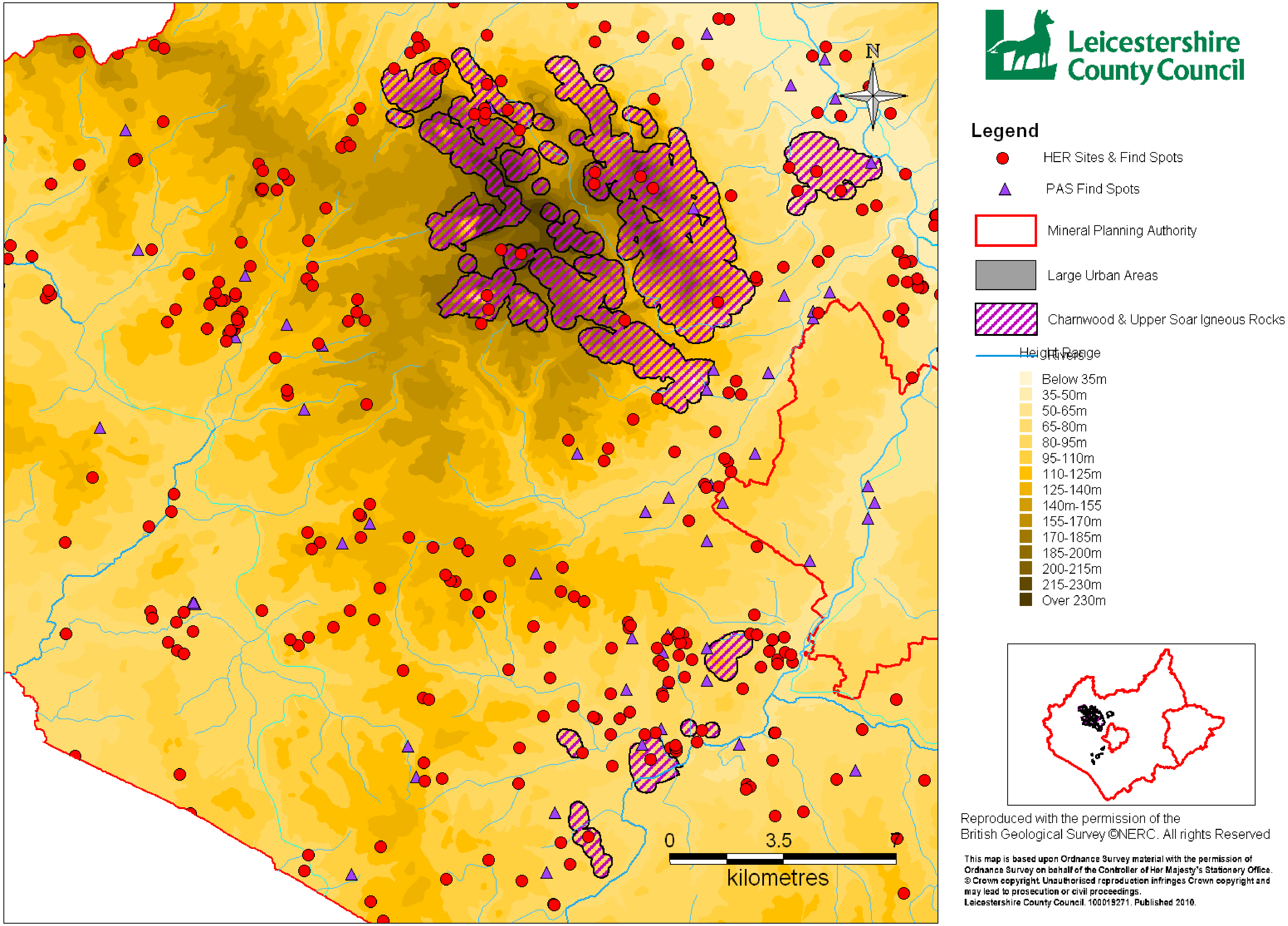
Charnwood & Upper Soar ARA Sub Area Mesolithic Sites and Findspots



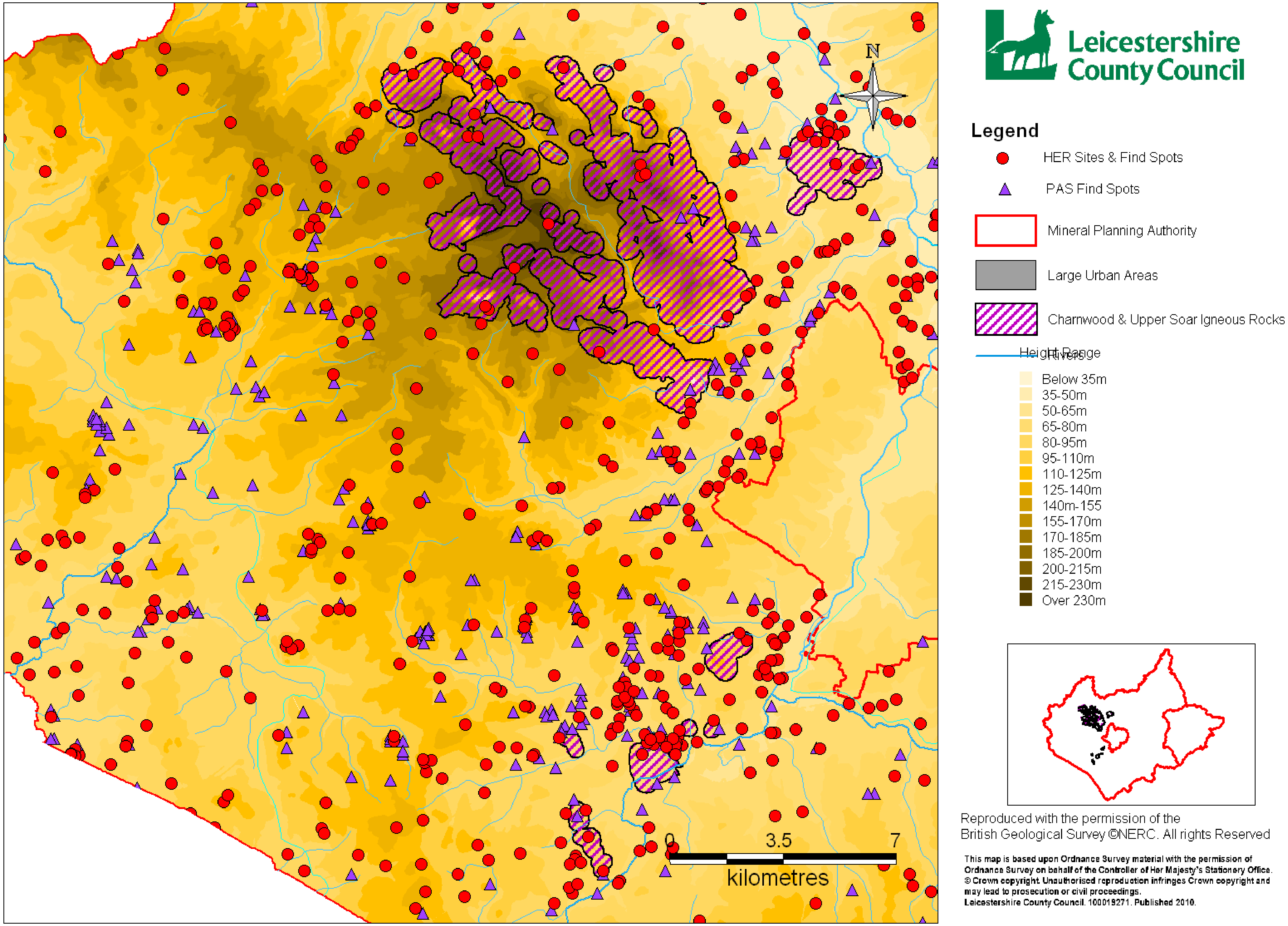
Charnwood & Upper Soar Igneous ARA Sub Area Neolithic Sites and Findspots



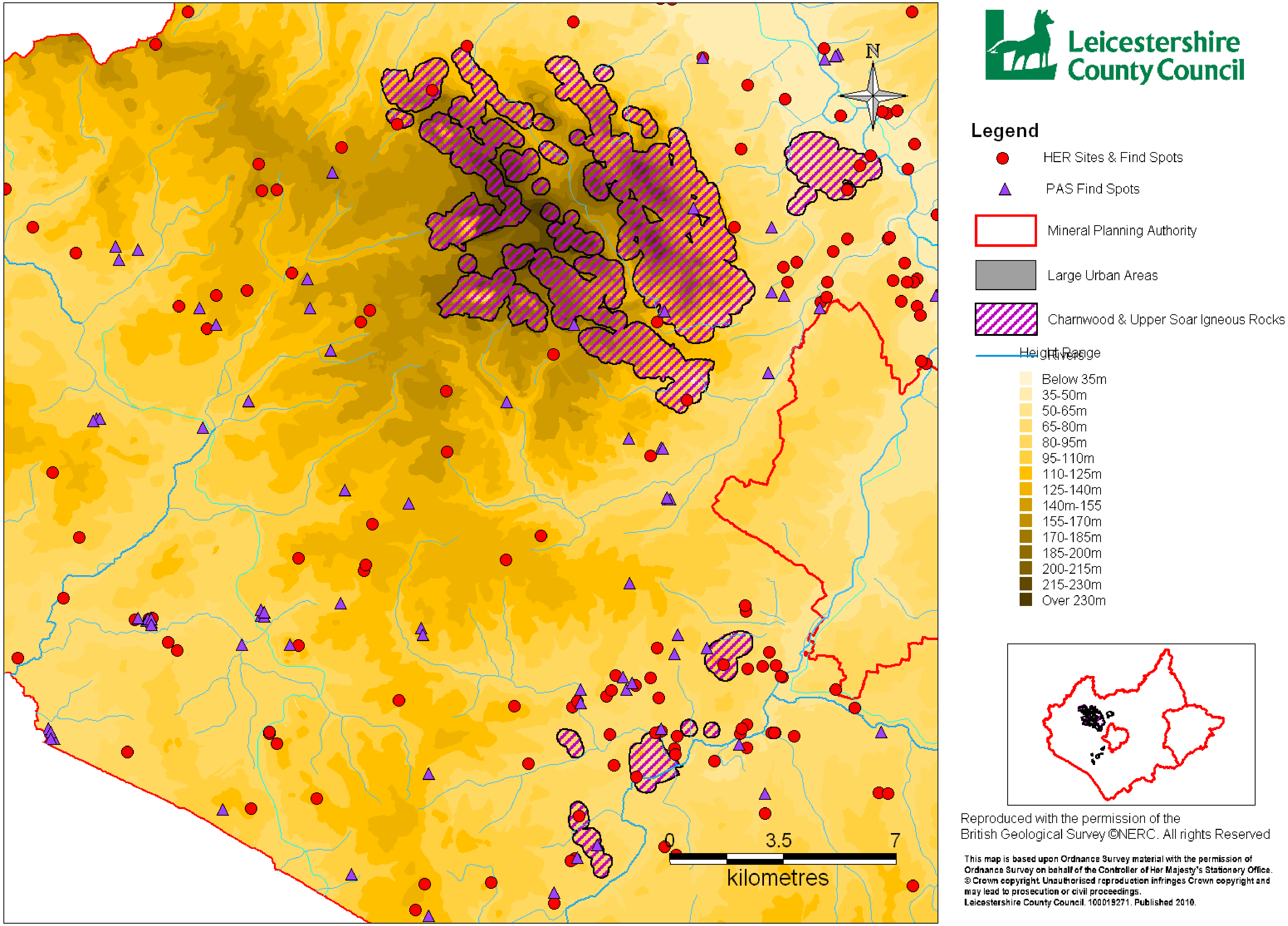
Charnwood & Upper Soar ARA Sub Area Bronze Age Sites and Findspots



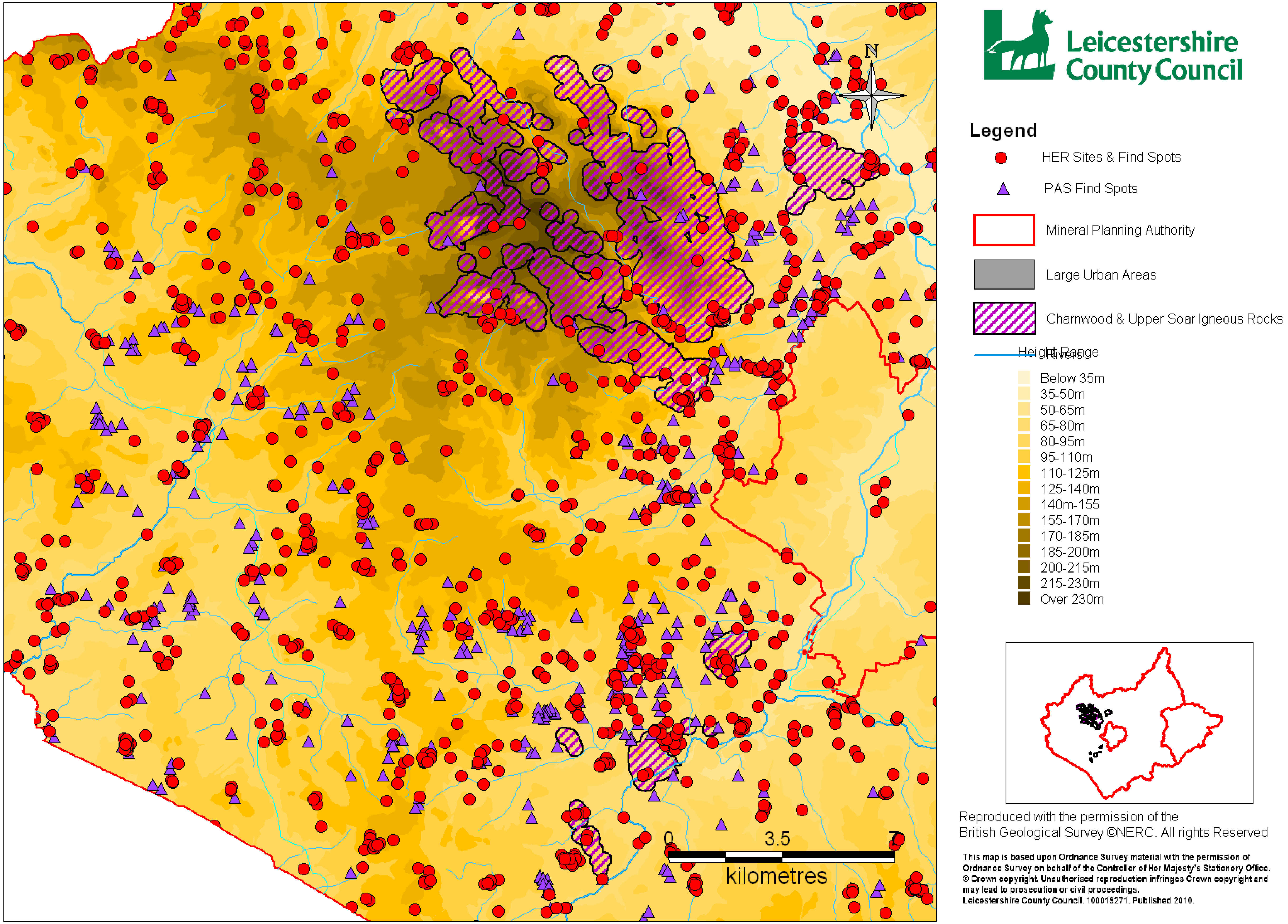
Charnwood & Upper Soar Sub Area Iron Age Sites and Findspots



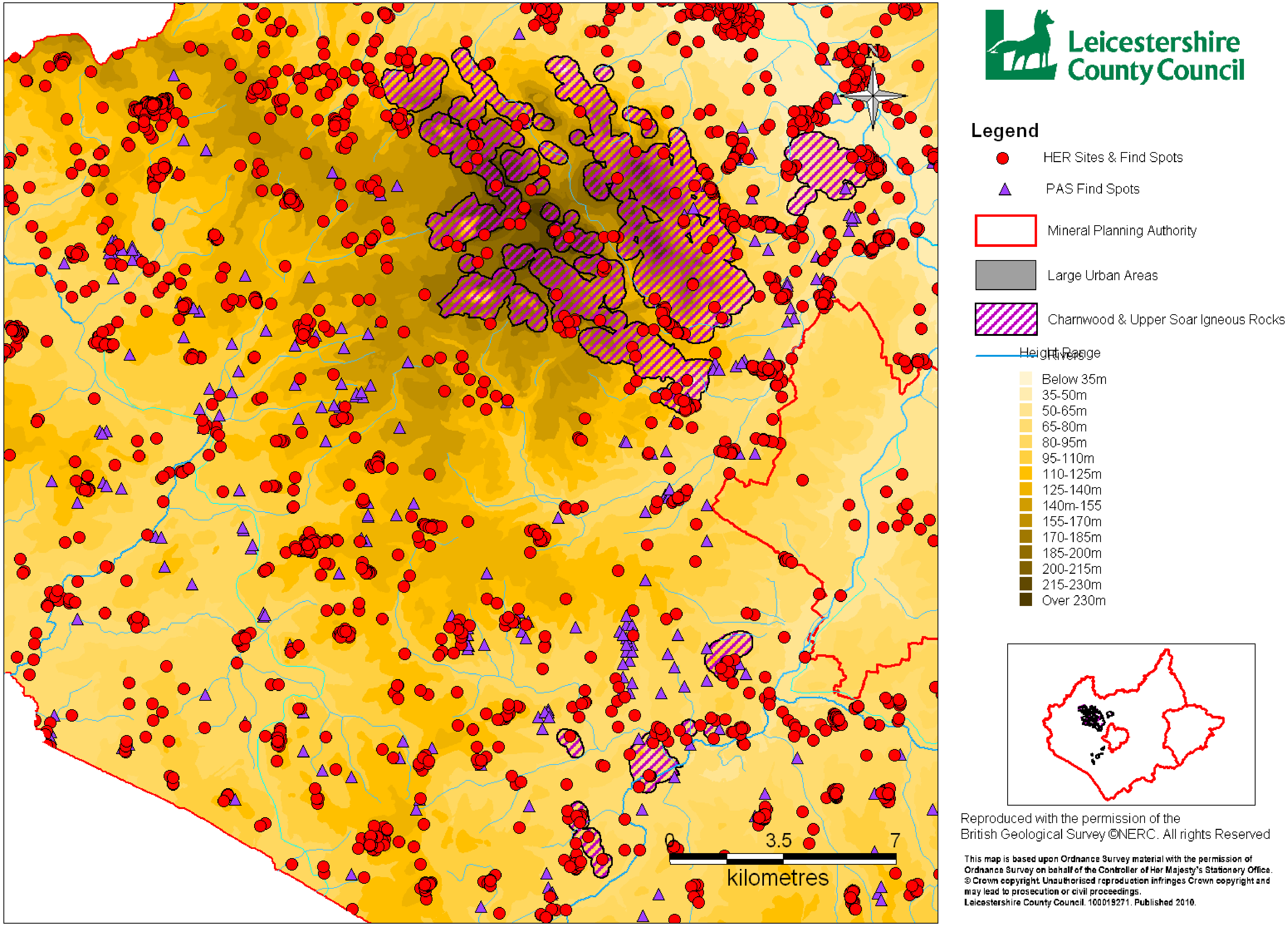
Charnwood & Upper Soar ARA Sub Area Roman Sites and Findspots



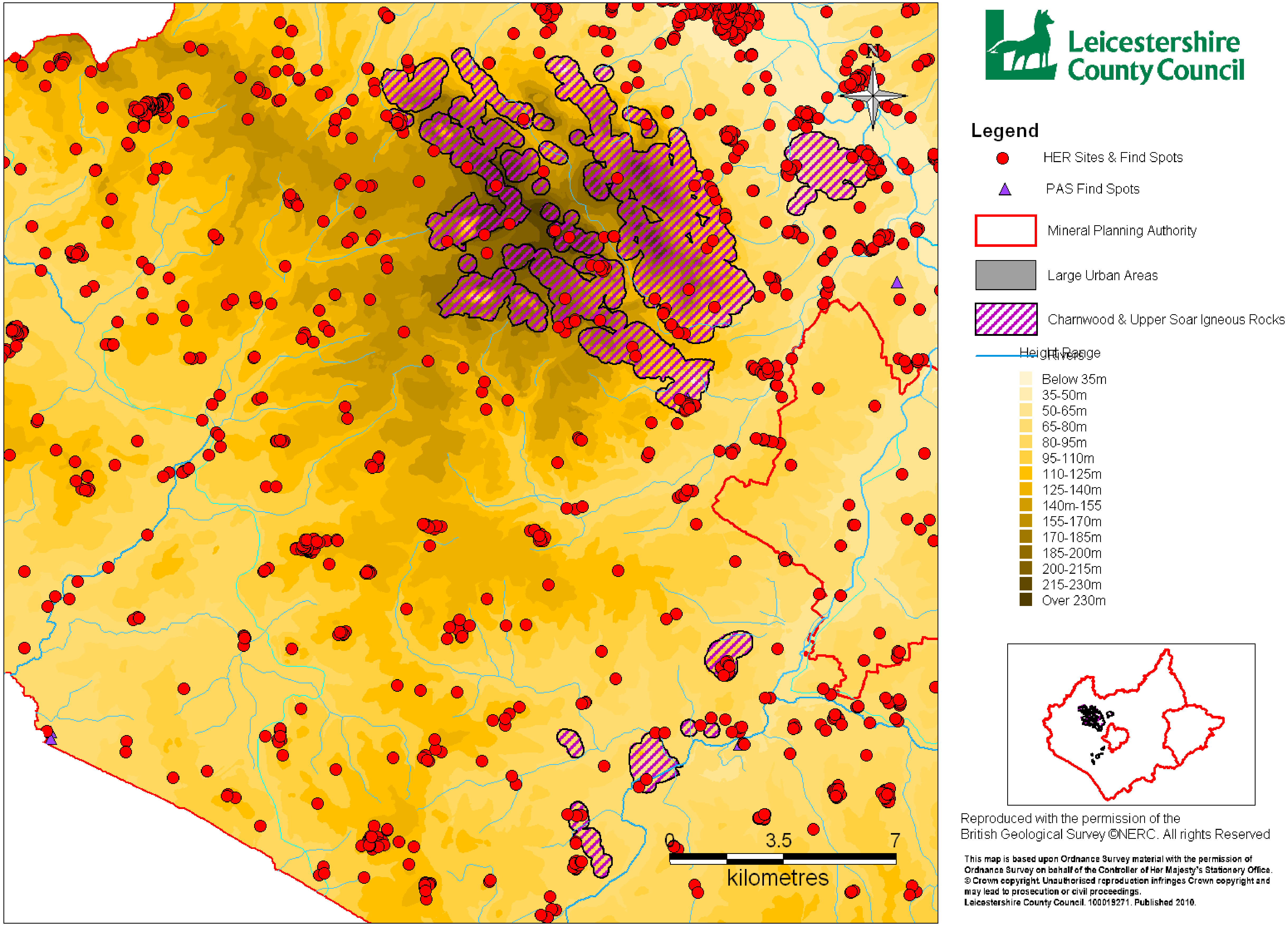
Charnwood & Upper Soar ARA Sub Area Anglo-Saxon Sites and Findspots



Charnwood & Upper Soar ARA Sub Area Medieval Sites and Findspots

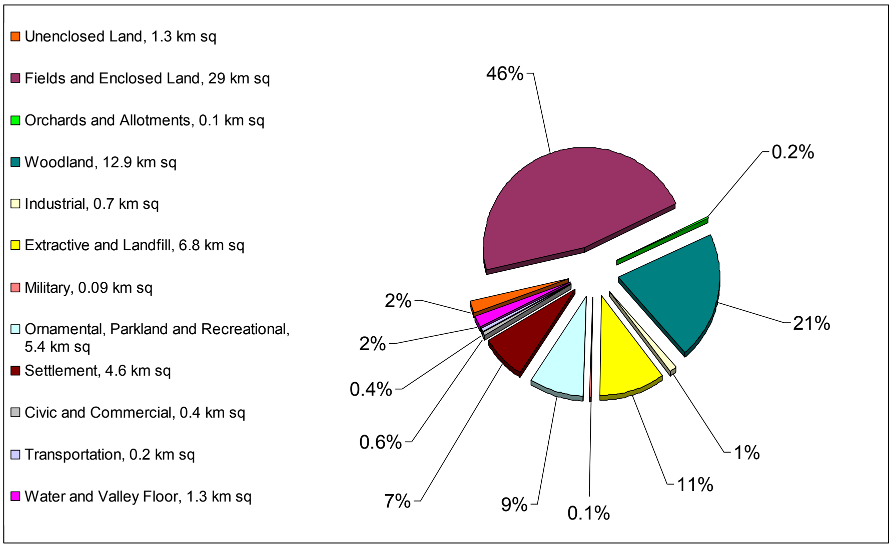


Charnwood and Upper Soar ARA Sub Area Post-Medieval Sites and Findspots

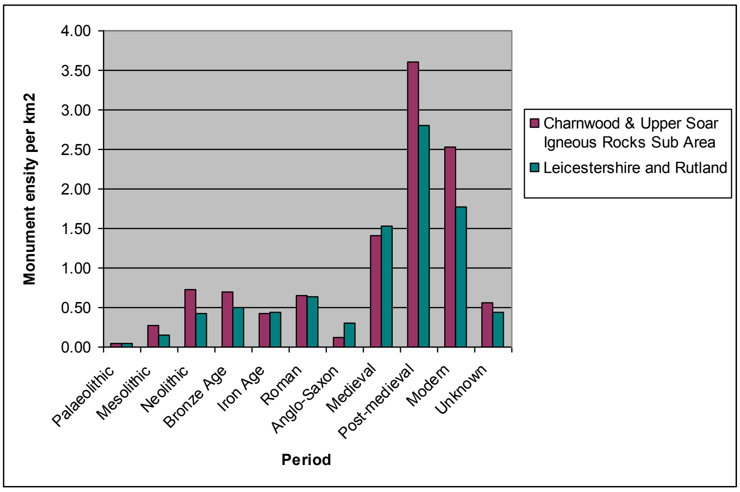


Charnwood and Upper Soar ARA Sub Area Modern Sites and Findsp

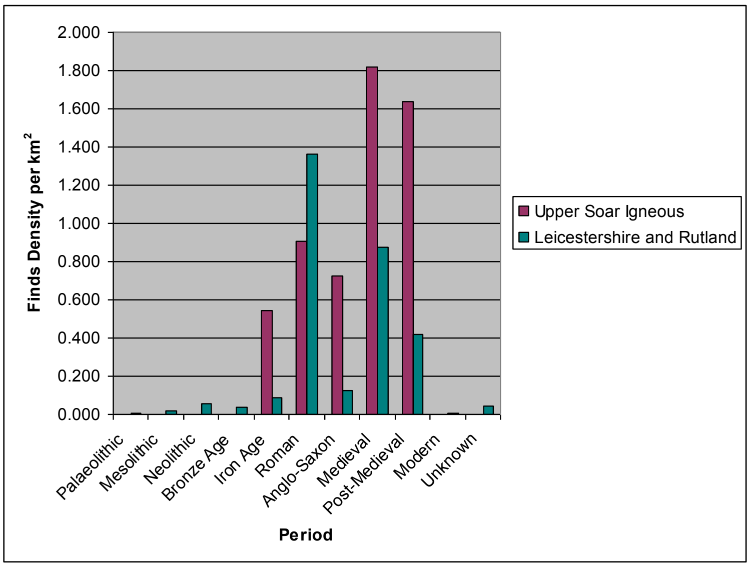
Appendix 8: HLC, HER and PAS Density and Distribution Information for the Charnwood and Upper Soar Igneous Rock ACA



HLC Broad Types within the Charnwood & Upper Soar ARA Sub Area



Density of monuments and find spots recorded on HER for the Charnwood & Upper Soar ARA Sub Area compared with the whole project area



Density of find spots recorded through PAS for the Charnwood & Upper Soar ARA Sub area compared with the whole project area