Archaeological Resource Assessment of the Aggregates Producing Areas of Warwickshire and Solihull

Final Report Draft

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Summary

This document is an assessment of the archaeology associated with aggregate minerals in Warwickshire and Solihull. The project was undertaken by the archaeology section of Warwickshire Museum Field Services, based within the Adult, Health and Community Services Directorate of Warwickshire County Council.

The project has characterised, digitally mapped and subsequently analysed the resource, in order to inform the development of both minerals development frameworks and archaeological research, and provide a sound dataset for management and decision-making.

This project primarily matched the criteria in Objective 2 of the Aggregates Levy Sustainability Fund (ALSF; strategic mitigation of future extraction): the analysis of existing data and wider dissemination matched Objective 3 (mitigation of past extraction).

This project has used a number of data sources, primarily: relevant geological information, in particular that which is available in digital form from the BGS; relevant archaeological data, contained in the Warwickshire and Solihull HERs; aerial photographic information including additional mapping as part of English Heritage's National Mapping Programme.

The project has resulted in: a corpus of baseline data to inform future strategies; enhancement of the Warwickshire and Solihull HERs; increased awareness of archaeological issues in relation to aggregates extraction; dissemination via this project report, a non-technical leaflet and through the Warwickshire County Council web site.

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Front cover illustration: An Anglo-Saxon square-headed brooch from Wasperton

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List of Abbreviations Used in the Text

ALSF – Aggregates Levy Sustainability Fund

AONB – Area of Outstanding Natural Beauty

AP – Aerial Photograph

BGS – British Geological Survey

BNRR - Birmingham Northern Relief Road

BTSO – Blythe/Tame (study area in) Solihull MBC

BTWA – Blythe/Tame (study area in) Warwickshire

cal – calibrated (of carbon dates)

DB – Domesday Book

DEFRA – Department for the Environment, Food and Rural Affairs

DETR – Department of the Environment, Transport and the Regions

DoBP – Defence of Britain Project (during WWII)

DOE – Department of the Environment

DWA – Designation Warwickshire (a Warwickshire HER UID)

EA – Environment Agency

EH – English Heritage

GIS – Geographical Information System

HEEP – Historic Environment Enabling Programme

HER – Historic Environment Record

HLC – Historic Landscape Characterisation

IA – Iron Age

IFA – Institute of Field Archaeologists

kya – thousand years ago

LIDAR – LIght Detection And Ranging

MAFF – Ministry of Agriculture, Food and Fisheries

MAP2 – Management of Archaeological Projects 2 (EH 1991)

MBC – Metropolitan Borough Council

MPG – Minerals Policy Guidance

MPP – Monuments protection Programme

MSI – Monument Solihull (a Solihull HER UID)

MWA – Monument Warwickshire (a Warwickshire HER UID)

mya – million years ago

NERC – National Environmental Research Council

NMP – National Mapping Programme

NMR – National Monuments Record

NNR – National Nature Reserve

OE – Old English

OIS – Oxygen Isotope Stage

ONS – Office of National Statistics

OS – Ordnance Survey

PAS – Portable Antiquities Scheme

PPG – Planning and Policy Guidance

RB – Romano-British

RCHME – Royal Commission on Historical Monuments; England

SAM – Scheduled Ancient Monument

SFB – Sunken Featured Building (grubenhaus)

SMBC – Solihull metropolitan Borough Council

SSSI – Site of Special Scientific Interest

UDP – Unitary Development Plan

UID – Unique Identifying number (of HERs)

ULAS – University of Leicester Archaeological Service

VCH – Victoria County History

WCC – Warwickshire County Council

WCCMFS – Warwickshire County Council Museum Field Service

WLG – Warwickshire Landscape Guidelines

WMA – West Midlands Archaeology

WMRRFA – West Midlands Regional Research Framework for Archaeology

WWI – First World War

WWII – Second World War

1 Introduction

1.1 Background

This project is a survey of the archaeology of Warwickshire and Solihull focussing on areas with the potential to produce aggregate. It is funded by the Aggregates Levy Sustainability Fund (ALSF), administered by the English Heritage (EH) Historic Environment Enabling Programme (HEEP), and follows similar projects in Gloucestershire and Worcestershire. It was intended that the project should meet the published criteria for ALSF projects[1]; those with which this project are particularly concerned are emphasised in bold:

> **"developing the capacity to manage aggregate extraction landscapes in the future;**
>
> **"delivering to public and professional audiences the full benefits of knowledge gained through past work in advance of aggregates extraction;**
>
> "reducing the physical impacts of current extraction where these lie beyond current planning controls and the normal obligations placed on minerals operators;
>
> **"addressing the effects of old mineral planning permissions;**
>
> **"promoting understanding of the conservation issues arising from the impacts of aggregates extraction on the historic environment."**

The primary aims of the project were to improve the quality and quantity of available archaeological data in respect of potential aggregate producing areas and to facilitate more informed advice concerning the impacts and mitigation of aggregates extraction. It is intended that this will provide input to:

> Reviews of minerals frameworks
>
> Reviews of existing minerals permissions
>
> Assessment of new application sites for minerals permissions

The data may also be of use as a basis for further research.

Similar ALSF resource assessment projects have been completed for Gloucestershire and Worcestershire.

The principal outputs of this project have been this report and enhancement of the Warwickshire and Solihull Historic Environment Records (HERs).

Further copies of this report can be obtained from:

> Warwickshire County Council,
> Museum Field Services,
> The Butts,
> Warwick,
> CV34 4SS

It is also available in the form of a CD-ROM and as downloadable ~.pdf files on-line[2].

1.2 Report Scope

Section one of this reports provides and overview of the project including its origination, management, personnel, geographical scope and the minerals development context at the time of writing.

Section two details the aims of the project and provides links to those sections of the report that were written to address each of these aims.

[1] http://www.english-heritage.org.uk/server/show/nav.1315

[2] http://www.warwickshire.gov.uk/Web/corporate/pages.nsf/Links/F9B702ADF1A7738B802571950047EE1D

Section three describes the methodology used to obtain the results detailed within the rest of the report concentrating in particular on the production of the aggregates resource base map. This section also details the data cleaning and validation undertaken, the use of aerial photographs (APs, see also appendices 10.4 and 10.5) and LIDAR (see also section 6.2.1.2) the collation of data to provide a simple statistical overview and produce period reports on which to base the assessment of the current state of knowledge of the archaeology of the study area, the development of a research agenda and management proposals and the intended methods of dissemination.

Section four summarises the geology of the study area, particularly in relation to aggregates.

Section five makes up the bulk of the report and consists of period based summaries of the current state of knowledge for each of the main archaeological periods. Each begins with a short discussion of the distribution of known finds and sites across the study area and in relation to aggregates. This is followed by a more detailed discussion of the known sites and their significance.

Section six is the research agenda organised by period in the same way as section five and summarises the key research objectives for each period.

Section seven address the management of the archaeological resource and begins with a discussion of the management of risk in the context of archaeology in a development context. It goes on to describe case studies which are related to these risks and to the outcome at each stage. It concludes with a summary of the methodological issues arising from this discussion organised by period.

The report concludes with a description of the archive (Section 8), references (Section 9) and appendices (section 10). The most significant of the appendices are Sections 10.4 and 10.5 which detail the results and methodology of the National Mapping Programme (NMP) work undertaken as part of this project.

The final part of this report, Section 11, contains the main illustrations and all the period based distribution maps.

1.3 Management and Personnel

This project was managed by Warwickshire County Council Museum Field Services, and undertaken at The Butts, Warwick, and the National Monument Record Centre, Swindon.

The English Heritage (EH) Project Officers were Fachtna McAvoy and latterly Linda Monckton. The EH Inspector with responsibility for Warwickshire and Solihull is Ian George and the EH ALSF advisor is Peter Busby.

The management team consisted of:

Magnus Alexander (Project Manager).

Jonathan Parkhouse (County Archaeologist) responsible for oversight of the project for the County Council and for budget management.

Emma Jones (Historic Environment Records Manager) had particular responsibility for issues around the HER.

Project members in addition to those on the management team were:

Stuart Palmer (Archaeological Projects Manager with the Projects Group) produced the prehistoric and Romano-British period resource assessments and developed their respective research agendas.

Alison Hatcher (Assistant Historic Environment Record Officer) assisted with data enhancement and collation as well as the integration of data into the Warwickshire and Solihull HERs, including work on integration of aerial photograph (AP) plots and NMP data.

Nicholas Palmer (Projects Group Principal Field Archaeologist) has been personally responsible for the Museum's aerial photography over many years, and provided input into the use and interpretation of the Museum's APs and plots.

Laurence Chadd (Mapping Project Officer) undertook the NMP-related work. This post was based at NMR Swindon and managed on a daily basis by Helen Winton from the EH Aerial Survey and Investigation Team.

Candy Stevens (Illustrator) produced the illustrations.

Anna Stocks, (Planning Archaeologist) attended project seminars.

Various other Warwickshire Museum Field Services staff provided invaluable advice on an ad hoc basis.

Jim Davies, (WCC Planning Officer) has responsibility for the County's Minerals Development Framework and provided much advice and information on this aspect of the project.

Dr Jon Radley (Assistant Keeper of Geology, Warwickshire Museum) assisted with geological advice.

Ed Wilson (Archaeologist, Environment Agency) provided sample EA LIDAR data.

1.4 The Project Area

The project area includes the modern County of Warwickshire and the Metropolitan Borough of Solihull, hereafter referred to as *The County* (see Figure 6). Solihull MBC was historically part of Warwickshire, and the Archaeology Service in Warwickshire has provided an archaeological planning advice and HER service for the borough since 2000.

Like most, the County is largely a creation of the later Anglo-Saxon state and as such does not form a topographically cohesive unit (see 5.3.5.2 below) and there will be important archaeological connections with adjacent areas: the Warwickshire Avon will have a shared history with the Lower Avon in Worcestershire and Gloucestershire, much of the north of the county will relate to Staffordshire; and the Anker Valley to the Leicestershire plain.

The Avon and its tributaries dominate the south-eastern two thirds of the county. The Avon rises just east of the county and flows west through Rugby towards Coventry where it is met by several tributaries draining that area before turning south to flow through Warwick and on past Stratford and Bidford eventually reaching the Severn. Its principal tributaries are the Leam that flows west to join it at Warwick, the Stour that flows north to join it between Stratford and Bidford, and the Arrow and Alne that flow south to join it just west of Bidford. The northern part of the county is principally made up of higher more rolling ground that forms one of the main watersheds of the Midlands. In the west the watershed consists of the more wooded Arden which extends from south of Solihull east, then curves to the north running to the west of Coventry and on towards Tamworth and the Nuneaton ridge. To the east the watershed is formed by the High Cross Plateau which occupies the area north of Rugby and is somewhat less undulating and wooded than Arden. To the north of the watershed, the Blythe drains the Solihull area before flowing north to join the Tame, which continues northwards towards Tamworth. The Anker flows northwest from the High Cross Plateau eventually also joining the Tame (see Figure 7).

The *Project Area* consists of those areas within the County that contain aggregate geologies (see Section 3.1.1), namely sand and gravel drift deposits and solid rock outcrops. These geologies are complex and cover approximately 600km^2; they also occurred widely across the Study Area. After buffering (see Section 3.1.1.3), the Project Area was in the order of 740km^2, a little over a third of the County. The Project area was subdivided into 12 *Study Areas* largely based on topography and the nature of the resource (see Section 3.1.2 and Figure 2).

Note the distinction here between the County (WCC and Solihull MBC), the Project Area (those areas within the County containing aggregate geologies) and the Study Areas (the sub divisions of the Project Area).

1.5 Minerals Planning Context

The purpose of the project was to construct a strategic overview of the extent and character of the aggregate deposits in Warwickshire and Solihull, and the archaeological resources of those areas. This increased understanding was intended to inform the prioritisation of the preservation of important sites (through designation and other management methods) and the management of all sites through the minerals planning process.

The draft WCC 'Minerals Local Plan' (WCC 1993a) was adopted following a Public Local Inquiry (WCC 1995). Its successor 'Minerals Development Framework' is currently in preparation by the County Council. Early stakeholder engagement for the 'Minerals Core Strategy' was undertaken during 2006, with public consultation due to be undertaken in mid 2007 and a target adoption date of 2008; for minerals allocation early stakeholder engagement is scheduled for the end of 2007, with public consultation in 2009 and a target adoption date in 2010. Mineral policies for Solihull Metropolitan Borough Council are contained within the Solihull Unitary Development Plan the draft of which was published in 2003 and on which the Planning Inspector has reported (May 2005) consequent modifications proposed (August 2005) and a final version published (2006).

The time was thus highly appropriate to provide an appraisal of the County's aggregate mineral resources from an archaeological perspective, and to develop a suitable tool that could identify constraints on extraction and opportunities for further archaeological research.

The existing WCC Minerals Local Plan shows the mapped hard rock geological resources (including hard rock aggregate sources). In respect of soft aggregates however, the plan identifies 'Preferred Areas' where resources are known to exist and broad 'Areas of Search' within which mineral deposits are believed to be present but where there is no firm evidence about economic viability. Several areas were identified at the draft stage (ie WCC 1993a) that were either not adopted or had their boundaries modified. Identification of areas as belonging to either type did not imply that those areas would be worked in the future, or that these were the only areas where mineral working may be considered. These areas are, however, indicative of the areas where WCC considered that there would be least planning objection to extraction taking place and where sustainable extraction policies are most likely to be achieved. The 'Preferred Area/Area of Search' approach is likely to be carried through into the new Minerals Framework documents and may be expanded to cover other mineral resources. The Draft Minerals Development Framework (WCC, 2007) Policy Principle 4 states that "Areas allocated as Preferred Areas for mineral extraction have a general presumption in favour of proposals for extraction within them".

As noted above, WCC provides advice to Solihull MBC on minerals planning issues. The Solihull 'Unitary Development Plan' defines a Minerals Consultation Area in the area between Berkswell, Meriden and Hampton-in Arden (the Meriden Sands). Aggregates resources are protected by restrictions on surface development within this area, although additional areas of aggregates within the Borough are also mapped. The Borough makes a relatively small contribution to aggregates supply in Regional terms, but ongoing extraction occurs at Meriden and Berkswell/Park Farm Quarries. Solihull MBC policy is to identify specific sites, rather than 'Preferred Areas' or 'Areas of Search'.

An overview of mineral resources and constraints in Warwickshire and the West Midlands was prepared for DETR in 1999 (BGS 1999). The 1:100,000 summary map accompanying that report identifies environmental constraints only at the level of formal designation (Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest, National Nature Reserves, and Scheduled Ancient Monuments); consequently a large proportion of historic environment assets are excluded from consideration. By focussing on these formally designated assets, strategic decisions may be made that are not based on all available knowledge. Although the policy guidance framework allows investigations to take place once allocations have been made it would seem preferable to make allocations based on the full knowledge available at the time. In addition, old planning permissions for aggregate extraction may exist which predate the current planning guidance frameworks in respect of archaeology – these have not been reviewed in an archaeological context.

Since this report was first written two relevant documents have been published. These are "Planning for Mineral Extraction and Archaeology: Practice Guide" by the Minerals and Historic Environment Forum (ARSL 2007) and "Mineral Extraction and the Historic Environment" by English Heritage (EH 2008).

2 Aim and Objectives

The following Aim and Objectives were defined in the Project Design.

2.1 Aim

To identify, characterise and digitally map available information on Warwickshire's archaeological resource in areas of past, present and potential future aggregates extraction, in order to enhance existing baseline data, to improve archaeological mitigation of future extraction proposals in the county, and to promote better public understanding of, and engagement with, these issues.

2.2 Objectives

2.2.1 Produce baseline data to facilitate mineral planning decisions in respect of archaeological sites and historic landscapes in Warwickshire and Solihull

For the methodology adopted to address this objective see 3.1.1 for the definition of the minerals resource and 3.1.2 for the definition of Study Areas. For a description of the aggregate resource see Section 4 on page 13.

2.2.2 Define all actual and potential areas of aggregates working, creating a GIS-based database

For the methodology adopted to address this objective see 3.1.1 for the definition of the minerals resource and 3.1.2 for the definition of Study Areas.

2.2.3 Data enhancement within extraction areas

For the methodology adopted to address this objective see 3.1.3. The outputs for this objective were enhanced Warwickshire and Solihull HERs. This is not readily demonstrable in this report but see Section 5.2 on page 24 where the countywide statistics give some indication of the improved 'resolution' in the HERs.

2.2.4 Collate available archaeological data for areas defined in (2.2.2)

For the methodology adopted to address this objective, see Section 3.1.4. The outputs for this objective formed the inputs into the resource assessment (Objective 2.2.5).

2.2.5 Assess state of knowledge of the archaeology of each aggregate area

For the methodology adopted to address this objective see 3.1.5. For the resource assessment see Section 5 on page 23.

2.2.6 Develop an archaeological research framework and agenda in respect of aggregates areas

For the methodology adopted to address this objective see 3.1.6. For the research framework and agenda see Section 6 on page 113.

2.2.7 Develop historic environment policies and mitigation strategies for activities related to aggregates extraction

For the methodology adopted to address this objective see 3.1.7. For the management case studies, policies and mitigation strategies see Section 7 on page 130.

2.2.8 Increase understanding of the archaeology of aggregate areas amongst the public and the aggregates industry

For the methodology adopted to address this objective see 3.1.8.

3 Methodology

3.1 Description of Methodology

The project was based upon the methodology designed for 'The Aggregate Landscape of Gloucestershire; Predicting the Archaeological Resource' (Mullin 2004) and that of 'Archaeology and Aggregates in Worcestershire' (Jackson and Dalwood 2006). Another similar project has also been undertaken for Somerset County Council.

Project data was managed by means of a geographical information system (GIS). The GIS used was MapInfo 8.5, which uses the term 'table' to refer to both the underlying data table and the associated map. Therefore, in this study, the term 'table', in the context of GIS data, will be used to refer to both the map itself and associated data.

3.1.1 Definition of the Aggregates Resource

The definition of the aggregate resource consisted of the identification of the relevant geologies and their spatial extent, using British Geological Survey (BGS) digital data and that held by WCC Minerals planners. This was intended to meet Objectives 2.2.1 and 2.2.2. The results are described in Section 4.

A range of data was obtained from the BGS[3] that consisted of general geological tables at a nominal scale of 1:50,000, detailed minerals resource tables for specific study areas at a nominal scale of 1:25,000[4] and summary mineral resource data for the whole county at a nominal scale of 1:100,000. The 1:50,000 data was intended to provide the baseline coverage for the entire county. For this reason partial data sets were not used in this study. The only complete linear data set (faults) was not directly relevant in this context and was excluded. On inspection the 1:100,000 Minerals resource data contained several anomalies. These appeared to have arisen from the detail provided in areas that had been covered by specific Mineral Assessment Reports (the 1:25,000 tables). For this reason it was decided not to use this 1:100,000 mapping directly, but as a comparison with the layers arrived at by identifying geologies known to produce commercially viable aggregates.

3.1.1.1 Current and Potential Exploitation

The WCC Minerals Planning section provided the location and extent of current extraction sites. The type of aggregates produced by each of these sites, either bedrock or superficial, were identified and the sites were compared to the appropriate underlying geology maps. This produced a list of quarries and their underlying geology (Appendix 10.2, Table 11), which was compiled to produce a list of all currently exploited bedrock and superficial geologies (Table 12 and Table 13 respectively).

The same process was repeated for extraction sites allocated in the minerals local plan, both draft (WCC 1993a) and final (WCC 1995; see Appendix 10.2) to produce Table 14 and Table 15. It should be noted however that only sand and gravel sites were allocated in the local plan and likely future bedrock extraction areas have not been identified.

The information from Table 12 and Table 15 was used to form the basis of a query of the bedrock and superficial geology BGS layers to produce initial versions of 'exploited_bedrock' and 'exploited_superficial' MapInfo tables respectively.

In many areas, generally along the river valleys, alluvium appeared to overlie identified aggregates-producing deposits, principally River Terrace Gravels (BGS 1999: 21). However, these geological deposits were not included as it was felt that buffering the identified superficial geologies (see below) would pick up the vast majority of these cases and where it did not the underlying aggregate deposits were likely to be inaccessible.

[3] Details in Appendix 10.1.

[4] Based upon assessments commissioned by the County and the former Department of the Environment of the mineral resource in selected areas undertaken by the University of Liverpool in the 1980s (University of Liverpool 1989a, 1989b, 1989c); and technical assessments undertaken by the Institute of Geological Studies and the British Geological Survey (Crofts 1982, Cannell and Crofts 1984)

At this stage, the exploited geology tables were compared to the 1:100,000 BGS minerals resource data. It was noted that the BGS had identified a Marlstone Rock Formation[5] in the south of the county as a potential resource that had not been identified in the above process. It was clearly very similar to the Marlstone Rock Formation currently being exploited at Edge Hill Quarry and so it was added to the 'exploited_bedrock' table. A similar situation was identified with a range of minor sand and gravel deposits[6] and so these were added to the 'exploited_superficial' table.

Several areas on the BGS 1:100,000 Minerals Resource tables are shown as having concealed sand and gravel deposits, ie potentially commercially viable aggregate deposits below overburden. These were only defined however, in areas that had been studied in more detail by the BGS (published in Mineral Assessment Reports 107, 115, 125 and 142). Whilst this information was felt to be valuable, it was not available for the whole county. It was consequently decided to adopt a methodology that would be applicable countywide by using the information on concealed resources to identify overlying geologies associated with concealed resources and to then extrapolate these areas across the county. This produced a few anomalies, such as a large area of till between Harbury and Kineton in Feldon which was known to overly aggregate in other areas but was very unlikely to do so here, but it was felt that the benefits of a uniform approach outweighed these problems. In the area between Coventry and Rugby (Crofts 1982) the concealed deposits lay beneath the Wolston Clays (BGS tag WOC-CLSI) and the Thrussington Tills (THT-DMTN). The former had already been identified and included but was initially deleted as not being an aggregates producing deposit. It was however retained, as there was a clear association with substantial concealed deposits. The latter had also already been identified but deleted, however, as it was only associated with marginal concealed deposits and it was felt that these would be best picked up by buffering as described below. In the area south and east of Solihull (Cannell & Crofts 1984) the concealed deposits lay beneath Middle Pleistocene Till (TILMP-DMTN). These covered considerable areas in close association with surface deposits of glaciofluvial sand and gravel. These deposits were therefore added in but those isolated patches with no association with glacial sands and gravels were deleted.

3.1.1.2 Past exploitation

At this stage, the identification and location of past minerals sites were based on the artificial geology table as supplied with the BGS 1:50,000 data, which mapped made ground in areas such as back-filled quarries or road and rail embankments. From this data set, aggregate extraction sites were initially identified by comparison with the exploited geology tables (see above). At this stage, where there was any doubt about the nature of a 'made ground' polygon it was included. These polygons were then compared to a wide range of other available data sources[7] to ascertain the exact nature of the site. Where the polygon could be excluded, it was then deleted from the table. The remaining polygons were then compared to the map accompanying the BGS Minerals Resource Information for Warwickshire (BGS 1999) and further polygons were identified for deletion.

This process picked up one further geology type[8] that had been exploited but that had not previously been identified. This was therefore added to the exploited superficial GIS table. A few inactive exploitation sites were identified on the BGS Minerals Resource Information Map that had not been identified in the above process. It was not possible to digitise these however as the scale was too large and the mapping too vague to allow this.

It was appreciated that this overall approach was far from ideal. It was originally intended to use WCC Minerals Planner's data to compile an accurate table of past exploitation but this did not prove to be viable. The data held in the minerals planning department was largely paper based and not readily available. It was also a history of permissions granted rather than actual

[5] BGS LEX_ROCK tag MRB-LMFE

[6] BGS LEX_ROCK tags ALF-SAGR, ALF-GRAV, ANSG-SAGR, BWAT-SAGR, GFTMP-SAGR, HISA-SAND, NIT-SAGR, PA-GRAV, PERT-SAGR.

[7] Sources included: aerial photographic GIS tables, Ordnance Survey current and historic mapping GIS tables (1880s, 1950s, 1970s-1990s), Habitat Biodiversity Audit GIS tables, target notes and Ecosite files. All held by WCC.

[8] BGS LEX_ROCK tag PA-GRAV

exploitation and given the time constraints of the project the decision was taken not to use this data. It was instead decided to focus on the case study areas identified as part of the study of past management (see below). Much better quality information on past exploitation across the County is clearly required.

3.1.1.3 Final processing

In order to simplify the process of querying the HER, the multiple polygons on each of the two exploited geology tables were copied into new tables and combined to create a single set of polygons for bedrock and superficial geologies. In order to pick up areas where overlying geologies might have covered viable aggregate geologies (for example the case of alluvium overlying river terrace deposits described above), to allow for the ancillary land-uses associated with extraction operations and to ensure HER sites on the edge of these polygons would be picked up, these polygons were buffered by 100m.

There were several areas, particularly along the River Tame where it was clear that the level of past exploitation was such that all superficial deposits had been removed. Consequently, these areas did not appear in the exploited geologies tables. In order to resolve this issue the old workings polygons were buffered by 100m to reflect the buffering of the identified geologies and these were then combined with the exploited geologies tables to fill these gaps.

Excluded Areas

Though the original project design stated that areas where extraction was 'unlikely ever to take place, such as urban areas, AONB &c', would be identified and excluded from the study areas, this was not felt to be appropriate. Whilst the 'Minerals Local Plan for Warwickshire' identifies sixteen restraints including ancient woodlands, SSSIs, nature reserves, commons, country parks, and so on (WCC, 1995: 8-10) it was felt that excluding the full range of areas identified in the 'Minerals Plan' would not be justified on two counts. Firstly, it was hoped that this report should have as long a currency as possible and that changing conditions might mean that in the future such areas of exclusion might be redrawn, downgraded or discounted. Secondly, excluding too many areas from the study would be likely to distort the data set and consequently any conclusions based upon that data.

The exception to this was the urban areas. These were excluded because the nature of tenure (i.e. the owning of bricks and mortar by individuals in perpetuity) means that minerals extraction is extremely unlikely to ever take place. The extent of urban areas was based upon data supplied by the Office of National Statistics (ONS) as part of the 2001 census. Urban areas within this data set were defined by the ONS as areas that were "irreversibly urban in character" with an area of at least 20ha and a population of at least 1500 people (these areas are shown on Figure 6). The boundaries were generalised to an accuracy of 20m (by the ONS) in order to reduce the size of the data set. The resulting boundaries were described as being "suitable for non-demanding GIS analyses (such as buffering)". Given this qualification on the accuracy of the data the urban layer was buffered by 100m. This figure was a balance between excluding too large an area and ensuring the exclusion of urban areas together with reasonable exclusion zones based on areas unlikely to have development permitted within them during the life of this report. These areas were excluded from the study.

3.1.2 Definition of Study Areas

The aggregate resource identified above was subdivided into study areas based on the geology being exploited, the topography of the county, and the landscape character.

Two areas based on hard rock geologies were defined; Industrial Arden and Cotswold Fringe: and ten areas based on superficial geology; Anker, Arrow/Alne, Blythe/Tame, Central Arden, Dunsmore, Eastern Arden

This element of the project was intended to meet Objectives 2.2.1 and 2.2.2. The definition of the study areas (including their geology, topography and boundaries) are described below and they are shown in Figure 12.

The nature of the aggregate resource in each is described in Section 4 below.

3.1.2.1 Bedrock Aggregate Areas

The subdivision of the bedrock areas was straightforward. They formed two discrete areas, one in the north of the County, the other in the south.

3.1.2.2 Superficial Aggregate Areas

The subdivision of the superficial aggregates areas was considerably less straightforward than that of the bedrock aggregate areas. A large proportion of the county is covered with potential superficial aggregate deposits that roughly sub-divide into two groups, fluvial and glacial. Generally, fluvial deposits are found along the main river valleys and glacial deposits on higher ground, but in many areas these two groups of deposits inter-digitate. Therefore dividing the county up on simple topographic lines would split blocks of glacial deposits if watersheds were used as boundaries, and would split fluvial deposits if river valleys were used. It was also not feasible to divide areas based simply upon geology, as this would not have produced coherent land units.

Consequently, in order to split the county into manageable areas a combination of approaches was adopted. Given that this is an archaeological resource assessment it was felt that the study areas used should have some degree of internal consistency. It was therefore necessary to examine the general character of the landscape and use this as the basis for creating subdivisions. This was based partly on general knowledge of the county, and partly on targeted field visits to transitional areas.

Previous work within Warwickshire County Council had already classified the county into several landscape regions (Warwickshire Landscape Guidelines (WLG; WCC, 1993B)). Where suitable these areas were used though the WLG mapping was at a large scale and unclear and the exact distinctions used not always directly relevant.

3.1.3 Data Enhancement

The work described below addressed Objective 2.2.3.

3.1.3.1 Data Correction and Validation

Understanding the resource is reliant upon the quality of data within the HER, which was of an inconsistent standard across the County. This was particularly pronounced between the separate Warwickshire and Solihull HERs. In order to reduce the effects of this some data correction and validation was undertaken, which focussed upon ‘period’ and ‘type’ descriptions.

It is important to appreciate here that the correction and validation described below does not address underlying data imbalances within the HER. To a large extent the HER is a record of activity that has produced archaeological information, rather than a record of the geographical distribution of archaeological evidence. This activity has included archaeological research, as well as development that has led to archaeological interventions such as ‘rescue’ excavations, and, since the advent of PPG16, planning led enquiries. Occasionally, research has been countywide providing a uniform data set but it is much more typically geographically biased. Research has concentrated on particular topics or areas, for example the Arrow Valley needle industry (see p.93, 104 and Figure 50 below) and development, including aggregates extraction, is typically concentrated in particular areas. See also Section 5.2.

The individual period date ranges used in each HER were inconsistent, with a number of illogical overlaps. Therefore the two sets of date ranges were harmonised and overlaps were removed where possible. In addition, a large number of sites had no dates entered for them so these were assigned date ranges where possible, however broad. Where this was not the case they were assigned an ‘unknown’ date (as distinct from being undated).

Broad categories of sites were identified that had been described as having ‘unknown’ dates or very wide date ranges where the dates could be narrowed. For example, many crop-marks were simply assigned to the prehistoric period and it was felt that it would be reasonable to assign these to the Neolithic or later if they could not be refined further. Sites that spanned multiple periods were then examined in more detail to see if their dating could be refined further.

At the data collation stage problems with individual HER entries were identified and where these were not major they were corrected on the spot. Problems that were more complex were noted and referred to HER staff. Most of these corrections have been done, the remainder are ongoing.

The principal outputs for this work were enhancements to the HERs. This can principally be seen in the statistics described in Section 3.1.4 and reported in Section 5.2.

3.1.3.2 Aerial Photography

There were two main components to this part of the project.

Warwickshire Museum Field Services had already undertaken some aerial photographic analysis during the 1990s. This RCHME funded work covered the whole county, checking all (readily) available oblique photos[9]. Key areas were sketch plotted at 1:10,000 and the work was critical, aiming to exclude natural, medieval and post-medieval features. Whilst these had been scanned, they had not been incorporated into the HER. This required geo-referencing and the preparation of an index table.

In addition to this, several pilot areas were mapped to National Mapping Programme standards, in conjunction with the National Monuments Record. This work is described in Appendix 10.4 and 10.5.

The principal outputs of these elements of the project were enhancements to the HERs and so are not described in detail elsewhere though they are summarised in Section 6.2.1.1.

3.1.3.3 LIDAR

LIDAR data, held by the Environment Agency (EA), provides high-resolution digital terrain and surface modelling, and where available is likely to provide detail of valley bottom physiography/geomorphology, as well as detail of archaeological sites to supplement aerial photographic evidence. This technique has provided good results in river valleys including the Trent, Yorkshire Ouse and Witham valleys (Challis in press).

At the beginning of this project, the EA LIDAR coverage in Warwickshire was limited and did not overlap, for the most part, with areas of significant aggregate geology. Nevertheless, there were a few areas where analysis was felt likely to be worthwhile and so it was hoped to study some sample data in order to assess its potential. During the latter part of 2006 however, extensive areas within the County were flown covering both new areas and old areas at a higher resolution (see Figure 11).

Obtaining this data however proved difficult in part due to changing EA policy. Some sample LIDAR data in the form of .jpg files was examined for a limited area to the south-east of Coventry but this was not made available until January 2007 and only limited assessment was possible, which is described in Section 6.2.1.2.

3.1.4 Data Collation

This work was intended to meet Objective 2.2.4.

Data collation took two forms, the preparation of monument density figures and the preparation of period based reports of summary monument information. The former was intended to provide a backdrop to the resource assessment, the latter to provide the basic information upon which to base that assessment.

The term ‘monument’, as used here, refers to classes of archaeological sites as defined for inclusion in the HER. As such a single multi-period site might actually be classed as several different monuments within the HER. Similarly, a single period site with several discrete elements might also be entered as several separate monuments. There is no implication of legal protection in the term and in this context a monument can refer to familiar monuments such as hillforts as well as individual find-spots.

An initial draft analysis was undertaken before data correction and validation by querying the Warwickshire and Solihull HERs and manually transferring the data into an Excel spreadsheet. This was intended to form a benchmark against which the effects of the data correction and

[9] ie those held by NLAP Swindon, CUCAP and Warwickshire Museum, but not eg Aerofilms

validation could be compared in order to assess its effectiveness and to determine how best to focus activity in the available time. This analysis took the form of an assessment of the monument density per square kilometre across the county and further subdivided by district and study area. These were also broken down by period. The analysis was repeated after data validation and correction and the two analyses compared (see Section 5.2).

The period based assessments for the prehistoric and Romano-British periods were produced by Stuart Palmer. He was provided with period summary reports and maps from the HERs produced by the Project Manager and the Assistant HER Officer. For the remaining periods the HERs were queried directly by the Project Manager.

3.1.5 Archaeological Resource Assessment

Objective 2.2.5

An assessment of the existing archaeological resource in aggregate producing areas, summarising the known archaeology of each area on a period basis, and describing the character of the surrounding landscape, was produced in order to provide an overview of existing knowledge. This provided a baseline for the development of a research agenda, highlighting gaps in knowledge and, where possible, identifying threats to the archaeological resource other than aggregates extraction (see Section 0).

3.1.6 Research Agenda

This section relates to Objective 2.2.6.

Areas where further investigation could address some of the issues highlighted above were identified. Links to the emerging West Midlands Regional Research Framework for Archaeology (WMRRFA[10]) were also identified. The aim of the WMRRFA is to produce an archaeological research framework for the region that will provide a viable, realistic and effective academic basis for undertaking archaeological intervention, either as a result of development-related operations or to underpin future research designs. The framework was also linked to the Resource Assessment undertaken by the Shotton Project (Buteux, et al 2005) and to the work of the National Ice Age Network[11], which seeks to provide support for research into Pleistocene studies of England's sands and gravels (see Section 6 on page 113).

3.1.7 Management proposals

Objective 2.2.7

Risk management in the context of development and archaeology wa summarised. A series of case studies were compiled and assessed against the concepts of risk management and their outcomes. From these management proposals in respect of specific extraction zones, site-types, and geologies, in relation to the research framework previously identified were drawn up (see Section 7, below).

3.1.8 Dissemination

Objective 2.2.8

The recipients of this report will include English Heritage Historic Environment Enabling programme (HEEP) and their West Midlands Regional Office, the relevant Minerals Planning officers at WCC and Solihull MBC, representatives of the minerals industry and other interested parties. Wider dissemination of the results of the project will be achieved through the HER, the WCC website[12] and publicised by a leaflet/poster. Digital copies of the report and relevant archives will be deposited with the Archaeological Data Service.

[10] http://www.iaa.bham.ac.uk/research/fieldwork_research_themes/projects/wmrrfa/intro.htm

[11] http://www.iceage.org.uk

[12] http://www.warwickshire.gov.uk/Web/corporate/pages.nsf/Links/8D5B48D69F4E05D4802571940055981E

3.2 Appraisal of the Efficacy of the Methodology

Overall the methodology was felt to be effective and the comments received support this. The approach to the identification of the aggregates resource seemed efficient and produced maps that the county minerals planners and the museum curator of geology felt were realistic. The definition of aggregates study areas generally proved to be relatively straightforward though some decisions were by their nature somewhat arbitrary. It was felt that the use of these study areas allowed for a better structuring of the discussions that followed.

The work on the HER to correct and validate the data held was extremely useful but threw up more issues than it solved. It was however already fully appreciated that the nature of the HER meant that the data was of a highly variable quality and so this was not a surprise. It was obviously essential to prioritise the work to produce the best result within the time available and this focussed on those enhancements that would facilitate the collation of data, the production of period based reports upon which to base the assessment of the archaeological resource, and the case studies. Though valuable work was done, much work clearly remains to be done on the HER data, and probably will for the foreseeable future.

The resource assessment itself formed the core of the project and generally went smoothly. The quality of the prehistoric and Romano-British sections is clearly higher than the later sections. This was the result of their production by Stuart Palmer who is both a pre-historian and knows the county extremely well. The later sections suffered from being produced by someone less experienced, unfamiliar with the county and with a much larger quantity of data to get a grip on. The approach used by Worcestershire (Jackson & Dalwood), where each section was written by a period specialist with additional input to each section by other specialists such as finds or environmental, might have enhanced this aspect of the report.

The assessment of management issues, case studies and proposals were also an extremely useful exercise. The production of the case studies was time consuming and lead to considerable editing and refinement of the HER but this in itself was a valuable insight demonstrating the need for accurate recoding of intervention events and the results of each stage. They also demonstrated clearly the iterative nature of the work and led to several conclusions that might not have come to light otherwise. The value of the management recommendations will be proven over the next few years.

The real test of this document will be in its use. That will depend on its quality but also it dissemination to those who might find it of value. That lies in the future and hopefully will not be neglected.

4 Description of the Aggregates Resource

This section is intended to meet Objective 2.2.1.

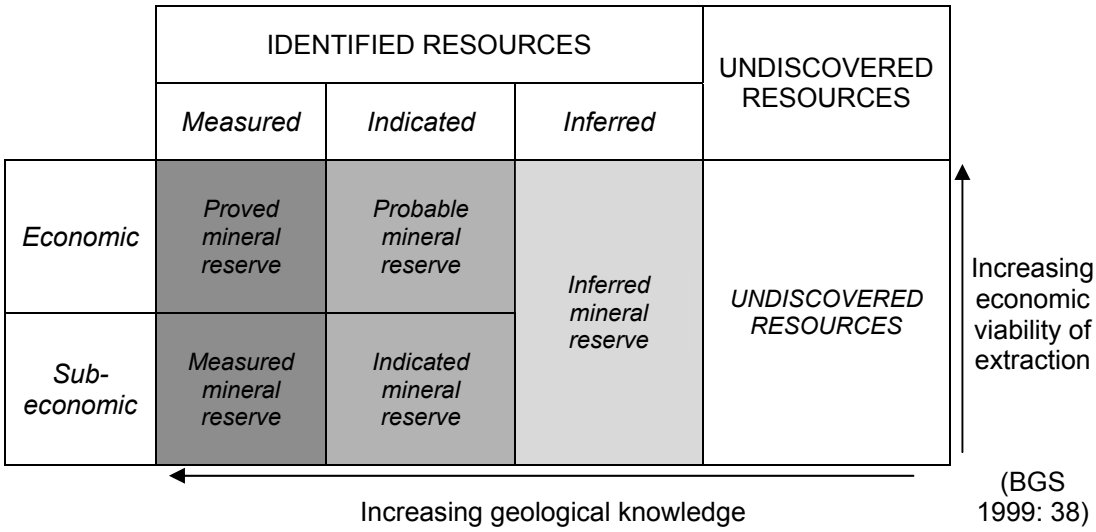
4.1 Geological Description

Aggregate minerals occur, and have been extracted, in many areas within Warwickshire and Solihull. The proximity of the West Midlands conurbation ensures that demand for these limited resources is high. They consist of two main types: (1) sands and gravels extracted from superficial Quaternary deposits and (2) bedrock deposits quarried and crushed to produce a range of products.

4.1.1 Minerals Resource Classification

The BGS has produced an assessment of the minerals resource within Warwickshire entitled 'Minerals Resource Information for Development Plans: Warwickshire: Resources and Constraints' (BGS 1999). This report pulls together information from a range of other reports including BGS Mineral Assessment Reports 107, 115, 125 and 142, Technical Report WA/89/29 and a report by Liverpool University (1988, 1989a-c). As such, the level of knowledge regarding the aggregate resource across the county varies. These varying levels of knowledge have been classified and are summarised in Table 1 below:

Table 1 – Mineral Resource Classifications



(BGS 1999: 38)

This project maps aggregates across the county, generally at the 'inferred' level where they can be identified from existing geological information but have not been evaluated or characterised. Consequently, little is known about their economic viability or suitability for any given application.

In areas covered by the reports identified above, the mineral resources may be definable at the 'indicated' level. In these cases, some form of systematic investigation has been undertaken and it is possible to make a preliminary assessment of the potential economic viability of the resource and the extent of any possible hidden resource, where aggregates are concealed by overburden.

Mineral resources cannot be classified as 'measured' until they have been fully evaluated. This typically happens as part of a planning application by a commercial extractor and is not usually in the public domain before submission of an application due to commercial sensitivity.

The Project Area defined in this study indicates an inferred mineral reserve. Since the county has not been fully covered by detailed Mineral Assessments, deposits shown within these reports as overlying concealed aggregates were included within the aggregates study areas (see below). Whilst this means that a consistent methodology was applied across the whole county and ensures that all concealed deposits were included, it also means that some areas that are extremely unlikely to ever produce viable aggregate have also been included. The larger sample size however, will increase confidence in the archaeological characterisation.

4.1.2 Hard rock

Two widely separated areas with very different geologies are significant.

Industrial Arden

Of primary importance are the Cambrian sandstones of Hartshill (the Hartshill Sandstone) and the associated igneous (Ordovician) intrusions which have in the past been an important source of high quality crushed hard rock aggregate for roadstone and are still worked in large deep quarries in the area between Mancetter and Bedworth, in North Warwickshire.

These very old rocks form the ridge that runs north north-west beneath Bedworth, Griff and Nuneaton before curving north-west beneath Hartshill and Oldbury. Geologically, the ridge is termed the Nuneaton Inlier. The oldest rocks make up the Precambrian Caldecote Volcanic Formation which has been dated to c 603 million years ago (McIlroy et al, 1998) and has been exploited at Judkins Quarry. Unconformably overlying these are a series of Cambrian rocks including the Hartshill Sandstone Formation and the Purley Shale Formation, which both outcrop at the surface in the Nuneaton area. The Ordovician (410-445 mya) intrusions are of primary interest to the aggregates industry together with the thermally altered sedimentary rocks immediately surrounding them. The Carboniferous rocks that include the Coal Measures were laid down over these rocks. During the Hercynian Orogeny (c 390 - c 310mya), the rocks that now constitute the Nuneaton Inlier were folded to produce the very steeply dipping strata that can be seen at the surface today and which can be visualised as the rim of a buried bowl sloping down and in towards the south-west. After this period of folding, Triassic sedimentary rocks were deposited across much of the region.

Figure 1 - Judkins Quarry, Nuneaton

Cotswold Fringe

The Banbury Ironstone Field extends from Oxfordshire into Warwickshire along the county's southern border. The ironstone is the Lower Jurassic Marlstone Rock Formation laid down approximately 190 million years ago. It consists of ferruginous limestone that has been enriched by secondary oxidation and is up to around 10 m thick. It generally occurred under little or no overburden and was extensively quarried for ore in northern Oxfordshire, mainly for steelmaking in South Wales, until 1967. Quarrying as a source of ore in Warwickshire was limited to short-lived

ventures on the Burton Dassett Hills. In Warwickshire, the marlstone is best known as a source of building and ornamental stone – 'the 'Hornton Stone'. Aggregate was always a by-product that has been used in less rigorous applications such as drainage and capping layers and as Type 1 sub-base. Deposits are variable and suitability for particular applications would need to be determined on a site-by-site basis (BGS 1999).

Figure 2 - Disused Ironstone Quarry on the Burton Dassett Hills

4.1.3 Superficial (Quaternary) Deposits of Sand and Gravel

The Quaternary is the most recent geological period dating from about 2.5 million years ago to the present (BGS 2005). It has been divided into two epochs, the Pleistocene, which covers the whole of the period up until about 10,000 years ago, and the Holocene. Fluctuating temperatures dominated the Pleistocene leading to a series of long, cold glacial periods or Ice Ages with shorter, warmer inter-glacials between them. The Holocene represents the period since the last glacial.

The aggregates-producing deposits were laid down during the Pleistocene and can be divided into river terrace and glacial deposits. The former can be seen along the terraces of the Avon and Tame and their tributaries, the latter includes deposits such as those in the Wolston area, the Dunsmore Plateau, and the Meriden Sands in Solihull.

4.1.3.1 River Sands and Gravels

River gravels tend to be well sorted with lower amounts of intercalated silt and clay than glacial deposits. River gravels therefore usually produce more economically viable deposits, than glacial deposits that are closer to user specifications (BGS 1999: 19).

River terrace deposits are thought to have been deposited in braided river regimes. Some are associated with channel fills from which much archaeological and palaeontological evidence has been recovered (Buteux et al, 2005: 20). During warm phases, the river channels were eroded downwards leaving terrace deposits at their sides. Higher river terraces are thus older than lower ones (Dr J Radley, pers comm). The river terraces can be dated from organic material they contain.

Sands and gravels occur beneath the alluvium along the floors of the major valleys as well as comprising the terrace deposits flanking the valley sides. In Warwickshire, they are mainly associated with the Rivers Avon and Tame and their tributaries. Five terraces have been identified on the Warwickshire Avon, of which the second and third are important as aggregates resources, and two on the River Tame (BGS 1999: 21).

Around Coventry and Warwick, terrace-like spreads of sand and gravel have been mapped as glacial sands and gravels (such as the Hillmorton Sands and Gravels near Rugby and the Baginton Sands and Gravels between Warwick and Coventry); however it seems likely that these older Quaternary deposits were deposited by fluvial activity within an older river network draining the pre-glacial land surface (BGS 1999: 20). These older Quaternary deposits are important for understanding Middle Pleistocene events in the Midlands (eg Keen 1999); they also incorporate some of the oldest human artefacts found in the UK including handaxes from quarrying at Waverley Wood and Wood Farm, Bubbenhall (Shotton *et al* 1993; Lang & Keen 2005). Although some areas of the Hillmorton Sands and Gravels have been worked out, the Baginton Sands and Gravels still represent a significant aggregates resource.

Figure 3 - Marsh Farm Quarry, Lower Avon

4.1.3.2 Glacial Sands and Gravels

In contrast to fluvial deposits, glacial deposits were laid down by a wide variety of processes and are more variable and less predictable in their extent, and typically have a greater proportion of clays and silts that require processing to remove (BGS 1999: 19). As a result they are less likely to be economically viable although evolving market conditions may well alter this.

The most severe glacial episode identified during the British Pleistocene is known as the Anglian, which has been dated to between 478,000 and 423,000 years ago. During this time, much or all of Warwickshire was covered by an ice sheet. During the last glacial episode, the Devensian, dated to between 110,000 years ago and 12,000 years ago Warwickshire does not appear to have been ice-covered though it undoubtedly suffered periglacial conditions. Between these two glacial episodes there were several other cold phases but details are poorly known.

The Anglian glaciation is significant in that, for the Midlands at least, it marks a discontinuity between a pre-Anglian topography, and the origins of the modern topography. The pre-Anglian

topography of Warwickshire was dominated by the valley of the 'River Bytham' which ran from Worcestershire across Warwickshire and on into Leicestershire on a similar alignment to the modern Avon though flowing in the opposite direction towards the North Sea. It appears to have drained a large part of the Midlands and it is thought that this river system may have some surviving terraces (Bateman and Rose, 1994: 33). During the Anglian glaciation, a large part of the geological sequence associated with this drainage system was obliterated and the broad pattern of drainage seen today established.

Glacial deposits typically form sheet-like layers commonly 3-4m thick, mainly derived from the erosion of local rocks. They typically blanket the underlying bedrock forming rolling plateau areas and remain in the watershed areas within the county where they have not been eroded by the river systems. These form two main areas, the Central Arden between the Arrow/Alne and Blythe/Tame river systems and the High Cross and Dunsmore plateau between the Avon and the Anker. These deposits are variable in lithology and thickness but may represent valuable aggregate resources, for example in the areas around Coleshill and Meriden where there are working quarries.

4.2 Overview of Past and Present Extraction

See Figure 12 – Study Areas on page 241

4.2.1 Bedrock Aggregate Areas

Industrial Arden

This area in the north of the County consists of a narrow band of Cambrian sandstone (intruded by Ordovician igneous rocks) forming an upstanding ridge running SSE to NNW under Nuneaton and Atherstone. There is also a small outcrop some way to the west on the edge of the Blythe/tame study area and close to the county boundary.

This area is broadly equivalent to the 'Industrial Arden' identified in the Warwickshire Landscape Guidelines (WLG, see below) though more narrowly defined. In this document, it is described as "a rather variable, often run-down urban fringe landscape characterised by mining settlements, spoil heaps and pockets of farmland" (WLG map).

There are a few areas where potential superficial aggregate overlie these bedrocks. In such cases, the superficial deposits were given priority, since if they were viable it seemed likely that they would be exploited before any underlying bedrock. Consequently, they were assigned to the appropriate superficial study area.

The resource consists of igneous Ordovician rocks intruded into Cambrian sandstones and shales, used for the production of crushed rock aggregates (principally for good quality road stone).

Large-scale quarrying dates back to the first half of the 19th century (at least as far as 1840). The Cambrian sandstones dip steeply, are well-jointed and easy to quarry. In some areas, the sandstone beds were too brittle and in others there were beds of poor quality material that together resulted in quite a high percentage of waste, which was dumped in great spoil heaps reminiscent of those that characterise coal mining areas. The Ordovician igneous rock is harder and sometimes has required blasting. It was extensively used for paving sets and kerbstones across the midlands during the 19th century. The products of extraction were initially transported mainly via the Coventry Canal with wharves at Anchor Inn (335947) and Boon's Wharf (347933). Later the railways came to take the load with spurs taken from the main lines to serve the individual quarries (Millward & Robinson, 1971: 136-7).

The resource is currently exploited by Griff IV, and Mancetter quarries. Jee's and Boon's quarries (Hartshill) are dormant.

Cotswold Fringe

This area in the south of the County equates to an outcrop of Lower-Middle Jurassic strata, running from Priors Marston along the south-eastern edge of the county to its very southern tip and on the hills west and northwest of Ilmington.

This area forms the edge of the Cotswold Plateau described in the WLG as "a sparsely populated region of limestone and ironstone uplands, characterised by open wolds, large walled fields and distinctive stone villages" (WLG map).

This area has extensive historic quarry workings that primarily worked ironstone (Marlstone Rock Formation) for building and consequently, some at least, are likely to go back to the medieval period. In the post-war period, there has been very limited production of aggregates and production was always as a by-product of the building stone industry and has virtually ceased, Edge Hill is the only site with any current aggregate production and even this may have fully ceased by the time this report is published

4.2.2 Superficial Aggregate Areas (Sands and Gravels)

Central Arden

This study area in the western part of the County forms the watershed between the Rivers Alne to the south and Blythe to the north. A substantial proportion is within the Coventry/Solihull green belt though it extends south, to the edge of the Avon Valley.

Overall the landscape is rolling, relatively high with enclosed fields and well wooded either as woodland or with well-developed hedgerows and other tree belts. It consists of the 'Arden Pastures' as defined in the WLG and described as "a small scale, enclosed landscape, often pervaded by suburban influences and characterised by small fields, typically bordered by mature hedgerow trees" (WLG map). It also incorporates part of the 'Ancient Arden' described as "a small scale farmed landscape with a varied, undulating topography, characterised by an irregular pattern of fields and narrow winding lanes" (WLG map) together with areas of 'Arden Parkland' - "an enclosed, gently rolling landscape defined by woodland edges, parklands and belts of trees".

The boundaries to the north and south both suffer from the inter-digitation described above. The boundary to the south is reasonably distinct with isolated areas of river terrace gravels easily assigned to the Arrow/Alne area (below) though some areas of overlap had to be edited manually. The northern boundary was less easily defined as river deposits formed isolated patches a long way up the Blythe valley and areas of glacial deposits extend out into the more open areas of 'Arden Parkland' that form part of the Blythe/Tame study area (below). Field inspection showed that though the isolated pockets of river terrace deposits clearly formed flat areas, these sat within the rolling landscape typical of this study area as a whole and it would not make sense to assign them to a different study area. Topographically the allocated areas within the Solihull UDP formed a discrete block. The northern part of this block is generally level and of an open character in keeping with the Blythe/Tame study area, the southern part was higher and more rolling like the rest of Central Arden. It is not possible to draw any distinction between these two areas on geological grounds and the topographic distinction was unclear. It was therefore decided on pragmatic grounds to include the whole of the Solihull UDP discussion area within a single study area and as the currently exploited areas were in the Blythe/Tame study area rather than Central Arden the former was chosen. It is appreciated however, that the boundary in this area, around the north end of Balsall Common, does not reflect the topography or the geology.

The resource consists primarily of fluvioglacial deposits. The majority of this study area has been assessed in detail in BGS Mineral Assessment Report 142 (Cannell & Crofts 1984). This revealed substantial areas of hidden sands and gravels beneath clay/silt overburden.

Past exploitation of the aggregates resource has been on a small scale. There were sand and gravel quarries at Cuttlepool Lane, Pinley Green Sandpit, Claverdon and Snitterfield and several borrow pits associated with the construction of the M40 motorway (BGS 1999: accompanying map). All are now disused and there are no currently active sites.

Blythe/Tame

This area in the north-west of the county is principally river valleys. It covers much of Solihull extending north from an extensive area of glacial deposits (Central Arden above) towards Tamworth. The southern boundary was difficult to identify but was drawn to pick up all the fluvial deposits where the Blythe valley runs up into Central Arden.

The southern end of this study area consists of 'Arden River Valleys' (WLG classification) that are described as "narrow meandering river corridors with riverside trees and grazing meadows" (WLG map). Heading north the landscape opens out somewhat to encompass the 'River Valley Wetlands' (WLG) described as "a highly modified rather degraded river valley landscape strongly

influenced by sand and gravel extraction and other industrial activities" (WLG map) and to a limited extent areas of the surrounding 'Arden Parkland' described above.

Apart from the southern boundary discussed above, the definition of the rest of this study area was straightforward.

This area has been extensively exploited for sands and gravels principally focussed on river terrace deposits in the north but including glaciofluvial deposits in the south of the area. The old workings have generally been reinstated and are now used for leisure and nature conservation (eg Kingsbury Water Park which was exploited in the post-WWII period).

There are currently active sites at Meriden, Coleshill, Denton, and Middleton Hall.

Eastern Arden

This area to the immediate west and north of Coventry includes restricted areas between Nuneaton, Bedworth and Coventry. It is a watershed area similar in character to Central Arden above; however there are very small areas of glacial deposits, no known history of extraction or active sites and it is very unlikely to be exploited. It is not therefore a primary focus for this study.

Anker

This river valley in the far north of the County has been described as "a rolling agricultural region characterised by small rural villages" (WLG map). It really forms part of the larger Mease Lowlands that extend westward from Leicestershire.

To the south, the Anker has its origins in the High Cross Plateau area of glacial deposits. The boundary here is somewhat arbitrary but has been taken to follow the Ashby de la Zouch Canal, which follows the contours around the head of the valley, forming a clear feature in the landscape, and running approximately where WLG draws a distinction between these two landscape areas.

The aggregate resources are predominantly river terrace deposits though small areas of glacial deposits are common. There is no known history of aggregates extraction in this area and no active sites.

High Cross Plateau

This study area in the east of the County forms a rough triangle between north-east Coventry, Rugby and Nuneaton. It is a plateau area forming part of the watershed between the Avon and the Anker and is "a sparsely populated agricultural region distinguished by wide rolling ridges and valleys and a strong rural character" (WLG map).

The northern border is defined by the Ashby de la Zouch Canal and the suburbs of Coventry and Nuneaton and the southern boundary has been taken to be the Oxford Canal. To the east of Rugby, the boundary is based on the border between the glacial deposits to the north and the river terrace deposits of the Upper Avon to the south.

There has been relatively little previous exploitation of the resource in this area. Past workings have been identified at Comeback and Newton (BGS 1999: accompanying map).

There is a currently active site at High Cross (Copston Lane).

Dunsmore and Upper Avon

This study area in the eastern central part of the county forms a triangular area between Coventry, Rugby and Warwick/Leamington Spa. It is a topographically diverse area including the river valleys of the Upper Avon and the Leam and the higher plateau between them. It is described in the WLG as "an intensively farmed, and in places urbanised, region, with a varied rolling, dissected topography characterised by low glacial plateaux and incised meandering river valleys" (WLG map).

The boundary runs around Kenilworth, Coventry and along the Oxford Canal as described above. The southern boundary is drawn through Warwick/Leamington as a convenient division between the upper and lower Warwickshire Avon. To the east of this point the area includes the fluvial deposits associated with the Leam but not the minor glacial deposits (included in Feldon below).

The valleys of the Avon and the Leam contain extensive areas of river terrace deposits, particularly in the south towards Warwick/Leamington, and the Dunsmore plateau area consists of glacial deposits. The central area has been assessed in detail in BGS Mineral Assessment

Report 125 (Crofts 1982), which identifies some areas of hidden resource (though not as extensive as those in the Central Arden).

The known history of extraction goes back to the 1950s but has expanded significantly in recent decades. There are currently active sites at Brinklow, Bubbenhall and Ling Hall. Two of these sites had extensions allocated in the 1995 local plan (as did Bubbenhall though this did not get beyond the draft plan) as well as areas at Dunchurch, Kites Hardwick and Wolfhampcote (WCC 1995).

Feldon

This area in the south-east of the county is "a lowland agricultural region strongly influenced by Tudor and Parliamentary enclosures and characterised by heavy clay soils and a nucleated pattern of small rural villages" (WLG map). It contains occasional small areas of possible economically viable glacial deposits though the quality is unknown. The resource is likely to be more restricted than the mapping indicates. The majority of this study area consists of silt/clay overburden that elsewhere (eg Central Arden) conceals significant aggregate deposits. This is unlikely to be the case here however as there are only a few small pockets of known aggregate resource which suggests that any hidden deposits will be similarly restricted.

Whilst there has been extensive quarrying in this area it has generally been on the outcrop of the Blue Lias Formation as a source of materials for the Rugby Cement Industry, and has produced very few aggregates. There are no currently active aggregates sites and this area is highly unlikely to be developed.

Stour

This study area in the south of the county is a well-defined river valley that extends north from the Cotswold Edge (above). The southern part lies within the 'Cotswold' WLG region whilst the majority, to the north of Burmington, forms part of 'Feldon' in the WLG both described above.

In general, the definition of this study area was straightforward as the aggregate consists of well-defined river terrace deposits with only a few patches of glacial material. Where the Stour valley meets the Avon valley, at the northern end of the study area, the distinction between the two areas is less clear-cut. The river terrace deposits form a small spur of hills running north just to the west of the river itself. Therefore, whilst the majority of this study area follows the Stour valley, at its northern end, it includes this spur of hills rather than the more open Lower Avon.

The resource consists of river terrace deposits of unknown quality with a few small patches of glacial material. At the northern end of the study area these river terrace deposits form a small spur of hills running north into the Avon Valley just to the west of the river itself.

Gravels were previously exploited around Stretton on Fosse though apparently not since the 1950s. There are no currently active extraction sites.

Lower Avon

This study area in the south-west of the county consists of "a prosperous agricultural and market gardening region closely associated with the River Avon and characterised by historic market towns, nucleated villages and orchards" (WLG map). Topographically it is level and open in contrast to the surrounding areas that are more rolling with more incised river valleys.

The resource consists of extensive areas of river terrace sands and gravels. These have been exploited in the past at Alderham Farm (Barford), Charlecote (Wasperton) and Abbots Salford (BGS 1999: accompanying map) but there is only one currently active site in this area at Marsh Farm near Bidford.

Alne and Arrow

This area in the south-west of the county lies north of Lower Avon and south of Central Arden. It consists predominantly of narrow 'Arden River Valleys' (see Blythe/Tame above) running through 'Wooded Estatelands' that were described as "a well wooded estate landscape characterised by large scale rolling topography and prominent hilltop woodlands" (WLG map).

The resource consists primarily of fluvial deposits. Those along the Alne, to the north-east of Alcester, have been assessed in detail in BGS Mineral Assessment Report 142 (Cannell & Crofts 1984) though given that the resource consists of river terrace deposits it is unsurprising that this

did not reveal any hidden resources. No previous extraction sites are known and there are no active sites.

4.3 Implications for Future Extraction

The Warwickshire Mineral Development Framework: Core Strategy is currently in its final consultation stage (WCC 2007). The overall strategy to be adopted within this document is summarized as seeking to:

> "Focus aggregate production in close proximity to the principal road and infrastructure networks to limit the impacts from the movement of bulk materials especially on rural communities. Development will be particularly encouraged to make use of existing railheads and canals where practicable.
> "Encourage the extension of all mineral workings where environmentally acceptable; these commonly have less environmental impacts than new operations. Extensions may also maximise the efficient use of the counties mineral wealth by avoiding sterilisation of reserves. In terms of sustainability this approach is preferable to developing new sites" (WCC 2007, 37).

This clearly indicates that the areas most likely to be developed will be close to existing quarries and the existing road network. They will also be near to areas of development which, as well as areas within the limits of the County such as Coventry and Rugby, will include areas outside the county such as Daventry (Northants) and Redditch (Worcestershire).

4.3.1 Bedrock Aggregate Areas

Industrial Arden

Though no preferred areas for bedrock were identified in the 1995 Minerals Local Plan, the quality of the product suggests that extraction will continue. Jee's and Boon's (Hartshill) quarries are currently dormant but likely to be reactivated in the medium term and permission exists at Griff V that is likely to be taken up in the short to medium term (Jim Davies, WCC, pers comm).

Cotswold Fringe

These sites are mainly in the Cotswold AONB and not close to centres of development or the 'A' road. The resource is also of low quality and so aggregate production in this area, other than as a by-product from building stone, is highly unlikely.

4.3.2 Superficial Aggregate Areas (Sand and Gravels)

Central Arden

Future extraction is possible though not likely. There is a known resource that has been previously exploited but this was always small scale and much of the area is green belt. Also, despite its proximity to areas of development, the transport network is not generally suitable for Heavy Good Vehicles.

Blythe/Tame

An extension to Middleton Hall was allocated in the 1995 Minerals Local Plan, as were areas at Bodymoor Heath and Lea Marston. Two areas plus an extensive minerals consultation area have been allocated in the 2006 Solihull Unitary Development Plan (SMBC 2006). However, Coleshill, in the centre of the study area, is reaching the end of its viable life. Overall, it is clear that this area is likely to be a focus for continuing future extraction. There are current workings, the availability of a high quality resource in much of the area, the proximity of development areas and good transport links. In addition to these factors, Solihull Metropolitan Borough Council is required to produce a certain amount of aggregates and has limited options as to where that exploitation can take place.

Anker

The likely extent of future extraction in this area is unknown. The 1993 Draft Minerals Local Plan identified an area near Polesworth as an area of search but this was not included in the final plan. The A5 runs through the study area and the adjacent Industrial Arden already has active quarries with the consequent levels of HGV activity so it seems that the area has potential for exploitation.

High Cross Plateau

It seems highly likely that extraction will expand in the future. There is an active quarry at High Cross and access to the road network is good. A preferred area was identified in the Minerals Local Plan (WCC 1995) in the south of the study area at Cosford and an area of search at Stretton Baskerville to the north. Other areas were identified in the draft plan at Wolvey Heath and Shelford. This area is also close to Coventry, Rugby and Daventry over the County border, all likely to be the focus for development in the future.

Dunsmore and Upper Avon

Extraction is highly likely to continue in this area. There are active sites at Bubbenhall, Brinklow and Ling Hall. The latter two quarries had extensions allocated in the 1995 local plan (as did Bubbenhall though this did not get beyond the draft) and there are other areas at Dunchurch, Kites Hardwick and Wolfhampcote. There are good transport links and the area is close to likely areas of development.

Feldon

This area is very unlikely to be developed (other than 'borrow pits' for local use) as it has a limited resource and poor transport links.

Stour

This area is unlikely to be developed (other than 'borrow pits'). It probably has a reasonable resource (cite the source of this information) but it is not close to likely development areas and transport links are poor.

Lower Avon

There are several allocated sites at South-west Warwick, Greys Mallory, Hampton Lucy, Hunscote, Alveston Pastures, Alveston Hill, Atherston Airfield, Bidford-on-Avon and Abbot's Salford (plus one area at Thelsford Brook that never went beyond draft) though applications for extraction at South-west Warwick and Bidford-on-Avon have been refused. The likely nature of future extraction is unclear. Extraction is likely to continue in the short to medium term but whether it will increase or not and the long-term future is harder to predict. The quality of the resource, the extent of allocated areas and the proximity to markets suggest an increase but in many parts transport links are poor and recent decisions not to grant applications suggest otherwise. The most likely areas for extraction to continue would appear to be around Marsh Farm Quarry in the west of the study area where the A46 provides access to Redditch and Birmingham and the Wasperton area where the Barford By-pass will allow access to the M40.

Alne/Arrow

There are no allocated sites in this study area and future extraction seems generally unlikely. Some quarrying is possible however, in the area south of Alcester and adjacent to Lower Avon where there is a currently active quarry and transport links are better.

4.3.3 Summary

The above discussion is summarised in Table 2 below.

Table 2 – Summary of Future Extraction

District	*Short - Medium Term Future*	*Longer Term Future*
Alne/Arrow	Generally unlikely	Generally unlikely
Anker	Possible	Possible
Blythe/Tame	Continuing	Highly likely
Central Arden	Unlikely	Uncertain
Cotswold Fringe	Possible (as by-product)	Possible (as by-product)
Dunsmore/Upper Avon	Continuing	Highly likely
Feldon	Highly unlikely	Highly unlikely
High Cross Plateau	Continuing	Likely
Industrial Arden	Continuing	Highly likely
Lower Avon	Continuing	Likely in certain areas
Stour	Unlikely	Unlikely

5 Description of the Archaeological Resource

This section meets Objective 2.2.5.

5.1 Introduction

5.1.1 The Historic Environment Record

The Historic Environment Record (HER) has evolved in the depth and breadth of content and in the sophistication of management systems over the last 30 years. The HER now holds diverse information about the archaeological landscape and related data about finds, sources and recording events. During this 30 year period expectations of the record in its use as a development control tool, an information resource for the public and its use in academic research has increased enormously. However, use of HER data, especially for academic research, has limitations of which researchers and others should be aware.

Earlier forms of the HER (known as the Sites and Monuments Record or SMR), had minimal terminology control; the emphasis was on "archaeological sites" as discrete entities with little acknowledgment of the landscape within which they existed, and objects/finds were not individually recorded in detail. Appropriate recording within the HER (then SMR) of archaeological fieldwork did not begin until the early to mid 1990's when developer funded archaeology became fully embedded in the management system.

HERs have responded to the increased use of their resources and advances in computing (networks, hardware and applications) have facilitated this process. However, HERs have not had the resources to reconfigure records compiled according to older, more simplistic management systems. The result of this is variable level of detail and validity across the HER.

Within the context of this resource assessment the HER provides the best and most comprehensive body of data by which to compile archaeological summaries and mitigation strategies for the aggregates areas of Warwickshire and Solihull but the reader should make themselves aware of the limitations outlined above.

The period date ranges used within the HER are conventional and reflect the way in which databases operate. For example, the early medieval period is shown as ending in AD 1065 rather than 1066 as overlapping dates do not allow for simple period–based searches. The dates given in section headings are slightly different, as they do not use these conventional dates.

The conventional dates used for the main archaeological periods used here are:

- Palaeolithic (500,000 BC –10,001 BC),
- Mesolithic (10,000 BC – 4001 BC),
- Neolithic (4000 BC - 2201 BC),
- Bronze Age (2600 BC - 601 BC),
- Iron Age (800 BC – AD 42),
- Romano-British (AD 43 – 409),
- Migration (AD 410 - 800),
- Early medieval (AD 801 – 1065),
- medieval (AD 1066 – 1539),
- post-medieval (AD 1540 – AD 1750),
- Imperial (AD 1751 - 1913), Modern (AD 1914 +).

5.1.2 Overview of Fieldwork within the Project Area

The introduction of PPG16 in 1990 has led to a change in the nature of the vast majority archaeological work. Many more projects have been undertaken but these have generally been small with fewer opportunities for large-scale excavations and many projects have found nothing of significance. Also, they have not usually taken place within an academic framework and opportunities for site/settlement/area syntheses have been few. With a wider range of contractors the onus has been on Planning/County Archaeologists to encourage consistent approaches and national and professional bodies such as EH or IFA to set standards, support the development of

research frameworks, regional artefact type series and so on and allow for reasonably regular synthetic studies.

Since 1990 most fieldwork has been associated with development, mainly urban or residential, but also including road schemes, pipelines and aggregate extraction. This has meant that fieldwork has been geographically biased towards these areas, principally along the main river valleys where settlement is concentrated, particularly in a band extending south-west from Rugby, through Warwick and Leamington and on to Stratford and Bidford. Areas that have had little fieldwork are more rural in character and include the eastern part of North Warwickshire district, much of High Cross Plateau and much of east and south Feldon. This geographical bias has lead to a similar bias in archaeological data and any discussion of archaeological distributions needs to be conducted with this in mind

5.1.3 Individual Finds

Across Warwickshire, a large number of un-associated items have been recovered from unstratified contexts or found in the plough soil over the years. Many such finds are recorded within the HER as find spots. The rate of recovery of such items has increased over the last few decades with the rise of metal-detecting however, and in response to this the Portable Antiquities Scheme (PAS) was set up to improve recording levels. This information is collated nationally and is available for HERs to download from the scheme's web site. Up-to-date information is held as a GIS layer within Warwickshire's HER but has not yet been integrated with existing data. Individual find spots are considerably more susceptible to distortion by discovery activity than monuments. Without a matching distribution of activity, including places where items were *not* found, it is difficult to draw conclusions regarding the significance of any patterns.

5.2 Countywide Monument Densities

Countywide statistics were compiled from the HERs for Warwickshire and Solihull. These took the form of a table of monument density per square kilometre for the County as a whole and broken down by period/district. These figures were initially calculated in mid-2006 and again at the end of the project in mid-January 2007 to get an indication of the effect of data cleaning and validation.

The figures need to be treated with some caution as they simply show the number of monuments as recorded in the HERs, which do not necessarily relate directly to archaeological sites as more generally understood. Monuments as defined within HERs include standing buildings and individual find spots as well as more typical archaeological sites. In addition, there is not a one-to-one relationship between monuments within the HER and monuments in the field. A single HER entry can consist of several sites where it is difficult to separate them, whilst a single site in the field can consist of several entries where separate elements have been entered separately. The former case is more likely with prehistoric features, which may only be identified by aerial photography, for example, and the latter more likely in later periods where more information is available.

5.2.1 Districts

The number of monuments in each local authority district (mid-January 2007) broken down by period is reproduced in Table 3.

The figures are derived from direct queries of the HERs in order to obtain the number of monuments in each period/district. At the bottom of the table is a measure of the degree to which monuments appear in more than one period; the 'overlap'. This was calculated by totalling the number of monuments of each period and dividing the result by the number of monuments for the full period range as obtained directly from the HER. In order to standardise the values the number obtained above had one subtracted from it and was divided by the number of periods less one, eg:

$$\frac{(\text{sum (periods)}/\text{no. monuments (full period range)}) - 1}{\text{number of periods} - 1}$$

This produces a range of values from zero (no overlap) to one (complete overlap). Since any monument can continue in use for a long period some overlap is to be expected. It is clear however that the overlap is considerably higher in the prehistoric and Romano-British periods than it is in the historic periods, Solihull being significantly higher than any other district. This results from the increasing chronological uncertainty inevitable with increasing remove from the present

day. There are two aspects to this however; direct dating uncertainty, and the impact this has had on the way monuments are assigned dates within the HERs. In this case the current HER policy is to date prehistoric sites broadly unless there is negative evidence but to date historic sites more narrowly unless there is positive evidence for a broader date range. The effect of this is particularly noticeable at the end of the Romano-British period and at the beginning of the medieval period, which creates a clearer distinction between the periods concerned than is generally the case in earlier periods.

Table 3 - Raw figures, Monuments by District

Period	County	Solihull	North Warks	Nuneaton & Bedworth	Rugby	Warwick	Stratford
Palaeolithic	190	25	18	8	41	43	56
Mesolithic	319	27	51	7	57	78	98
Neolithic	797	87	96	18	150	179	267
Bronze Age	1034	97	114	22	190	226	384
Iron Age	885	97	96	15	160	178	338
Romano-British	1268	82	135	17	129	189	721
Total PH+RB	2366	131	289	43	346	451	1113
Migration	232	61	11	2	20	30	114
Early medieval	240	76	10	0	13	19	126
medieval	3522	690	380	105	427	569	1322
post-medieval	2658	575	281	44	302	467	958
Imperial	3722	494	512	247	673	639	1117
Modern	815	116	53	28	139	160	260
Total Historic	7961	1230	957	361	1169	1351	2846
Unknown/undated	962	66	84	15	210	156	430
Total	11312	1361	1340	421	1729	1949	4487
Area (km^2)	2149.44	177.75	283.41	78.72	352.5	282.05	975.01
Degree of overlap between periods: 0 is no overlap, 1 is total overlap							
Prehistoric & RB	0.18	0.43	0.15	0.20	0.22	0.20	0.13
Historic	0.08	0.13	0.06	0.04	0.07	0.08	0.07
Overall	0.04	0.07	0.03	0.02	0.03	0.04	0.03

The raw numbers of monuments were converted to monument densities per km^2 to allow comparisons to be made between districts of differing sizes and are reproduced in Table 4.

The overall monument density across the county was 5.26 per km^2. Solihull Metropolitan Borough (MB) and Warwick District were denser than this, Nuneaton & Bedworth and Rugby Districts were close to this value and North Warwickshire and Stratford District were less dense. It is likely that this distribution of monuments, at least in part, reflected the overall pattern of modern development and related archaeological discoveries and investigations across the County. Distribution patterns created by past human activity will have been distorted by this overall distribution of sites, particularly so for earlier periods when the number of sites was low. Therefore, for each period, the distribution pattern for that period must be compared with the overall distribution pattern to assess the extent to which the pattern within a period is likely to reflect modern activity or past activity. For example, in Solihull MBC the overall monument density was high as was the density in every period apart from the Mesolithic which was the same as the overall County value, and the Romano-British period, which was low. The relatively low density for the Mesolithic and Romano-British periods are therefore likely to be significant, particularly that for the Romano-British period.

When the County figure is broken down by period the Palaeolithic, not surprisingly, has the lowest monument density though at the district level Nuneaton & Bedworth has a higher density of Palaeolithic than Mesolithic monuments and in Rugby they are the same. Monument density then increases through time to the Bronze Age, a pattern seen in all the districts. It then drops slightly in the Iron Age (though in Solihull monument density is the same in these two periods) before rising again in the Romano-British period. At the district level, the Solihull and Rugby have lower figures in the Romano-British period than the Iron Age however. After this, there is a large drop in the number of monuments in the Migration and early medieval periods followed by an even larger

rise in the medieval period also seen across all districts. The post-medieval period has a lower density of monuments than the medieval period but the following imperial period is again higher, the exception again being Solihull. Monument density drops significantly in the modern period.

County wide, 0.45 monuments per km^2 are of an unknown date with high densities in Rugby and Warwick and low densities in Solihull, North Warwickshire and Nuneaton & Bedworth.

Table 4 - Monument Density (per km^2) by District

Period	County	Solihull	N Warks	N & B	Rugby	Warwick	Stratford
Palaeolithic	0.09	**0.14**	*0.06*	**0.10**	**0.12**	**0.15**	*0.06*
Mesolithic	0.15	0.15	**0.18**	*0.09*	0.16	**0.28**	*0.10*
Neolithic	0.37	**0.49**	0.34	*0.23*	**0.43**	**0.63**	*0.27*
Bronze Age	0.48	**0.55**	*0.40*	*0.28*	**0.54**	**0.80**	*0.39*
Iron Age	0.41	**0.55**	*0.34*	*0.19*	**0.45**	**0.63**	*0.35*
Romano-British	0.59	*0.46*	*0.48*	*0.22*	*0.37*	**0.67**	**0.74**
Prehistoric	1.10	*0.74*	1.02	*0.55*	*0.98*	**1.60**	1.14
Migration	0.11	**0.34**	*0.04*	*0.03*	*0.06*	0.11	0.12
Early medieval	0.11	**0.43**	*0.04*	*0.00*	*0.04*	*0.07*	**0.13**
Medieval	1.64	**3.88**	*1.34*	*1.33*	*1.21*	**2.02**	*1.36*
Post-Medieval	1.24	**3.23**	*0.99*	*0.56*	*0.86*	**1.66**	*0.98*
Imperial	1.73	**2.78**	1.81	**3.14**	**1.91**	**2.27**	*1.15*
Modern	0.38	**0.65**	*0.19*	0.36	0.39	**0.57**	*0.27*
Historic	3.70	**6.92**	3.38	**4.59**	*3.32*	**4.79**	*2.92*
Unknown	0.45	*0.37*	*0.30*	*0.19*	**0.60**	**0.55**	0.44
Total	5.26	**7.66**	*4.73*	5.35	4.90	**6.91**	*4.60*

High density values are bold (more than 10% above the overall county density)

Low density values are italic (more than 10% below the overall county density)

5.2.1.1 Solihull

Solihull HER is a separate database from the rest of Warwickshire and has a different history of development; consequently, it shows many differences to the other districts. Overall it has a high density of monuments and it shows a high density for all periods other than the Mesolithic and the Romano-British periods, as noted above. This is particularly significant from the medieval period onwards resulting in an overall monument density from the post-Romano-British period onwards being almost double that of the County as a whole.

A significant part of the explanation for these figures is that many records within the Solihull HER are poorly dated and thus appear in several periods severely distorting the figures. The figure for the overlap between the prehistoric and Romano-British periods in Solihull is very high; almost three times the overall value for the other districts (0.43 as compared to 0.16, see Table 3). For the historic period the values are lower but the figure for Solihull is still almost twice that for the rest of the County (0.13 compared to 0.07). Overall, the period overlap for Solihull is over twice that for the County (0.07 compared to 0.03) and it is clear that more work needs to be done on the dating of HER entries within Solihull. This should probably focus on making distinctions between the Bronze Age and the Iron Age (something that applies across all districts to a greater or lesser extent, but see Section 5.3.3.1) and the Anglo-Saxon periods.

This district contains significant parts of the Central Arden and Blythe/Tame study areas.

5.2.1.2 North Warwickshire

North Warwickshire has a low monument density overall and for all periods other than the Mesolithic and Neolithic periods, which have a high density, and the imperial period, which is comparable to the county as a whole. This is principally due to the limited fieldwork activity within the district. Most development took place in the immediate post-WWII period without archaeological intervention and much of the district, particularly the eastern half, has retained an essentially rural character. The area is also flown for aerial photography rarely. In this context the

high monument density in the Mesolithic and Neolithic is notable, though this is due to the activity of a single fieldworker (Mr Ron Waite) over many years rather than a particularly high level of past activity.

The majority of both the Blythe/Tame and Anker study areas lie within this district as well as a large part of Industrial Arden.

5.2.1.3 Nuneaton & Bedworth

Though Nuneaton & Bedworth has a monument density comparable to the County overall, this is distorted by a very high density of HER entries from the Imperial period, the highest for any district. In fact, it has a low monument density for every other period apart from the modern period which is also comparable to the County overall and the Palaeolithic which is slightly higher. The generally low monument density here is due to similar reasons to those given for North Warwickshire above and the higher level of Palaeolithic finds is again due to the work of Waite. The high density of monuments of the Imperial and Modern periods is a result of the urban nature of the district, most of which developed in the 19th and 20th centuries.

This district is largely urban, as noted above, and much is therefore excluded from this study. It contains small parts of the Industrial Arden, Anker and High Cross Plateau study areas.

5.2.1.4 Rugby

Rugby District also has a monument density comparable to the County value but in this case, the period figures show less distortion by individual high values. The prehistoric period generally has a high monument density, whereas from the Romano-British period onwards the figures are generally low, with the exception of the Imperial period. Whilst this pattern might have an archaeological explanation it could equally be due to biases in the data and without further research it is unsafe to draw any firm conclusions.

Almost all of the High Cross Plateau is within this district as well as the majority of Dunsmore.

5.2.1.5 Warwick

Warwick District has a high monument density overall as well as in every period other than the post Romano-British and early medieval which are close to the county values. Given the generally high density of sites in this district these slightly lower values may be significant. Overall this high monument density is the result of research bias extending back into the antiquarian period and earlier.

This district includes large parts of Dunsmore and Central Arden and part of Lower Avon.

5.2.1.6 Stratford

Stratford District is the largest by some way. This means that despite having more monuments than any other district it has the lowest monument density. It has a low monument density in every prehistoric period but in the Romano-British period it has the highest density of any district, which, given its generally low density values is likely to be highly significant. The Migration and early medieval periods have a somewhat high density but all periods from the medieval period have a low monument density.

Overall, the low monument density figures probably result from the generally rural nature of this district and the overall lack of development. The high density of Romano-British sites probably represents a genuinely higher density of activity in this period than seen elsewhere, most of which is likely to have been associated with Alcester and the Fosse Way. The high density in the Anglo-Saxon periods is likely to be represented by the early cemeteries along the Avon valley and also probably indicates a genuinely higher level of activity during this period.

This district includes a small part of Dunsmore, all of Feldon, Stour and Cotswold Fringe, large parts of Lower Avon and Arrow/Alne and part of Central Arden.

5.2.2 Comparison with Gloucestershire

Only Gloucestershire and Worcestershire had completed their resource assessments at the time of writing, at least in draft. Worcester did not however produce and data of this type and so a

comparison is not possible. A brief comparison between the figures for The County and those given in Gloucestershire's resource assessment (Mullin 2004, 23-28) reveal some startling contrasts between the two county HERs. The comparison is made between the published figures for and the figures given here before any data cleaning or validation as these are the most directly comparable.

Gloucestershire is less than half the size of Warwickshire and Solihull with an area of about 1025 km^2 but has almost four times the number of HER records at 45,554 (the equivalent figures for The County are 2327km^2 and 12673 records). This gives a monument density of 44.44 per km^2 compared with 5.26 for The County; over eight times higher. Such a massive difference must clearly be structural and lie in the differing ways archaeology has been recorded in the two HERs rather than reflecting an archaeological difference.

Compared with The County Gloucestershire has only one third the density of Palaeolithic records (0.03 records per km^2 compared to 0.09) and one half the Mesolithic records (0.08/0.15). These figures would however be higher using the methodology for this study as prehistoric records of uncertain date have been detailed separately in the Gloucestershire report (at a density of 0.871 records per km^2) whereas in this study they are included within each period. This difference would easily push up these lower figures to well above those for The County and illustrate the difficulty in making any direct comparisons between different HERs using this type of data.

Not surprisingly, the Gloucestershire HER generally has a higher density of monument records than The County HER. It has a slightly higher density of Neolithic records (0.43/0.37), and more than twice the density of Bronze Age and Iron Age records (1.15/0.48 and 0.86/0.41 respectively), though these would be slightly higher still if the general, prehistoric records were included (above). Much more significantly it has almost 12 times the density of Romano-British records (6.35/0.59), over four times the density of early medieval records (0.97/0.22) and medieval records (6.64/1.64), and six times the density of post medieval records (17.99/2.97 including what is referred to in this report as the Imperial period). However, for the Modern period it has less than half the density (0.18/0.38).

It is noticeable that given the overall much higher number of records within the Gloucestershire HER the prehistoric period overall only has something over twice the density of records whereas the later periods have a density approaching nine times that for The County. On these bald figures however it is impossible to say to what extent these large differences are the result of underlying archaeological differences (though for this size of difference this seems highly unlikely), or differing patterns of antiquarian activity, historical research, discovery activity, development and developer lead research, or a different history of development and approach to recording within the HER.

5.2.3 Effects of Data Validation and Cleaning

Work initially focused on undated sites (those with no date values assigned) trying wherever possible to assign a date range to them no matter how broad. This had the effect of increasing the number of monuments in many periods. This was particularly the case in Solihull where many sites known only from APs and that were previously undated were assigned to a broad period range. Later work however identified other sites that had been dated but should in fact have been assigned an 'unknown' date (as opposed to undated). This had the opposite effect slightly reducing the number of monuments assigned to all periods.

Work then focused on sites simply identified as 'prehistoric'. In many cases, these were known only from aerial photography appearing as soilmarks, crop marks or earthworks. It was not felt likely that these would be Palaeolithic or Mesolithic in date and their 'from' dates were changed to reflect this. This had the effect of significantly reducing the number of sites of these two periods. For some classes of monument it was also possible to refine their date further, for example pit alignments were assigned to the late Bronze Age to late Iron Age (S Palmer, pers comm).

Whilst examining early medieval sites it became clear that many had been assigned to this period simply on the basis that they were medieval and so might have had their origins in this period. Those monuments that had no evidence for this assumption had their start dates changed to the medieval period reducing the number of sites in the post-Romano-British and early medieval periods in all districts other than Solihull.

Several monuments were identified that appeared as a single entry but should in fact have been separate entries; these were split. For example, several sites had been occupied for a

considerable period but not continuously. According to current HER practice each discrete period of occupation should be a separate entry. This will have increased the number of sites.

NMP work in Solihull, North Warwickshire and Warwick District added and modified several monuments. In Solihull (Meriden) 57 monument records were added and the entries for 14 others updated. Of these new and updated records, 65% were for areas of medieval ridge and furrow. In North Warwickshire (Middleton Hall) 46 records were added and 15 updated and in Warwick District 70 records were added and 16 updated.

Table 5 below shows the effects of data validation and cleaning undertaken during, though not exclusively for, this project. The normal day-to-day working of the HERs will generally result in a slow increase in the number of monument records and certain areas have had data validation and cleaning undertaken for other purposes.

Table 5 - Percentage Change after Data Validation and Cleaning

Period	County	Solihull	N Warks	N & B	Rugby	Warwick	Stratford
Palaeolithic	-38.51	-10.71	-20.00	-26.79	-30.65	-41.67	-47.24
Mesolithic	-12.12	-10.00	-12.50	0.00	6.85	-10.91	10.34
Neolithic	-1.48	200.00	-5.26	-9.09	-1.10	-8.25	8.79
Bronze Age	6.82	115.56	0.00	-0.52	0.89	1.05	14.37
Iron Age	4.98	115.56	-11.76	-5.33	-1.66	0.90	11.84
Romano-British	5.58	182.76	-10.53	0.78	-2.07	0.28	14.14
Prehistoric & RB	3.23	65.82	-2.27	0.87	1.12	0.63	7.69
Migration	-29.48	190.48	-33.33	-47.37	-34.78	-43.84	-8.70
Early medieval	-26.83	261.90	-100.00	-65.79	-58.70	-37.93	-5.80
Medieval	6.12	20.42	-0.94	7.56	4.60	-2.44	13.87
post-Medieval	6.92	30.09	-6.38	2.37	2.86	-4.96	18.34
Imperial	2.76	17.06	-0.80	0.60	1.59	-6.37	10.86
Modern	3.43	26.09	21.74	0.72	7.38	-23.08	17.28
Historic	-6.36	15.82	-0.55	3.63	2.74	-2.37	9.18
Unknown	-1.64	-50.00	15.38	5.53	4.70	4.62	-79.66
Total	2.43	4.77	15.98	-12.41	2.69	0.58	5.32
Degree of overlap between periods: 0 is no overlap, 1 is total overlap							
Prehistoric & RB	-6.38	34.86	-11.72	-10.71	-6.60	-9.54	1.46
Historic	45.46	32.65	-3.88	-12.57	-6.18	-22.28	10.79
Overall	-1.26	112.85	-51.33	77.94	-8.79	-28.44	20.03

The figures in the body of the table show the percentage change in the number (or density – as these are percentages the changes will be the same whichever they are based upon) of sites by district and period following the data validation and cleaning described above. The discussion of site densities in the following sections uses the enhanced data.

5.3 Period Based Overviews

Please note that all the distribution maps relating to this section have been collated at the end of this report for ease of comparison.

A full Archaeological resource assessment has been published for the East Midlands (Cooper, N 2006) which is the region immediately to the east of Warwickshire. As such the period summaries therein contain much of relevance to Warwickshire and provide a useful comparison. Recent regional overviews have also been published by English Heritage and Warwickshire is covered in two of these volumes (Hooke 2006, Stocker 2006), though their emphasis is very much on the historic periods.

5.3.1 Palaeolithic and Mesolithic

For a summary of the research topics for the Palaeolithic and Mesolithic periods, see Section 6.1.1.

5.3.1.1 Introduction

The density of Palaeolithic entries in the HERs is 0.09 per km^2, which is, unsurprisingly, low (see Table 4). The districts with densities of Palaeolithic monuments above this are Warwick (0.15), Solihull (0.14), Rugby (0.12) and Nuneaton & Bedworth (0.10). Stratford and North Warwickshire Districts are below this (both 0.06).

The density of Palaeolithic monuments in aggregates areas is 0.09 per km^2, the same as for the county as a whole indicating that aggregates areas are generally as likely to contain sites of this period as non-aggregates areas (see Table 6). This does however hide considerable variations. Stour has a very high density of 0.78 which requires some explanation and may be due to a number of poorly dated flint scatters. Industrial Arden and High Cross Plateau also have above average densities but these can be explained by the activity of a single collector working in the region over a number of years and whose work is currently being re-evaluated (the Waite Collection). Lower Avon and Blythe/Tame have an average density of monuments of this period and the remaining areas are below average (Arrow/Alne – 0.06, Central Arden – 0.05, Dunsmore – 0.04 and Feldon – 0.03). No Palaeolithic monuments are known in Cotswold Fringe or Anker.

Overall monument density rises slightly in the Mesolithic to 0.15 per km^2. Warwick and North Warwickshire districts have densities above this (0.28 and 0.18 respectively), Rugby and Solihull similar densities and Nuneaton & Bedworth and Stratford have densities below this (0.10 and 0.09 respectively).

In the Mesolithic the density of monuments in aggregates areas is 0.22 per km^2 which is above the County average of 0.15. Industrial Arden has a very high density of 0.88 and Stour, Lower Avon, High Cross Plateau, Dunsmore, Cotswold Fringe, and Anker are also above the County average (0.44, 0.33, 0.32, 0.25, 0.20 and 0.19 respectively). Blythe/Tame is again average and Arrow/Alne, Central Arden and Feldon are all below average (0.09, 0.09 and 0.06).

5.3.1.2 Current State of Knowledge

(By Stuart Palmer)

5.3.1.2.1 The Palaeolithic (800 kya – 10 kya)

See Figure 13.

Palaeolithic archaeology is the study of early man during the Pleistocene geological epoch (Ice Age, c 1.8mya–12kya[13]) and is best approached through the discipline of Quaternary Science, which includes the study of geology alongside the natural environment. The Palaeolithic (Old Stone Age) has traditionally been divided into three periods based on the material culture: Lower; Middle; and Upper although this has recently been revised by Wymer (1999) whereby each period is subdivided to form a total of six divisions. It is now commonplace to chronologically reference these periods in terms of oxygen or marine isotope stages (OIS or MIS), which equate to broad periods of climatic and environmental change. Cold glacial or stadial periods (even numbered OIS/MIS) interleave with warm, interstadial periods (odd numbered OIS/MIS). In this assessment, the chronology (Periods 1-5b) adopted in the East Midlands and West Midlands Research Frameworks (McNabb, 2006; Garwood, forthcoming) are referenced whereby the material culture based timeframes are augmented by the oxygen isotope stages.

The early colonisation of Britain, which for the most part was a peninsular of the landmass of Europe, was a series of intermittent episodes of occupation and abandonment inextricably linked with the ebb and flow of glaciation. During the interglacials, and including the transitional periods between maximums (McNabb 2006, 13), climatic conditions were sometimes sufficiently temperate to allow plant and animal life (including early man) to migrate from warmer regions to the south.

Over 260 Palaeolithic artefacts have been recorded on the Warwickshire HER (Hingley 1996) with a further scatter of find spots in Solihull, mainly poorly dated material from Barston. Those with dubious provenance have been omitted from the consolidated distribution plot on Figure 13. The distribution of find-spots is not restricted to areas of mineral resource. Some of these could

[13] kya = thousand years ago. During the Palaeolithic dating is principally based on geological methods and consequently refers to years before the present rather than BC or AD as used in later periods. Given the great time depth they are broadly equivalent to BC dates.

indicate past human activity across the landscape regardless of the underlying geology (Ann Graff, pers comm) but others will be the result of poor recording or much more recent redeposition, either by natural or human agency. The vast majority though are recorded as Lower Palaeolithic artefacts, the range including basic core and chopper tools and bifacial handaxes of Acheulean type; there is no evidence for the Clactonian tradition in the West Midlands (Buteux & Lang 2002).

The Lower and Middle Palaeolithic (800,000 BC – 40,000 BC)

Period 1: Cromer/Cromerian and Anglian (OIS/MIS 19-12), c800–423kya.

Recent discoveries place the earliest arrival of the hominin possibly *Homo heidelbergensis* in Britain at c 700kya (Parfitt et al 2005), although it may be as early as 800kya in southern Europe. The Cromerian (*sensu lato*) landscape they inhabited was largely destroyed by the Anglian glaciation although river channels of this date have been discovered, with important Palaeolithic remains, in Warwickshire and elsewhere.

Evidence for Lower Palaeolithic people in Warwickshire is limited and largely circumstantial, being dependent on the recovery of the distinctive stone tools they used. Such finds have always been sparsely distributed in the Midlands in comparison to the south-east of England (Keen et al 2006, 1), largely being recovered either from the surface of ploughed fields or from within the underlying drift during gravel extraction. Some of these finds are far-travelled, having been transported from their initial or primary place of deposition to a secondary position during periods of sediment flow or solifluction, but some may be close to their point of origin, loss or deposition (Keen et al 2006, Graf 2004).

Gravel extraction at the Bubbenhall quarries of Waverley Wood Farm and Wood Farm (MWA7249, Dunsmore), has intermittently exposed channel fills cut into the underlying Mercia Mudstone bedrock below the Thurmaston Member (Keen et al 2006, 2). These channels have been shown to belong to a pre-Anglian river known as the Bytham, which flowed from the Cotswold escarpment past Coventry and Leicester to East Anglia, draining much of the midlands. The river has long since been obscured by successive glacial episodes with the more recent fluvial deposits of the Rivers Avon and Sowe overlying it. This site is now recognised as internationally important.

A total of 70 stone artefacts have been recovered from the site including six of andesite, one flint, one rose quartz and 62 of quartzite and it has been suggested that such a concentration was the result of fluvial action contemporary with the presence of humans who were making tools nearby. The assemblage includes a wide range of tools and working pieces in a variety of technologies and skill-levels, and has important ramifications regarding the pre-cognitive processing abilities of early man. It is considered highly likely that the Bytham was one of the routes along which early hominins entered the region.

Environmental data recovered from the ancient sediments included teeth and bones of straight-tusked elephant (*Palaeoloxodon antiquus*), a tooth of a horse (*Equus ferus Boddaert*), a horn core of cf. Bison sp., the toe bone of a large cervid (deer), (possibly *Megaloceros giganteus*), shrew, water and pine voles and mole. Examination of the molluscs, ostracods, beetles, pollen and macrofossils preserved in the sediment provide a detailed picture of the surrounding landscape, showing that the river had meandered across a broad flood plain leaving abandoned loops that filled gradually with sediment. Reed swamps grew at the river's edge separated from the distant grassland by water meadows. Spruce and pine grew on higher ground at the edge of the plain. The climate was generally little different to that of today although there was a period of arctic-like severity (Shotton et al 1993; Wise 1993). It is possible that some of the tools found at Baginton also belong to the pre-Anglian period.

Particular concentrations of implements from the Wolvey and Burton Hastings area (eg MWA2772, High Cross Plateau) east of Nuneaton were discovered as the result of dedicated prospecting (Saville 1988) but are more difficult to evaluate. They may derive from the Oadby Till laid down during the Anglian glaciation, and from the overlying Wigston (Dunsmore) Gravel, or more likely to post-Anglian activity in periods 2 or 3 (below) (Ann Graf, pers comm). Although these artefacts may be pre-Anglian, but redeposited in the course of the Anglian glaciation, they may otherwise relate to activity during an unknown warmer interstadial that occurred during the Anglian period (Garwood forthcoming). If the finds are pre-glacial, the sediments carrying the tools from where they were abandoned probably derived from somewhere north of the county.

Period 2: Hoxnian to middle Wolstonian (OIS/MIS 11-8), c 423-245 kya.

This period covers the occupation by hominins from OIS/MIS 11 to 8 (*H. heidelbergensis* to early *H. neanderthalensis*;). The majority of the Lower Palaeolithic finds in Britain date to this period (Acheulean handaxe and Clactonian flake tool industries) and are found primarily in river terrace deposits. In Warwickshire, the remnant 5th Avon terrace probably dates to OIS/MIS 9 (Lang & Keen 2005) although no finds have yet been recovered. Some of the surface finds of the Waite Collection and those at Little Alne (Clifford 1943) may date to this period (Ann Graf, pers comm).

Period 3: Middle Wolstonian to Early Devensian (OIS/MIS 7-4); c 245-60kya.

The 4th Avon terrace can probably be dated to the early Middle Palaeolithic OIS/MIS 7, a time of only limited hominin presence followed by the apparent absence of human populations from OIS/MIS 6 to late OIS/MIS 4. Significant assemblages of quartzite handaxes have been recovered at Little Alne, near Alcester (Clifford 1943; MWA1543; Arrow/Alne) and along the lower Avon Valley (Whitehead 1988; MWA4589/7320). Some of the surface finds of the Waite Collection may date from this period (Ann Graff pers comm).

Period 4: Early to Middle Devensian (first half of OIS/MIS 3); c 60-40kya.

This period sees the reoccupation of Britain by *H. neanderthalensis* from the end of OIS/MIS 4 to mid-OIS/MIS 3 and is associated with late Middle Palaeolithic Mousterian industries. None are known for certain in Warwickshire but such evidence should be expected in the 2nd Avon Terrace.

Upper and Final Upper Palaeolithic 40kya– 8kya

Despite Warwickshire lying to the south of the Devensian ice limits, evidence for Upper Palaeolithic and Final Upper Palaeolithic activity, the period when anatomically modern humans Homo sapiens began colonising the peninsula (c 40kya–10kya), is scant (Barton 1999). Currently, evidence for resident hunter-gatherers is restricted to a penknife point flint from Mancetter and a possible leaf point flint from Tiddington (Hingley 1996).

5.3.1.2.2 The Mesolithic (8000 – 4000 BC)

See Figure 14.

The end of the last Ice Age (c 8500 BC) was marked by a period of global warming when the open tundra landscape was gradually colonised by birch and pine, then later by more mixed deciduous woodland of hazel, oak, lime and elm. This burgeoning forest cover attracted a broader ranger of game animals including roe deer, red deer, wild pig and the people who hunted them. The rise in sea levels associated with this warm Holocene period eventually cut Britain from mainland Europe, effectively marooning the recently migrated species at c 6500 BC.

Technologically this period is defined by the making and use of a wide range of small retouched flint blades known as microliths and the introduction of the flaked axe or adze. The Earlier Mesolithic tool kit was based on broad blades and obliquely blunted points. Small scatters of earlier Mesolithic flint have been found at Warwick (MWA7904; Lower Avon), Great Packington (MWA4596; Blythe/Tame), Burton Dassett (MWA4594; Cotswold Fringe) and Over Whitacre (MWA3411; not aggregates) although it is likely that similar tools and flakes have been recovered in more widespread flint assemblages without being recognised or recorded.

The technology changed in the Later Mesolithic (c 6000–4000 BC) as assemblages become dominated by narrower blades in a wider variety of forms. This was apparently an insular (British) development without European parallels that possibly related to the growth and spread of mixed deciduous woodland, which seems to have necessitated the development of new and different hunting techniques (Mithen 1999). These new tool types have been found all across the county but in a few places where fieldwork has been concentrated such as Over Whitacre and two sites in Corley (non-aggregate) they were in sufficient numbers to suggest winter camp sites (Saville 1982).

By far the largest concentration of Mesolithic flint comes from the promontory at Blacklow Hill, Leek Wootton (MWA6042; Central Arden), where 2500 items have been found This site may have been visited on numerous occasions although the assemblage has not yet been studied in detail.

At Kisses' Barn Farm, Polesworth (MWA5761; Anker), an evaluation programme that included field walking, trial trenching and test pitting was able to demonstrate the existence of a fishing camp on a low-lying sand bar within a former channel of the River Anker. The site included

spreads of flint tools, a blackened lens of soil and a few cut features. This site had been partially sealed by alluvial clays that had protected some in-situ deposits from medieval and modern plough damage and remains the only known example of an in-situ occupation site in the county. A further group of microliths were found buried in a pit on a low gravel spur overlooking the river (Palmer, S 1992c; MWA5760/5762).

An in-situ scatter of over 1100 late Mesolithic flint pieces found at Wishaw Hall Farm probably represents a temporary campsite (Booth & Powell 2006; not aggregates).

Warwickshire has not benefited from wide-scale field survey and it is entirely likely that the find-spots indicated on Figure 14 represent a small proportion of the Mesolithic landscape. However, that the Mesolithic populace were widely travelled across the county is very apparent, perhaps favouring higher ground and land overlooking river valleys on a seasonal basis.

5.3.1.2.3 Summary Discussion

Lower and Middle Palaeolithic

Lower and Middle Palaeolithic archaeology consists for the most part of the recovery of lithics from secondary contexts in areas of aggregate geology; either in the overlying plough soils or from within the drift deposit themselves. The Bubbenhall sites of Waverley Wood (MWA7249) and Wood Farm (MWA7249) however, clearly demonstrate that deposits associated with the ancient River Bytham can produce finds and data of international significance. The Bytham is thought to have risen near Stratford upon Avon and flowed northeast through present day Dunsmore leaving Warwickshire at Copston Magna, and deposits associated with it could survive along its former course. However, recognising Bytham type sediments in open cuttings is extremely difficult and will require specialist Quaternary Science expertise.

The Avon terraces have yielded a small number of artefacts of post-Anglian date. These terrace sequences contain evidence for human activity during Periods 2 and 3, which can now be provisionally dated and related to the OIS/MIS sequence on the basis of palaeontological and archaeological evidence (Garwood forthcoming).

The possible occurrence of a major glaciation during the Wolstonian (OIS/MIS 10-6), for example, which would have destroyed the Anglian (OIS/MIS 12) and post-Anglian (Hoxnian; OIS/MIS 11) river systems, has not yet been resolved and the implications of such processes for understanding human occupation in the region remain unexplored (Wymer 1999, 115-19).

Upper and Final Upper Palaeolithic

Evidence for human activity within the study area during this period is restricted to a single certain (MWA6034) and a further possible stone tool (MWA6308). However, despite this shortfall, sites like Whitemoor Haye, Staffordshire (Birmingham Archaeology nd), Launde, Leicestershire (Cooper, L 2006), Newtown Linford, Leicestershire (Cooper, L 2002) and Glaston, Rutland (ULAS n.d.) demonstrate the potential for primary deposit sites to be found Particular attention should be paid to elevated positions as instanced in the latter three sites above (Myers 2002). Prospection for such sites is near impossible and therefore their recognition during fieldwork on sites of other periods is more likely.

There is currently no evidence for the contemporary environment in the study area.

Mesolithic

The distribution of find-spots of Mesolithic material is unlikely to fully represent the range of gatherer hunters during the period and is more likely a reflection of the fieldwork carried out. Concentrations in northern Warwickshire for instance are largely a result of dedicated prospection by specialist collectors and the concentration along the Avon Valley may well be a result of finds made during excavations of sites of a later date.

The levels of preservation at the Polesworth site clearly demonstrate the potential for similar sites to survive in the region. It is certainly the case that high ground, well-drained soils and access to water sources appear to have attracted some of the most significant concentrations of evidence (Myers 2002).

There is currently no evidence for the contemporary environment in the study area.

For a summary of the research topics for the Palaeolithic and Mesolithic periods, see Section 6.1.1.

5.3.2 Neolithic and Early Bronze Age (4000 BC – 1600 BC)

For a summary of the research topics for the Neolithic and Early Bronze Age periods, see Section 6.1.2.

5.3.2.1 Introduction

Across the County the density of Neolithic monuments is 0.37 per km^2, a considerable rise from earlier periods, in part the result of excluding sites identified from aerial photography from the earlier periods (see Table 4). Warwick, Solihull and Rugby have densities above this (0.63, 0.49 and 0.43 respectively), North Warwickshire has an average density and Stratford and Nuneaton & Bedworth have densities below this (0.27 and 0.23).

In aggregates areas the overall monument density (0.59) is above the County density with the highest value being in Industrial Arden (1.32) as it was for the Mesolithic (see Table 6). Lower Avon, High Cross Plateau, Dunsmore, Anker, Stour, Blythe/Tame and Central Arden all have above average values, though the latter two have a density below that of aggregates areas in general (1.00, 0.63, 0.62, 0.57, 0.57, 0.52, 0.46 respectively). Cotswold Fringe has an average monument density (0.37) and Arrow/Alne and Feldon have a below average density (0.22 and 0.21).

The nature of the HERs makes it unfeasible to identify the early Bronze Age as distinct from the rest of the period in all but a handful of cases and so the figures for this period have not been separately analysed. They are included with the rest of the Bronze Age described below in Section 5.3.3.1.

5.3.2.2 Current State of Knowledge

(By Stuart Palmer)

The emergence of 'Neolithic' ideas concerning ancestry, relations with nature, and community values and ideals at around 4000 BC is visible in the archaeological record as the introduction of pottery and polished stone tools, the construction of communal monuments, complex mortuary ritual and formal burial practice. It is likely that this new world view was slowly adopted and adapted by an indigenous population of hunter-gatherers who were able to access non-indigenous imports such as wheat, barley and sheep/goats (Whittle 1999, 59), although it is still uncertain if some of these exotic introductions were available in the preceding millennia (Mithen 1999, 54, Parker-Pearson 2005, 9-22).

The speed with which the transition occurred is much debated, not least for the absence in very many areas of the structures and farmsteads that are associated with long-lived domestic settlement sites and the absence of early forms of monumental architecture. It is widely, although not unanimously recognised (c.f. Darvill 2006, 18), that the transition occurred in different areas at different times with some areas not fully converted into settled agricultural communities until the middle of the second millennium BC (c.f. Thomas 1999; Whittle 1999).

In common with the majority of reviews, traditional chronological terminologies are used in this assessment despite their relative imprecision and overlap. The Neolithic is divided into Early, Middle and Late periods and the Early Bronze Age begins with the arrival of Beaker pottery.

The most commonly identified form of evidence for the Neolithic and Bronze Age are lithics and lithic scatters, principally flint tools and the waste flakes produced in their preparation. The distribution of these artefacts, illustrated in Figure 15, is a product of biased collection and is therefore unlikely to be a true reflection of land use during the period in question. Rather it is a combination of factors that include the locations where fieldwork has been carried out and the ease with which such items are visible to individual collectors. Many of the findspots shown represent material that has merely been recorded as prehistoric or has been assumed to be Neolithic/Bronze Age and not subject to specialist analysis and which could therefore be or include Mesolithic and/or later prehistoric elements.

It has been noted that artefact densities in the region are generally low when compared to other regions even in the most prolific areas (Barfield 2002). However, the extent to which this can be attributed to low incidence of repeated visits or short-term occupation is as uncertain as it is possibly a factor connected to the availability of raw material. Local flint is generally poor quality

and almost entirely derived from gravel deposits, although better quality material was evidently imported on some sites.

There have been no large-scale fieldwalking projects either in aggregate areas or in non-aggregate areas. Fieldwork since the implementation of PPG16 has often included elements of fieldwalking but not on a sufficiently large scale to have much relevance to general distribution patterns. The majority of large-scale excavations on aggregate geology have though for the most part yielded flintwork of this broad date range.

Round barrows and/or ring-ditches represent the second most distinctive site type, the majority being recorded as crop marks of Neolithic or Bronze Age date, a few as antiquarian observations or from documentary evidence whilst a few have extant mounds. The majority are ring-ditches evident as crop marks but recorded as ploughed-out round barrows. Several have now been excavated but few have produced unequivocal dating evidence.

The distribution of polished stone axes has often been used to demonstrate early clearance and therefore settlement activity but the true value of these finds is their ability to demonstrate long distance exchange networks that were in operation at this time (Parker-Pearson 2005, 27-31). Many can be traced to source, demonstrating links as far away as Cumbria and Cornwall, whilst a possible Bronze Age axe factory has been suggested near to Nuneaton (Shotton 1959).

5.3.2.2.1 The Early Neolithic (4000 – 3400/3300 BC)

See Figure 15 and Figure 16.

There are no precise dates available yet for Warwickshire's earliest Neolithic, but the absence of very many classic early monuments in the county could suggest that the transition occurred later here than in other regions (although see Ray forthcoming for discussion on non-megalith West Midlands). Nevertheless, scatters of Mesolithic and Early Neolithic flint tools found beneath Neolithic monuments in the county could suggest that some Mesolithic locations remained important during this transition (Palmer, S 2003e, 69; 2006a; Lambrick 1988, iii).

Apart from monuments, evidence for the communities that built them is largely reliant on the material artefacts they left behind Largely mobile, these small kin based groups herded livestock (mainly cattle), perhaps between rudimentary horticultural plots, but they were still heavily dependent on wild resources. Their polished stone axes, leaf-shaped flint arrowheads and blade-derived flint flaked tools are found as a low-density scatter (Hingley 1996, 7-9) across the wider county.

No certain settlement sites are known from the vicinity of the monument complexes, but in locations that were probably regarded as special, certain items that were invested with meaning were selected for burial within pits. Round bottomed pots, flintwork and less durable material including food items, which have sometimes survived as carbonised fossils, were mixed with the ashes from hearths, perhaps after a period of curation in a midden (cf Garrow et al 2005; Garrow et al 2006).

Cotswold Fringe

Two possible early Neolithic megalithic tombs at Little Compton (Rollright complex; MWA3817 & MWA3818), on the Oxfordshire border, are probably outliers of the distinctive Cotswold-Severn group (Hingley 1996). Warwickshire's only standing stone (The King Stone, MWA2394) forms part of the Rollright complex of which 'The King's Men' stone circle and 'The Whispering Knights' portal dolmen both lie across the modern border. Mesolithic and early Neolithic flintwork was recovered from the Rollright complex (Lambrick 1988, 111, MWA6041) suggesting that the locale had been important for some time.

Non-Aggregate Areas

Within the county proper, other possible early Neolithic monuments include possible ploughed out long barrows at Alderminster (MWA1256) and Ilmington (MWA2708) and a possible long mound at Hampton in Arden (MSI6962) although these remain unexcavated. The location of the two possible long barrows in the Stour valley may reflect their proximity to the Cotswolds and the activity of this date in that region, the valley being the most accessible route way to the Avon valley.

Lower Avon

Some of the undated ring-ditches known from crop marks may also be earlier Neolithic but probably later than the long barrows. The dates of the excavated examples at Charlecote (Ford 2003; MWA1146), Wasperton (Hughes & Crawford 1995; MWA6059) and Barford (Oswald 1969; MWA5559) remain ambiguous due to insufficient evidence. Earlier Neolithic pits containing pottery and flint were excavated at Brook Street, Warwick (Cracknell & Bishop 1992; MWA1985). Intensive fieldwork at Salford Priors, technically in the Arrow Valley just above the confluence with the Avon, yielded a sufficient concentration of flintwork to suggest an occupation site (Palmer, S 1999a, 34; eg MWA7227).

Dunsmore

Other excavated ring-ditches at Baginton (Hobley 1971; MWA6079) and King's Newnham (MWA3455) may likewise date from this early period whilst Mesolithic and earlier Neolithic flintwork beneath this latter site imply continued attraction at this locale (Palmer 2003e). Earlier Neolithic pits have been found at two sites in King's Newnham (Palmer 2003e, 2006a; MWA8819), across the River Avon at Church Lawford (Palmer 2006a; MWA8818), and at Baginton (Hobley 1971; MWA2672).

High Cross Plateau

A ring-ditch evaluated at High Cross Quarry, Copston Magna, although not well dated (Palmer, S 1989; MWA3525), may also belong to this early period.

Arrow/Alne

Flintwork found at Coughton Court (Evans 2003; MWA9004) has been used to date the features it was found in but it is equally likely that it was residual and derived from an activity area in the vicinity. A few, possibly natural tree-throw pits at Oversley also contained flintwork of this period (Palmer 1992a; MWA12127).

Stour

Flintwork found at Stretton-on-Fosse (Gardener et al 1982; MWA3000) has been used to date certain features but it remains possible that much was residual and thereby from an occupation site in the vicinity (see below).

5.3.2.2.2 The Middle Neolithic (c 3400/3300 BC – 3000/2900 BC)

See Figure 15 and Figure 17.

By far the majority of Warwickshire's early communal monuments are found as part of complexes on the gravel terraces along the River Avon. A major artery for travel and communication, the Avon Valley was a focus for Neolithic ceremonial activity, holding special meaning for local communities.

Apart from the poorly dated ring ditches, the earliest elements within the Avon and Avon/Dunsmore complexes were constructed in this period and include two large segmented enclosures, related to the earlier causewayed enclosures of southern Britain (Palmer, S 2006a). A further possible example at Ettington known as a crop mark (MWA5202) has yet to be tested by excavation.

Lower Avon

The monument complexes at Longbridge (Warwick; MWA1921), Barford Sheds (MWA718), Wasperton (MWA4652) and Charlecote (MWA1145) are so closely spaced as to appear more like a single extended complex or cult centre (loveday 2006). At Wasperton, a quadrant of a probable circular segmented enclosure was partially excavated but was devoid of internal features (Hughes & Crawford 1995). Longbridge (Warwick), Barford Sheds and Charlecote appear to have developed around individual cursus monuments of probable Middle Neolithic date (Barclay & Harding 1999) although the Barford cursus is poorly dated despite being excavated (Loveday 1989). These long, perhaps 'processional' monuments may have been 'monumentalised avenues for the dead' (Parker-Pearson 2005, 56) or 'monumentalised community long houses' (Loveday 2006), apparently related to the shorter, oblong enclosures which seem to have derived from the long barrow and mortuary enclosure tradition (Loveday 1989). The particulars of this lineage elicit much speculation (Loveday 2003, 2006), the date and function of the internally mounded oblong enclosure excavated at Charlecote (Ford 2003) remaining uncertain.

Middle Neolithic (Peterborough Ware) pits have been recorded at Wasperton (Hughes & Crawford 1995; MWA6058) and within Warwick (Woodward 1995, 33)

Of the two Neolithic houses postulated in Warwickshire (Darvill 1996, 106), the rectangular, posthole with bedding trenches, structure at Barford is the more convincing (MWA4688). It was associated with Ebbsfleet Peterborough Ware (Site C, Enclosure 4, Oswald 1969, 19-27) while several less well-dated groups of stakeholes, postholes and pits have been interpreted as Neolithic huts, (Site B, MWA6069, ibid, 16-19, fig 8). The possible house postulated at Stretton-on-Fosse was indicated by a sunken floor and dated by a few flints of Mesolithic or early Neolithic date (Gardener et al 1982; MWA3000).

Dunsmore

An elongated segmented enclosure on the valley shoulder at Church Lawford (MWA3445) contained a wide variety of ritual pits revealing that the locale was frequented for over 1000 years (Palmer 2006a). Some of these pits have preserved the earliest evidence within the County for cultivated cereals in the form of carbonised seeds of domesticated wheat and barley associated with Peterborough Ware pottery. Small fragments of cremated human bone found in some of the pits hint that the feasting was associated with mortuary activities. The site overlooks the partially excavated barrow cemetery at King's Newnham (Palmer 2003e; MWA3455) on the northern bank and it seems likely that the monuments were constructed by two contemporary communities whose territories met at the river. The date and function of the King's Newnham oblong enclosure also remains uncertain (Palmer 2003e).

A possible cursus is suggested by a crop mark at Ryton on Dunsmore (MWA4280) and Peterborough Ware pottery has been recovered from later features at Bubbenhall.

5.3.2.2.3 The Late Neolithic (c 3000/2900 BC – 2600/2200 BC)

See Figure 15 and Figure 18.

During the third millennium BC, a transformation seems to have occurred in religious and social practices across Britain, as the cult of the ancestor gave way to the worship of cosmological phenomena (Parker Pearson 2005, 127-28). The new forms of communal monuments created may be evidence for the rise of 'ritual authority structures' (Harding 2003). However, the practice of curating domestic waste in middens and including it within the structured deposits in pits continued, suggesting a degree of continuity in the way people referenced the past.

Grooved Ware, the classic tub and barrel shaped pottery style of this period intimately associated with henges, pig bones and feasting, is included in the structured pit deposits. The absence of 'classic' henges in the region may be related to the use of cursus sites (Loveday 2006).

No evidence for settlement of this date has been found, although some of the flint scatters recorded across the county include pieces typologically of this date. Whilst such finds could imply continuous occupation, it is more likely that they represent successive visits to the locale over a long period.

Lower Avon

Although no classic henges are known from Warwickshire, hengiform ring-ditches were added to the complexes at Barford (Oswald 1969; MWA718) and Wasperton (Hughes & Crawford 1995; MWA6755). Grooved Ware pits were excavated at Wasperton (Hughes & Crawford 1995; MWA1845) and Salford Priors (Palmer 1999a; MWA7454).

Dunsmore

Grooved Ware pits were found within the Church Lawford enclosure (Palmer 2006a; MWA8818) and a further Grooved Ware pit has been excavated at Ling Hall Quarry, Church Lawford (Palmer, S forthcoming g; MWA9189). A Neolithic pit containing flintwork and hazel nutshells dated 2890-2630 cal BC was found at Lodge Farm, Long Lawford (Havard et al 2006).

5.3.2.2.4 The Early Bronze Age (c 2600/2200 – 1600 BC)

See Figure 15 and Figure 19.

Nationally there is a proliferation of elite burials in the single grave tradition in this period. Some 128 barrows and/or ring-ditches have now been recorded in the County. These occur predominantly as crop marks, often in groups or cemeteries and incorporated into earlier

monument complexes along the Avon Avon/Dunsmore Valley, although it remains possible that many are from a much earlier period.

In other regions, some of these burials are often richly furnished, illustrating for some archaeologists the eventual dominance of a 'prestige goods economy' demonstrated by the fancy goods 'Beaker package', imported from Europe. These finely made pottery vessels accompanied changes in flint technology such as thumbnail scrapers, barbed-and-tanged arrowheads, flaked knives and daggers, ground-stone mace-heads and battle-axes and metalwork (Parker-Pearson 1999). Although the arrival of 'Beakers' has conventionally marked the advent of the Early Bronze Age, there are no precise dates for the introduction of metal into Warwickshire.

During the second millennium BC, the mortuary tradition includes both inhumation and cremation burial, often accompanied by new forms of pottery such as Food Vessels, whilst Collared and Biconical Urns can be found in other contexts.

The complete absence of settlement evidence during this period could suggest that local people were still engaged in a mobile lifestyle.

Lower Avon

Beaker pottery has been recovered from ring-ditches at Wasperton (Hughes & Crawford 1995, MWA4652), Charlecote (Ford 2004, MWA4731), Barford Sheds (Oswald 1969, MWA4689) and from a pit at Oversley (Jones et al 1997, 85) where it was associated with cereals (MWA10287). An early Bronze Age radiocarbon dated pit was found at Park Farm, Barford along with a single pottery sherd (Cracknell & Hingley 1994; MWA7204). Collared Urn fragments have been found at Charlecote (MWA1146), Wasperton, and Oversley (MWA10287).

Dunsmore

Beaker pottery was found in pits at Church Lawford (Palmer, S 2006a), also in association with cereals (MWA8818).

High Cross Plateau

A concentration of barrows around Wolvey (Garwood forthcoming) at the head of the Anker Valley seems to suggest new areas of dense occupation.

Industrial Arden

A barrow excavated in the 19th century at Oldbury, Hartshill contained a Collared Urn and a bronze knife (Thomas, N 1974; MWA246).

Blythe/Tame

A pit group containing placed deposits of fragmentary urns and accessory vessels dated between 1800 – 1600 BC was excavated at Meriden (MSI1274). An adjacent double-ringed post circle may have been a contemporary roundhouse although it remained undated (Stevens 2005).

A Beaker pit was found at Coleshill (Magilton 2006).

5.3.2.2.5 Summary Discussion

The Early Neolithic

There are no proven earliest Neolithic monuments (portal dolmens, oval barrows or simple round barrows) in the county; the two possible examples on the Oxfordshire border may even have been destroyed without record. There are likewise no classic causewayed enclosures and the three possible long barrow sites have not been tested and may have already been ploughed to destruction. Some ring-ditches may belong to this period but none have been satisfactorily proven. There is currently no evidence for farming, the domestication of plants and animals or the general environment and there are no human burials or useful radiocarbon dates.

Nevertheless, the occurrence of flintwork of this date, particularly on the river gravels, is sufficiently widespread to confirm that the region was widely populated at this time. However, at only a few sites have the flintwork been sufficiently distinct (Bradley 2000; Brown 2003), or been recognised from material of other dates, to provide the essential data which would indicate the site use etc Pits have been encountered at a few sites in the Avon Valley although the groups at Warwick (MWA1985) and Baginton (MWA6079) were excavated before the significance of such features was properly recognised and appropriate analysis and archiving was not undertaken. The

remaining few at Church Lawford (MWA8818) and King's Newnham (MWA8819) provided only limited environmental data.

Clearly then the river gravels contain the primary resource of detailed information on the Mesolithic – Neolithic transition and the early Neolithic occupation of the county. The occurrence of undistinguished flint assemblages in all the other aggregate and non-aggregate areas of the County however, suggests that not only is there a potential for occupation and activity areas to be isolated by intensive and wide-scale survey but that it will be essential in order to compare and contrast the range of activities undertaken on such sites and the range of geologies, topographies and aspects in which they were undertaken. The gravel terraces might well be expected to provide environmental data in the form of macrofossils and pollen surviving within datable palaeochannels although to date none has been recognised. Likewise, alluviated landscapes may well be masking riverside sites.

The Middle Neolithic

The Avon monument complexes probably date from this period, although despite sometimes concerted excavation, none are well dated. The plethora of cursus monuments in the middle Avon Valley may well indicate the area was a cult centre (c.f. Loveday 2006). Some ring-ditches may belong to this period, the examples at Charlecote (Ford 2003; MWA4731) probably providing a precedent for many of the Avon Valley crop mark sites. Many of the pit groups of this date in the Avon Valley were not recorded to a standard required in modern excavation but those at King's Newnham (MWA8819) and Church Lawford (MWA8818) (Palmer 2006a) have provided our earliest glimpses of domestic crop use, although the acidity of the gravels has probably ensured that complimentary evidence regarding domesticated animals has not survived. There is no evidence for the contemporary environment other than a few charred plant remains from the Church Lawford and King's Newnham pits which provided an indistinct vignette of the immediate locale. There are no complete burials and the few radiocarbon dates acquired at Church Lawford are insufficient to present a satisfactory chronology of even that site. Flintwork of this date has not been distinguished in collected assemblages so there is no definitive evidence for settlement or areas of temporary activity.

As for the Early Neolithic, the Middle Neolithic of the County is only known from the river gravels and the Avon terraces in particular. Wide-scale and intensive field survey is paramount if we are to understand how the population inhabited this landscape. The absence of environmental data is again a major deficit that is only likely to be tackled by sampling palaeochannels and other waterlogged sites.

The Late Neolithic

Late Neolithic monuments are the least common within the tripartite Neolithic and are only known from the Avon Valley. The absence of henge monuments may well relate to the occurrence of the earlier cursus monuments (c.f. Loveday 2006) so similar hengiform sites like those at Barford (MWA718) and Wasperton (MWA6755) might be represented by the crop marks at, for instance, King's Newnham (MWA3455), and elsewhere along the Avon. Pit groups are slightly more widespread than in the earlier periods with examples outside the Avon corridor along the Arrow at Broom (MWA7454) and isolated pits in Dunsmore at Ling Hall Quarry (MWA9189) and Long Lawford. These pits also provide our only evidence for the environment at these locations albeit in the form of charred plant remains that only indicate certain aspects of the immediate locale. At Church Lawford, there was limited evidence for cereal use whilst at Broom (MWA7454) only wild species were represented. The few radiocarbon dates from the pits at Church Lawford and Broom do not provide a reliable chronology for activity at either site (Palmer, S 2006a). There are no burials for this period although cremated bone was recovered from the Church Lawford and Broom pit groups. There are no distinct flint scatters of this period and no clear evidence for settlement or other activity areas.

The current evidence suggests that the Avon remained an intrinsic life-way for Neolithic peoples in this late period with the majority of the datable evidence coming from its gravel terraces. There is though some evidence that activity extended into the smaller valleys and onto higher more remote topographies such as Dunsmore where it was previously absent. The distribution of undifferentiated flint scatters in the wider region may suggest that Late Neolithic activity areas could be isolated if wide-scale and intensive survey is conducted. The absence of environmental data is again a major deficit, which is only likely to be tackled by sampling palaeochannels and other waterlogged sites.

The Early Bronze Age

As in the earlier periods, there is a proportional increase in monuments of this date within the County although the statistics are almost entirely reliant on round barrows that have not been tested by excavation. The occurrence of barrows on the High Cross Plateau clearly relates to the spread of undifferentiated flintwork in that area which is not matched anywhere else in the County, with the possible exception of the Industrial Arden where a small group of barrows and flint scatters are present. There is though no corresponding match of flintwork to barrows southeast of the Feldon and in the Arden but this could be explained by the lack of fieldwork in these areas. Although the earlier complexes along the Avon appear to acquire new elements, barrow building does not appear to have been requisite along the valley. It is possible that barrows have long since been ploughed down but there is no proliferation in ring-ditches either. Excavated barrows have produced very little dating evidence and none are richly furnished.

There is no evidence for settlement but the occurrence of pits is more widespread than during the preceding period. The pits at Church Lawford (MWA8818) and Oversley (MWA10287) have revealed limited evidence for cereal use, whilst the presence of charred plant remains allude to their local environments but like the earlier periods, there is no clear evidence for the wider region.

There is no evidence for settlement and no flint scatters are sufficiently distinct to isolate activity areas but it is reasonable to suppose that much of the material recorded on Figure 15 is of this date.

Evidence for the Early Bronze Age is probably more widespread than that of the earlier periods although still largely focussed on the aggregate areas. The absence of environmental data is again a major deficit that is only likely to be tackled by sampling palaeochannels and other waterlogged sites.

For a summary of the research topics for the Neolithic and Early Bronze Age periods, see Section 6.1.2.

5.3.3 Middle Bronze Age to Late Iron Age (1600 BC – AD 43)

For a summary of the research topics for the Middle Bronze Age to Late Iron Age periods, see Section 6.1.3.

5.3.3.1 Introduction

Within the HERs there is an overlap between the date ranges for these two periods resulting in a frequent lack of distinction between them and the monument densities reflect this. This is particularly the case within Solihull HER.

By the Bronze Age, the density of monuments across the County has risen to 0.48 per km^2 (See Table 4). Warwick District, Solihull and Rugby District are above this average (0.80, 0.55 and 0.54 respectively). North Warwickshire, Stratford (both 0.38), and Nuneaton & Bedworth (0.28) have below average densities. Note that these figures include the early Bronze Age as explained above (Section 5.3.2.1).

In the Iron Age, the overall monument density drops slightly to 0.41 per km^2. This is mirrored across all districts which show the same pattern with Warwick, Solihull and Rugby having above average densities (0.63, 0.55 (not actually a drop) and 0.45 respectively) and North Warwickshire, Stratford and Nuneaton & Bedworth below average (0.35, 0.34, 0.19).

Within aggregates areas, both periods have an above average density of monuments (0.79 and 0.69 respectively, see Table 6). In the Bronze Age the highest monument density is seen in Industrial Arden (1.55) as it has been since the Mesolithic with Lower Avon second (1.42). In the later period these positions are reversed (Lower Avon – 1.91, Industrial Arden 1.21) and it is worth noting that Industrial Arden is the only study area with a higher monument density in the Iron Age than the Bronze Age. The remaining study areas show a broadly similar distribution in the two periods with Anker, High Cross Plateau, Dunsmore, Cotswold Fringe, Stour, and Central Arden being above average in both, Arrow/Alne average, and Feldon below average.

5.3.3.2 Current State of Knowledge

(By Stuart Palmer)

5.3.3.2.1 The Middle Bronze Age (c 1600 – 1200 BC)

See Figure 20.

Across Britain the early second millennium BC is widely regarded as a time of enormous social change engendered by new conceptions of identity and territory. The landscape gradually became more divided and as clearance and new settlement increased so did new manifestations of prestige, authority and regional diversity (Champion 1999; Parker-Pearson 2005, 96-100). There is though an alternative model in which the fluid and mobile lifestyle of the Neolithic prevailed well into the second half of the second millennium (Richmond 1999; Kitchen 2001, 110) with some regions not exhibiting the boundary and farmstead evidence associated with permanent settlement until the first millennium BC.

In Warwickshire and Solihull, the quantity of metal artefacts in circulation increases throughout the Bronze Age (although all Bronze Age artefacts are shown on Figure 20 due to the limitations of the HERs). Axes, palstaves, other weapons and gold objects have been recovered by metal detectorists or sometimes by chance, but few from a recognised archaeological context. Their spatial patterning however does not correlate either with the spread of round barrows or burnt mounds and cannot therefore indicate any more than an unspecific presence. Two (surviving from a group of four) Ewart Park type Late Bronze Age swords from the River Blythe at Meriden were probably votive offerings (MSI6289) but otherwise the metalwork has been recovered from dry land contexts. Whether this is because the practice of conspicuous consumption (c.f. Bradley 1990) was not focused on 'watery places', as is common in other regions, or too little river dredging has occurred in recent times, or because there are no known bog deposits in the study areas is a matter for speculation and future research.

Arrow/Alne

A burnt mound, possibly associated with a shallow gully and a pit, and covered by alluvium lying adjacent to the River Avon was examined at Welford on Avon (Network Archaeology 2003) whilst a further possible burnt mound adjacent to the River Arrow was recorded at Church Farm, Coughton, also beneath alluvium (ibid.). Their occurrence beneath river alluvium in this area clearly suggests the potential for finding similar sites in the region.

Lower Avon

Traces of three possible post-built round-houses excavated adjacent to the Neolithic complex at Barford have though been posited as Bronze Age constructions, based on a few pieces of flint (Hingley 1996, 12), but this site still awaits proper analysis. A bronze chisel was deposited in a pit within the Neolithic hengiform enclosure at Barford (Oswald 1969; MWA718).

A small pit found amidst later features on the Barford bypass contained several sherds of probable middle Bronze Age date (Palmer, S forthcoming f).

Dunsmore

A late Deverel-Rimbury cemetery has been excavated at Ryton Wood, Ryton-on-Dunsmore (Bateman 1978a; MWA1842) and a further example may have been chanced upon in gravel workings at Wolston (Chatwin 1949; MWA3407).

Blythe/Tame

There is a plethora of burnt mounds, variously described as cooking places or the remains of sweat lodges, mostly in the Birmingham/Solihull area (Hodder 2004; eg MSI1751) but which extend into north-western Warwickshire (Barfield & Hodder 1989; Hodder 1992). Identification of these still enigmatic sites is a corollary of the intensive and systematic fieldwork undertaken in that area. As a group, they appear to indicate the presence of a significant population active in areas devoid of any earlier evidence. Given that there is little evidence for continued activity at the earlier ie, Neolithic and early Bronze Age sites, this evidence could be taken as an indication that there was a shift in occupation strategies or a translocation of settlement. Further burnt mounds have been excavated on the M6 Toll and an example at Langley Brook produced a radiocarbon date within the Early Bronze Age (Booth & Powell 2006; MWA9118).

Non-Aggregate Sites

Two further burnt mounds found at Sharmer Farm, Harbury (Barfield & Hodder 1989; MWA5112 and MWA800) were chance encounters on non-aggregate soils but their existence proves that the site type is likely to be more widespread than current evidence suggests.

Pottery and a small copper alloy knife found in a pit group at Coton Park, Rugby (Northamptonshire Archaeology 1998; MWA10312) and a second pit group associated with a significant assemblage of Deverel-Rimbury pottery found on an adjacent site (Maull 2001; MWA7953), along with a large portion of a single vessel recovered from a pit at Mancetter (Palmer 2004; MWA9843) provide further tantalising glimpses of possible settlement evidence, but equally they may only represent short-lived visits to a locale.

A small Deverel-Rimbury associated cremation cemetery was excavated at Coton Park adjacent to the Middle Bronze Age pit group (Maull 2001; MWA7953) and further single cremations were recovered from Long Itchington (Palmer, S 1992b; MWA5748) and Harbury (Palmer, S 2006a; MWA8822).

5.3.3.2.2 The Later Bronze Age and Early Iron Age (c 1200 BC – 400 BC)

See Figure 21.

The climatic down-turn at the beginning of the first millennium BC may well have provoked social and economic pressures in the increasingly settled and divided agricultural landscape (Champion 1999). It is in this period that we have our earliest evidence for permanent settlement although the extensive field systems prevalent in other areas (Yates 2001; Evans & Knight 2001) are still absent in the county. Many of the unexcavated pit alignments known as crop marks in the major river valleys may date from this period as they do in the region to the east of Warwickshire (Jackson, 1993) and many of the region's undated crop mark sites could also reasonably expected to include elements of this date. There is evidence at a number of excavated sites for the continued deposition of significant and special deposits in this period.

Lower Avon

Along parts of the Avon and Arrow valleys smaller tributaries were used to define land-units (Palmer 1999a), whilst at Wasperton the earliest example of a man-made boundary, a ditch that sealed off a loop in the River Avon, is dated c 1300–850 BC (MWA5500). This early boundary was re-dug as a pit alignment c 850–650 BC. Four small, house size enclosures constructed either side of the boundary have also been dated 850–650 BC and contemporary features include two large linear pit groups. The earliest dated enclosures in the area were also found at Wasperton: three large rectilinear enclosures dated 650–550 BC. One enclosure was associated with two ditched trackways or drove roads, which by implication suggests a fairly sophisticated regime involving fields for crops and/or areas of pasture. Four early Iron Age pit burials were recorded at this site and in the Late Bronze Age a pit with structured deposits was positioned on an alignment of Neolithic monuments (information supplied by Ann Woodward).

A small group of pits of probable late Bronze Age date was found at Park Farm, Barford (Cracknell & Hingley 1994; MWA7024) and these might have been related to a linear boundary ditch associated with a palisade, although a later date is also feasible. Trial trenching at Charlecote also produced pottery attributable to this period (Hughes & Jones 1996).

The burial record in this period is almost unknown save for an unusual high status cremation performed within a mini-ring-ditch at Broom, Salford Priors, in which three rare bronze cauldrons were included on the pyre (MWA7229). The pyre site lay immediately adjacent to a Late Bronze Age pit that contained a ceramic 'drinking set' and there was evidence for the exploitation of woodland, such as coppicing in the Late Bronze Age (Palmer 1999a, 36-43).

Dunsmore

At Ling Hall Quarry, Church Lawford, in the centre of the newly deforested Dunsmore plateau, alignments of closely spaced posts were erected c 920-410 BC (Palmer 2002; MWA7208/9189). These are thought likely to have been screens associated with an open area between individual land units. A small number of unenclosed Late Bronze Age roundhouses have been identified (Area AB) and these currently represent the earliest securely dated evidence for domestic buildings in the county (Palmer forthcoming b). Some of the houses are associated with an early phase of pit alignments: two parallel alignments aligned northeast to south-west divide the area although the alignments may have followed an existing boundary (Palmer forthcoming g).

Trial trenching at Wolston Fields Farm, Ryton-on-Dunsmore identified several areas of activity over a 140ha. site (Palmer 1990, eg MWA4001). One such area that included a large bell-shaped, clay-capped pit has recently been re-excavated and it seems that the Late Bronze Age material was residual within the later Iron Age pit (Palmer forthcoming c).

Anker

A few features of probable Late Bronze Age/Early Iron Age date were evaluated at Polesworth (Palmer 1992c; eg MWA5766) but it is far from sure how well such features reflect the settlement record.

Cotswold Fringe

An unenclosed pit group was excavated at Burton Dassett (Booth 1989c; MWA8735), although no other evidence for contemporary settlement was encountered. It is conceivable that a trackway that was examined on the Oxfordshire side of the border at Rollright (Lambrick 1988a-c, 80-1) extended into Warwickshire, or at least to an otherwise unrecognised settlement predating the Middle Iron Age enclosure.

Non-Aggregate Sites

At Coton Park, Rugby, several arcs of shallow gullies have been suggested as evidence for a transitory episode of settlement (Northamptonshire Archaeology 1998; MWA10313) and a single pit was found at Harbury (Palmer 2006a; MWA8821). The large ceramic assemblage recovered during fieldwalking at Whitchurch (Hingley 1989a; 1996, 12; MWA4885) is reminiscent of the great midden heaps of Wiltshire such as Potterne (Gingell & Lawson 1985; Lawson 1994) and East Chisenbury (Brown et al 1994) and seems likely to be related to contemporary settlement. An assemblage of Bronzes from the site that includes miniature votive axes (Waddington pers comm) lends credence to the theory that this may be a high status site where social rituals of feasting and conspicuous consumption were performed (Palmer forthcoming d) but could also represent a single element in a densely occupied area.

Hillforts (see Figure 22), perhaps once the quintessential site type of the Iron Age, have in the past been interpreted as tribal capitals, communal stores, meeting places, markets and community retreats in times of trouble, but are now more widely regarded as a regionally diverse manifestation often developed in the later Bronze Age. Only three within the county have been tested but none sufficiently excavated to determine their function and the absence of such sites in large parts of the county raises many questions as to their role as central places or elite residences (Palmer forthcoming d). The defences at Nadbury hillfort, Kineton (MWA755) have been dated c 600-400 BC although pits beneath the rampart are likely to have been older still (McArthur 1990). Similarly dated pottery has also been recovered from the surface near the ramparts (Wager 2002). Pottery likely to be of a similar date has been recovered from a so-called pit dwelling at Meon Hill hillfort (Hodges 1906; Price & Watson 1982; MWA5459), yet there is no record of its considerable defences having been examined. The defences at Corley included a timber rampart (Chatwin 1930b; MWA369) whilst those at the one-time valley fort of Wappenbury (see Hingley 1996, 18, Fig 10; MWA1840) were again tested and found to be Romano-British or later (Booth 1991; Palmer 2003c). Further evidence that local hillfort sites were used at this time was recovered during fieldwalking at Foxhill, Alderminster (Hingley 1987a; MWA3846).

Further settlement locations of this date are indicated by ceramic assemblages recovered from fields at Ettington (Hingley 1987b), Idlicote (Hingley 1987c) and Halford (Hingley 1987d), all in the Feldon area.

At Wishaw a human skull found in a pit, part of a pit alignment (MWA9091), has an early Iron Age radiocarbon date although pottery from the same feature is likely to be later (Booth & Powell 2006, 290).

5.3.3.2.3 The Middle and Later Iron Age (c 400 BC – AD 43)

See Figure 23.

Population expansion concomitant with a slowly improving climate from the middle of the first millennium BC prompted new episodes of forest clearance (Haselgrove 1999), initially for pasture and later for cultivation. Earlier notions of belonging and exclusion were emphasised with the construction of major earthwork boundaries and the further division of the landscape. The near ubiquitous rectangular ditched enclosure crop marks of Warwickshire are generally thought to be Middle Iron Age in date (Hingley 1989d; 1996, 16), although earlier and later examples are known. The dead were generally excarnated leaving little trace, although certain individuals received special treatment (Carr & Knüsel 1997).

Lower Avon

At Wasperton the Early Iron Age enclosure was abandoned between 500–250 BC and a replacement constructed to the south (MWA5501). Further enclosure modifications were made on the east of the boundary and open settlement occurred to the north. The main enclosure was enlarged and open settlement is associated with a large pit group during the period 250 - 1 BC. The main settlement enclosure was enlarged again during the conquest period but there was a focal shift to the south in the early Romano-British period (Information from Ann Woodward).

At Marsh Farm, Salford Priors (MWA5757) the largest of a pair of enclosures and nearby open settlement features have radiocarbon determinations that indicate use throughout the Mid-Late Iron Age (Palmer 2000d; forthcoming b).

Further enclosed settlement was excavated at Park Farm, Barford, where 'currency bars' were deposited in the top of the enclosure ditch (Cracknell & Hingley 1995). Antenna ditches attached to a large rectangular crop mark and external pit groups were excavated adjacent to the river on the Barford Bypass with one pit containing a dump of charred wheat (MWA700). A nearby pit and posthole group was also examined (Palmer forthcoming a). Elsewhere in Barford parish a group of three small rectangular enclosures set close by the Neolithic monuments at Barford, (Oswald 1969; MWA4700) may now be considered as possible ceremonial sites (Palmer 2006a).

Further enclosed settlement was excavated at Brandon Grounds, Brandon and Bretford (MWA1836; Bateman 1978b); whilst an enclosure evaluated at Fulbrook was apparently empty (Palmer, N 1996; MWA4948).

At Walton, Wellesbourne, a linear boundary ditch may have divided an area of occupation from an area of propitiatory and ritual activity, whilst also providing the axis for the settlement features. Three pit burials were found alongside the boundary ditch adjacent to a pyre site covered by a stone cairn and a further pit contained an articulated animal carcass. The excavated part was apparently occupied through the Mid-Late Iron Age (Palmer 2006b).

Middle and Late Iron Age settlement activity was found beneath the Romano-British village at Tiddington (N Palmer pers comm; MWA5554).

Late Iron Age pits were examined in an enclosure at King's Newnham with one pit producing evidence for a dump of spelt/bread wheat (Palmer, S 2003e; MWA3456) and further limited evidence for activity was examined at Wixford where there was evidence for the cultivation of spelt wheat (Palmer, S 2000e; MWA7232).

A very deep, almost shaft-like, pit was found within a possible enclosure at Charlecote Road, Wellesbourne (Jones & Palmer 1997; MWA7926).

A few linear features that yielded pottery were revealed during an evaluation at Longbridge Manor (Warwickshire Museum 1997) although the site was developed without any further record being made (MWA7947).

Dunsmore

On Dunsmore, the earlier system of pit alignments is augmented by alignments of smaller round pits that radiate from the earlier alignments forming new land-units that are mirrored by medieval township boundaries (Palmer forthcoming g). Many of these alignments were later redefined by shallow gullies (Palmer 2002). The washing-line enclosures at Ling Hall Quarry, Church Lawford (Areas F & AB; Palmer 2002; MWA9189) and Bourton Heath (Hodgson 1991; MWA7373) post-date the pit alignments to which they are attached but are Middle Iron Age. Not all were actual settlement sites as some were devoid of internal features and are likely to have been used for stock control. This landscape also included a major complex of Late Iron Age inter-linked enclosures (Area Z) attached to a double pit alignment that extended between two major boundary alignments. Many of the enclosures contained buildings although preliminary analysis suggests that only one building existed within each enclosure at a time (Palmer forthcoming g). Two mini-ring-ditches have been identified, one in a sub-rectangular enclosure outside the main Area Z complex. A group of possible excarnation platforms could be seen within an adjacent land-unit. Extensive sampling for charred plant remains at this site has recovered evidence that suggests that woodland clearance precipitated the development of heathland on the acid rich soils and the shortage of timber probably resulted in the burning of gorse and heather as fuel throughout the occupation of the area. The only pre-Romano-British field in the County was identified at this site (Area AB).

A D-shaped enclosure with a possible palisade at Frankton seems unlikely to have been domestic given the low incidence of pottery and its morphological similarity to the double ditched D-shaped enclosure at Ryton Wood, Ryton-on-Dunsmore (Palmer 2006a; MWA8820). This feature was originally published as Late Bronze Age (Bateman 1978b), but it is now thought more likely to be Middle Iron Age (Cracknell & Hingley 1994, 27; Hingley 1996, 11; Palmer 2006a).

A Middle and Late Iron Age settlement site that apparently extended into the Romano-British period was partially excavated at Lodge Farm, Long Lawford (Havard et al 2006). This site located on Lower Lias geology produced little environmental data but seems likely to have been in an environment of damp grassland, supporting a presumably pastoral economy.

Settlement of Middle to Late Iron Age date at Wood Farm, Bubbenhall has been examined (MWA8779). This apparently agglomerated open settlement included a large group of roundhouses built directly on the clay substrata that overlies the gravel. The site lies to the north of Glebe Farm where previously some large Iron Age ditches were found cutting an outcrop of the gravel (Jones et al forthcoming). That the settlement was on the clay and not the gravel has many implications not least that other settlements are likely to exist on the less tractable geology and that this particular landscape is likely to have been well exploited.

Late Iron Age ditches and gullies were examined at Cawston Old Farm, Cawston (Kenyon 2001; MWA4142).

Stour

A disparate group of features of Late Iron Age/early Romano-British date has been recorded under difficult salvage conditions at Stretton-on-Fosse (Gardner et al 1982) but it remains unclear as to their function and significance (MWA5463). A possible burial of Iron Age date was accompanied by two bracelets (Thomas 1974, 40; MWA3004).

Arrow/Alne

A single pit of middle Iron Age date has been recorded in Alcester (MWA5679), whilst a late Iron Age settlement was evaluated to the west (Jones & Palmer 1995; MWA7113). Beneath the Romano-British site at Coulter's Garage (MWA10237), pollen, macrofossil (Woodwards & Greig 1989, 91-4) and insect remains (Girling 1989, 95-6) provided evidence of an extremely wet environment, probably of marshy ground with standing water. Some nearby forest of oak and lime with hazel scrub was indicated although grassland and weeds of disturbed land were likely to have been closer by. This horizon was dated to the Middle Iron Age (HAR 4905; Booth 1989).

Anker

A late Iron Age pit group excavated at High Cross Quarry, Copston Magna (MWA10232), seems to be isolated from any settlement remains although further features of this date were evaluated in the quarry site (Palmer forthcoming e).

Blythe/Tame

An unusual polygonal enclosure settlement with double opposed entrances at Meriden is thought likely to have origins in the middle Iron Age (Stevens 2005; MSI6400).

A curious site excavated on the south side of the county boundary at Langley Mill, Wishaw (MWA9109; Birmingham Northern Relief Road (BNRR) Site 30), included a possible roundhouse with a western entrance lying adjacent to an annular ditch. Both were securely radiocarbon dated to the middle Iron Age but their location immediately adjacent to a watercourse and the absence of domestic finds temper any suggestion that they were settlement features. A spread of burnt stones had a similar radiocarbon date. North of the brook, a sub-rectangular enclosure containing a single roundhouse of a similar date was excavated (Staffs). Very few finds were recovered from this site, the dating almost totally reliant on the radiocarbon dating results. Some 2km to the west at Wishaw Hall Farm (BNRR Site 19) a pit alignment with a radiocarbon date placing it in the middle Iron Age was superseded by a segmented ditch of a similar date (MWA9091). A human skull with a radiocarbon date in the early Iron Age was placed in the bottom of one of the pits in the alignment although this site was predominantly on Mercia Mudstone (non-aggregate geology). A banana gully of this date was excavated on the adjacent site (MWA9096/7; BNRR Site 20) along with a few pits (Booth & Powell 2006).

Central Arden

Many of the undated linear crop marks in the region probably date from this period. The massive Hobditch earthwork enclosure and boundary system (MWA1202) partially examined at Lapworth (Cracknell & Hingley 1995; Hingley 1996, 12) possibly represents a 'territorial oppidum' (Hingley 1989e, 145) and therefore be of late Iron Age date. Such sites may have been constructed on tribal boundaries in areas with little previous settlement evidence (Moor 2006) and have been important trading and meeting places.

Cotswold Fringe

At the enclosure excavated at Long Compton (Rollright; MWA5536) a preponderance of sheep remains was taken as evidence that the upland location was used for grazing with pottery in the surrounding ploughsoil indicative of manuring and thus of agriculture. The skeleton of an infant was recovered from a pit (Lambrick 1988, 84).

Non-Aggregate Sites

An extensive settlement with at least 25 buildings at Coton Park, Rugby was discovered as a result of geophysical survey on Boulder Clay (Northamptonshire Archaeology 1998; MWA8221). This site has produced a reasonable assemblage of animal bones and there appear to have been distinctive areas where industrial or craft activities took place. One group of structures was associated with bone and copper working, as 'bronze working' crucibles and fired clay moulds for horse harness fittings have been identified. Iron smelting slag was recovered from another building and a separate building was associated with fired clay loom-weights. The implications of this are potentially far reaching, as it appears that the site was far more sophisticated in terms of material culture than any of the sites so far excavated on gravel. Quite why this settlement produced substantial material evidence whilst the enclosures beneath the deserted medieval village to the north did not (Maull 2001; MWA10314) is yet to be explained.

A late Iron Age pit recorded at Long Marston produced domestic debris indicative of settlement and an assemblage of snail shells indicated that it was filled in an open grassland environment (Network Archaeology 2003).

Late Iron Age settlement features were also recorded at Napton with some evidence that occupation continued into the Romano-British period (Dalton & Booth 1997; MWA7395).

The single known example of a 'banjo' enclosure in the county at Heathcote produced a few sherds of probable Middle Iron Age pottery when evaluated (Coutts & Jones 1998; MWA4561).

5.3.3.2.4 Summary Discussion

Middle Bronze Age

Evidence for the Middle Bronze Age within Warwickshire and Solihull is largely a reflection of the distribution of burnt mounds and the occurrence of Bronze Age metalwork. No settlement sites or field systems have been identified and only a few sites have produced pottery of this date. Radiocarbon dates are restricted to those from burnt mounds and cremations and there is no environmental evidence at all for this period.

In Gloucestershire, a correlation has been noted between settlements and cemeteries of this date (Darvill 2006) so the cluster of cremation cemeteries along the Upper Avon gravels could imply nearby settlement, as has been observed on the non-aggregate clay site at Coton Park (Northamptonshire Archaeology 1998; Maul 2001; MWA10312 & MWA7953). Flintwork of this period has generally not been distinguished from that of other periods; hence there are no known settlement sites evident as surface scatters.

The spread of burnt mound sites in the Solihull area can be attributed to the prospecting for such features by individual field workers in that area and likewise the cluster of sites around Langley Brook may be attributed to survey in advance of the M6 Toll Road. The known distribution then is unlikely to be a true reflection of the relative densities of burnt mounds in the study area and therefore the blank areas are unlikely to be locations where Middle Bronze Age activity was not performed. One of the Langley Brook burnt mounds has yielded Neolithic radiocarbon dates (MWA9118) so by implication some of the other undated examples may belong to other periods.

The location density of metalwork find spots are equally misleading as they largely represent chance finds or the locations where metal detectorists have been actively reporting their finds. The plot on Figure 20 includes all metalwork reported as Bronze Age in the HERs and thus could

include Early and Late objects. It is also impossible to distinguish whether they represent chance losses or items deliberately deposited within activity areas or whilst travelling etc.

Clearly although the aggregate areas retain a prominent role in the Middle Bronze Age, the current, albeit limited, evidence for activity suggests that occupation was more widespread than previously, with new areas showing evidence for activity. The extent to which the current evidence can be used to interpret the period though will require much more detailed survey and analysis across more varied geologies and topographies. The location and excavation of sites of this period is a research priority.

Late Bronze Age and Early Iron Age

The earliest evidence for permanent settlement and boundary construction within the study areas occurs in the Avon Valley and on Dunsmore although domestic houses are known only from Dunsmore. Boundary features include pit alignments, posthole alignments and ditches. Houses are circular and built with mass walls, a tradition that continues until the Romano-British period, and a technique that leaves little trace unless the house is set within a penannular ditch. More ephemeral traces of settlement have been glimpsed in the Anker Valley, the Cotswold Fringe and in the wider Feldon region. No enclosures are known to date from the Bronze Age, the earliest so far known being Early Iron Age, although there is limited evidence for activity at one site at least that later developed into a hillfort. There is mounting evidence for settlement on various non-aggregate geologies and the Whitchurch midden site has yielded an impressive range of artefacts suggestive of high status occupation. There are only a few burials of this date. The chronology of the period is woefully poor being reliant on ceramic typologies augmented by a few radiocarbon dates.

Evidence for the environment during this period is poor, being reliant on a few charred plant assemblages that only partially reveal the environment local to the context from which they are derived.

The distribution of evidence for this period has been heavily biased by excavations on mineral extraction sites and the evaluation of proposed mineral extraction sites. The occurrence of finds on non-aggregate geology therefore serves to show that it is possible that farming settlement and activity of this period did not favour the gravels. Nevertheless, it will require considerably more survey work on a range of geologies and across varying topographies to determine the importance of the aggregate areas. The location and excavation of sites of this period is a research priority.

Middle Iron Age and Late Iron Age

There is an almost exponential increase in settlement activity and pit digging throughout this period that is likely to reflect the increase in the population over this time. There is likewise continued development of the boundary systems. The occurrence of ditched enclosures predominantly of Middle Iron Age date in aggregate areas is undoubtedly a reflection of their ability to produce crop marks so it can be assumed that there is a proportionally larger amount of unenclosed late Iron Age open settlements still to found What the proportion of these sites will be within the aggregate areas is still debatable not least because of the recent work on non-aggregate geologies, which has yielded what are probably higher status sites than those on the gravels.

The possible Hobsditch territorial oppidum in the Arden (MWA1202) could potentially provide invaluable data regarding political and social aspects of the pre-Romano-British Iron Age and given that Romano-British occupation is already known here, it may well provide data on the transition.

A small number of burials can be dated with certainty to this period, but evidence for field systems is limited to a single example and there is little environmental evidence for the region.

The chronology of the sites has until recently been reliant on ceramic assemblages but it is becoming increasingly clear that so-called middle Iron Age forms remained in use well into the later period on some sites. It is not until the arrival of Belgic grogged wares that a distinctive Late Iron Age can be recognised on some sites, although its absence need not imply inactivity at this time. There are only a very few radiocarbon dates for the period.

Clearly, the aggregate areas contain a wealth of data for the period, which is steadily being augmented with evidence derived from non-aggregate areas. This data should be synthesised to allow comparative studies to be made at sub-regional, regional and national levels.

For a summary of the research topics for the Middle Bronze Age to Late Iron Age periods, see Section 6.1.3.

5.3.4 Romano-British Period (AD 43 – 410)

For a summary of the research topics for the Romano-British period, see Section 6.1.4.

5.3.4.1 Introduction

In the Romano-British period, the monument density across the County rises to 0.59 per km^2, its highest value so far (See Table 4). The southern districts of Stratford and Warwick have densities above this (0.74 and 0.67 respectively). The northern districts of Solihull, North Warwickshire, Nuneaton & Bedworth and Rugby are all below this (0.46, 0.48, 0.23 and 0.37 respectively). Given their overall density values the low values in Solihull and to a lesser extent Rugby, and the high value in Stratford are likely to be significant.

The overall Romano-British monument density on aggregates is fractionally above the County average (0.61, see Table 6). The highest density of sites of this date was seen in Arrow/Alne (1.48), which is clearly significant given the much lower densities seen here in earlier periods and probably the result of Alcester's situation within the study area. Stour, Anker, Lower Avon and Industrial Arden are also above average (1.35, 1.06, 0.97 and 0.88 respectively). Dunsmore is close to the average (0.56) and Cotswold Fringe, High Cross Plateau, Blythe/Tame, Central Arden and Feldon are all below average (0.48, 0.41, 0.39, 0.39, 0.27). The overall pattern seen for the districts, showing low densities in the north and high densities in the south, suggests that the above average densities for Industrial Arden and Anker in the north are particularly significant, as is the low value for Feldon in the south.

5.3.4.2 Current State of Knowledge

(By Stuart Palmer)

See Figure 24 and Figure 25.

The story of Romano-British Warwickshire begins with the arrival of, and subsequent occupation by, the Roman army, as there is no evidence for Romano-British influence in the region before the later AD 40s (Booth 1996, 26). The immediate effects of the new order on the majority of the population are difficult to recognise in the archaeological record, as the pre-conquest settlement patterns continue well into the early Romano-British period. Any study of the period will therefore include, of necessity, the Late Pre-Romano-British Iron Age background Indigenous society is likely to have been based on kin groups of varying sizes holding land or estates, as agricultural and economic units, and subject to partible inheritance (Smith 1997, 275-277), and there is some evidence to suggest that this social structure continued throughout the Romano-British period (Hingley 1989d). Currently there is no evidence for native nucleated settlement before the invasion.

Burials have been recorded at a number of sites, although datable examples have all been later Romano-British. The absence of early Romano-British burials may well reflect a continued adherence to late Iron Age funerary practices. If indeed so, late Iron Age religious, ceremonial and ritual practices are also likely to have continued. It is also evident that the majority of the rural populace continued the Iron Age tradition of building circular dwellings in the early Romano-British period, there being no evidence for rectangular structures until the later Romano-British period, except at Tiddington (Palmer, N 1983). Whether these aspects of domestic life reflect a reluctance to accept or engage with Romano-British acculturation, or merely the relative pace of the spread of these innovations, remains unknown.

5.3.4.2.1 Military Sites

Six military centres are known in the county[14], although only three have been subject to excavation. Other military constructions include the early road network, which was designed to link military centres by the quickest possible routes (Margary 1973). These were major constructions that in some cases cross several study areas. At least four routes: The Fosse Way (MWA4759), Watling Street (MWA420), Ryknield Street (MWA445) and the Salt Way (MWA4757) are likely to have had military origins on the basis that they link forts and their routes are tolerably well known. Other minor roads that linked settlements and which may have been later civil constructions are less well known, as few have been excavated and dating such features is particularly difficult (cf Palmer, N 1983; Stanley & Stanley 1959, 1960; Foster & Cameron 1961). There is a presumption that settlement will have developed along many of these routes, eg Billesley Manor Farm (Palmer, S 2003a; MWA7277).

Arrow/Alne

A crop mark of a fort on a ridge overlooking the River Arrow at Lower Oversley Lodge, Alcester is thought to be early in date, although it has yet to be tested by excavation (MWA455). It may have been replaced by a later structure in the Bleachfield Street area in the centre of Alcester, around which the later town developed. Evidence for this comes from a few military finds and limited structural evidence. Both these sites lie next to Ryknield Street (MWA445), which was a strategic military road before forming the basis of the local trade route network. There is some evidence to suggest that the Bleachfield Street fort may have been occupied as late as the 2nd century (Booth 1996). This is considerably later that other local military establishments but it remains possible that occupation was by troops undertaking procurement duties for the frontier army.

Dunsmore

An unusual fort at Baginton has been extensively excavated (Hobley 1969, 1973, 1975) and its remarkable gyrus is unique in Britain (MWA2673). However, the full extent of its earliest phase remains uncertain (Booth 1996), as does the extent of any associated or later settlement (Frere 1984, 295).

High Cross Plateau

A small fort at High Cross identified from a crop mark c 1km northwest of the junction of two major Roman Roads (Foss Way and Watling Street) was demolished after a short period of use when Watling Street was built across the site (Wilson 1971, 258; Leics).

Lower Avon

Two unexcavated crop mark sites at Orchard Hill Farm, Stratford-upon-Avon (MWA871) and Budbrooke, Warwick (MWA2798) could represent forts (Booth 1996, 28).

Industrial Arden

A probable 'vexillation fortress' at Mancetter (MWA7960) has seen numerous small-scale excavations and was probably occupied by a legionary detachment with auxiliary troops. It was probably reoccupied on a smaller scale, perhaps to police the region after the Boudiccan rebellion, and was finally abandoned in the mid-late 70s (Booth 1996; Scott 1984 & 2000; Thompson *et al* 2006).

5.3.4.2.2 Nucleated Settlements

The term nucleated refers to those complex settlements with more than one domestic or residential focus, ie in modern parlance a town, village or hamlet, although these terms are thought inappropriate in the majority of the cases below because insufficient evidence exists to demonstrate the differences between them.

Arrow/Alne

The most important settlement in Romano-British Warwickshire was Alcester (*Alauna*; MWA4495), which is thought, on the basis of at least a few public buildings, to have had a local government status (Booth 1996). Alcester is one of the most extensively excavated Romano-British small towns in Britain (Booth 1989a, 1989b; Cracknell 1989, 1996; Mahany 1994; Cracknell

[14] An alleged fort at The Somers, Meriden (Booth 1996, 28), was recently excavated and found to be a post-medieval enclosure (Stevens 2006; MSI645

& Mahany 1994, Booth & Evans 2001) although much remains beneath the present town. Cemeteries (MWA447) and isolated burials (MWA3788) have been found both within and outside the urban areas and a number of sites have yielded data on the local environment and the agricultural market although this has yet to be synthesized (Booth 1996, 45).

Blythe/Tame

The character and extent of the settlement at Coleshill (MWA10263) also remains largely unknown despite recent excavations (Thompson forthcoming), although there is certainly evidence for buildings/structures, pits and enclosures over a 500m stretch alongside the River Cole. It may have developed as a roadside settlement but the focus was a major temple complex (Magilton 2006) perhaps indicating the tribal boundary between the Cornovii and the Corieltauvii. This site is also significant for the continued use of middle Iron Age pottery fabrics and forms into the early Roman Period.

High Cross Plateau

The settlement at High Cross (MWA3678) is mostly known from the work undertaken across the modern county border in Leicestershire although scatters of Romano-British pottery have been found on the Warwickshire side (Palmer, S forthcoming a).

It is not certain if the settlement at Caves Inn, Churchover (Tripontium; MWA2788) developed from a military site (Booth 1996, 36) and the extent of the settlement remains largely unknown despite extensive salvage recording in the 1960s, although it seems to have spread outside the defended area (Cameron & Lucas 1969 & 1973; Lucas 2005). There was however, a substantial stone-built Mansio with an associated bathhouse (Lucas 1984).

Lower Avon

The settlement at Tiddington (MWA4469) is unique amongst the nucleated settlements in that there is evidence for Iron Age occupation of the site rather than it development along a major Roman road. The date of nucleation however remains uncertain although it was evidently during the mid-1st century transitional period. There is evidence for timber rectilinear buildings in use during the mid-2nd century and it seems to have been defended in the 4th century although the extent of the defences remains largely circumstantial. Pottery was also manufactured here (Palmer, N 1982, 1983). Soil samples have yielded important data on crop processing and the agricultural environment of the settlement (Moffett 1983).

To the south of Alcester, a small settlement at Bidford-on-Avon (MWA6178) developed at the point at which the Ryknield Street crossed the River Avon (Palmer, S 1991) although its size and extent remain unknown (Palmer, S 1999).

Dunsmore

The settlement on the Fosse Way at Princethorpe (MWA3106) may also have been defended, a surface pottery scatter indicating occupation both within and around the crop mark of a possible defensive enclosure (Booth 1996, 36). Small-scale excavations have demonstrated some 2nd century activity along the roadside (Cutler & Evans 2000).

The extent and character of the settlement around the fort at Baginton (MWA2673/5297-9) remains largely unknown (Frere 1984, 295) although given the importance of the place it is likely to have formed a nucleated settlement.

Industrial Arden

At Mancetter (MWA3860), the defended settlement lies astride Watling Street but further settlement spreads towards the nearby fort (Scott 1984 & 2000).

Cotswold Fringe

Extensive fieldwalking at Brailes has revealed Romano-British pottery scattered over an area of c 25ha (MWA2318). It is uncertain if this spread accurately represents the extent of underlying settlement, which would therefore be the size of a small town (Hingley 1988b) or merely the manuring pattern from a smaller nucleus.

Non-Aggregate Areas

The second most significant nucleated settlement in the county developed along the Foss Way at Chesterton and Kingston (MWA798). It is closely comparable to Alcester being a classic local

'central place' point midway between adjacent tribal centres (Booth 1996, 35) but there is no known military phase (Taylor 1967). Recent geophysical survey work has demonstrated that the settlement extends far outside the extant earthwork defences. A few small pits and a crouched infant burial were suggested as evidence for pre-Romano-British occupation although little further detail is known.

5.3.4.2.3 Other Settlements

This group includes the vast majority of rural settlements that appear or seem most likely to have been the farms and residences of family units: it includes villas, farmsteads and industrial sites.

Lower Avon

The villa site at Salford Priors (MWA1499), which lies on the terraces of the River Arrow, is the most extensively excavated in the county, although it remains enigmatic due to its dispersed layout. It developed from an Iron Age farmstead, migrating along the valley over time with the first villa type buildings erected in the 3rd-century (Palmer, S 2000e). Detailed environmental data was recovered in the form of charred plant remains (Moffett & Ciaraldi 2000) across the site, whilst waterlogged plant macrofossils (Monkton 2000), pollen (Greig 2000) and waterlogged insect remains (Smith & Langham 2000) came from a single waterlogged feature.

A villa at Welford Pastures (MWA4708) is known only from a combination of crop mark enclosures and a scatter of finds identified during field survey (Booth 1996).

The farmsteads at Abbot's Salford (Thomas & Palmer 1994; MWA10303) and Bidford Grange (MWA4923; Hart *et al* 1991) have been partially excavated, both yielding evidence for curvilinear enclosures but with little demonstrable signs of Romanisation other than each having corn drying ovens, although there was some evidence for rectangular buildings at Bidford Grange.

At Wasperton (MWA5502) a substantial enclosure and field complex represented a shift in settlement foci from the preceding Iron Age period but again other than corn drying ovens little evidence for Romanisation was recognised (Crawford 1982, 1983, 1984) although this site is yet to be fully analysed. A significant inhumation cemetery was also excavated (Ford 1996; MWA5503). Pollen evidence from a waterlogged well context revealed no evidence for cereal cultivation despite the proximity of the corn driers (Bowker 1983).

A small settlement enclosure sequence was excavated at Charlecote (MWA1147) although no buildings were identified and the site produced very few finds (Grey 1967).

Excavations on two adjacent enigmatic building sequences at Crewe Farm (MWA1887; Ford 1971a) and Glasshouse Wood, Kenilworth (MWA2594; Willacy & Wallwork 1978), revealed evidence for later Romano-British buildings but these sites are also imperfectly understood.

Arrow/Alne

A small scatter of pottery and flue tile at Sambourne (MWA3748) suggest the location of a small villa (Booth 1996). The Late Iron Age settlement known from the west of Romano-British Alcester (MWA7113) evidently continued into the Romano-British period although its nature and extent is little understood (Jones & Palmer 1999). Excavations amidst the crop mark enclosures at Church Farm, Coughton (MWA4646) recorded Romano-British elements (Network Archaeology 2003).

Stour

Salvage recording at Stretton-on-Fosse (MWA5360) revealed discrete elements of a settlement that probably developed from an Iron Age site with some evidence for iron and lead working in the later Romano-British period (Gardner *et al* 1982). A significant inhumation cemetery was also discovered here (MWA1833; Ford 2003).

Concerted fieldwork in the Alderminster, Whitchurch and Halford region has outlined the presence of a number of Romano-British sites in the valley (eg MWA3844) (Hingley 1987b, 1989a, 1989b 1989c) and it is likely that expansion of the survey would find more.

Dunsmore

A villa has been recognised from field survey (Ratcliffe 1981; Jones & Wise 1997) and limited excavation (Palmer 2006a) at Long Itchington in the Itchen Valley on the southern edge of Dunsmore (MWA1701).

A small farmstead partially excavated at Ling Hall Quarry, Church Lawford (MWA9190) developed from an Iron Age precursor using the same boundary system but was abandoned during the 2nd-century. An unusual figure of eight feature found in the same land unit is thought to have been a small shrine (Palmer, S 2002).

A small circular enclosure of uncertain function but which was attached to an Iron Age D-shaped enclosure was excavated at Frankton (Palmer, S 2006a; MWA8820).

Romano-British pottery kilns, which produced a distinctive greyware, have been excavated at Bubbenhall (MWA7247; Jones & Palmer 1994), Wappenbury (MWA2967; Stanley & Stanley 1964) and Ryton-on-Dunsmore (MWA4278; Bateman, J 1978a). All three sites exhibited evidence for attendant farming settlements although only at Bubbenhall was this much understood.

At Lodge Farm, Long Lawford early Romano-British enclosures developed from an Iron Age occupation site (Havard *et al* 2006) although no actual domestic structures were recorded in the limited area excavated. Further boundary features belonging to an otherwise unknown settlement were excavated at Chapel Street, Long Lawford (MWA9846; Jones & Thompson 2005).

Central Arden

Tile kilns are known from four sites in the Arden. At Dean's Green, Ullenhall the evidence is tenuous (Hingley 1987d; MWA1202) but an extensive range of buildings was examined nearby (MWA4791; Hutty 1975). At Lapworth, the kiln (MWA1699, Baddeley 1968, 1969) was associated with a series of pottery kilns of 2nd century date (Booth 1988; MWA6108). A well-preserved tile kiln was excavated in Chase Woods near Kenilworth (MWA3202; Andrews 1927) and tiles stamped 'T C M' were found along with wasters near Cherry Orchard (MWA3243; Powell 1965), although further excavations determined that the kilns had probably been destroyed by a brickworks (Sunley 1967).

Industrial Arden

Sufficient pottery kilns have been found at Mancetter and Hartshill to indicate the existence of a major industry with significance both to the local economy and nationally in terms of the range and distribution of its products (Hartley 1973; Booth & Thompson 1983; Jones, M 1984; eg MWA3866 & MWA302). Tile kilns have been excavated at Arbury (MWA1659) and Griff Quarry, Nuneaton (MWA1660; Scott 1971 & 1975). A glass making furnace was also revealed by Hartley at Mancetter but it was not excavated due to time constraints (Gould 1964, 8; MWA6244)

Cotswold Fringe

A sequence of ditches excavated at Napton on the Hill (MWA7395) appeared to relate to an otherwise unknown site of 1st-mid-2nd century date (Booth & Parsons 1994; Dalton & Booth 1997), all the more significant for its location on Lias clay geology. The field system revealed beneath the deserted medieval village of Southend, Burton Dassett, (MWA6195) was also on Lias clay (N Palmer pers comm) and together with the stone-walled structure and ditches revealed in a narrow pipe trench adjacent to Burton Dassett church (MWA8827) (Palmer 1998) and the large aisled building recorded at Fenny Compton (MWA10258; Eames, 2002) suggest that the area was extensively settled during the Romano-British period.

A crop mark site at Long Compton (MWA7900) probably represents a villa although no corroborative fieldwork has been undertaken. Occupation debris scattered over fields adjacent to the Rollright complex (MWA3801) have been used to illustrate the agricultural extent of an otherwise unknown settlement (Lambrick 1988, 68).

Feldon

Parts of a major villa have been examined at Ewefield Farm, Chesterton and Kingston (MWA782) although the range and extent of the complex is still unknown (Booth 1996, 40). Parts of an enclosure system examined on the west side of the Romano-British town seem likely to represent a farmstead but could equally have been an extra-mural area (Palmer 2006a).

Three possible villa sites are known from finds scatters at Lighthorne (MWA2299), Gaydon (MWA687) and Brookhampton, Kineton (MWA4530; McKay & Hingley 1984) although none has been tested by excavation. These sites have been found through local prospection and their existence clearly illustrates the potential for finding similar sites by this method elsewhere in the region.

Blythe/Tame

At Wishaw Hall Farm an enclosure with a trackway and parts of a field system superseded an Iron Age boundary system (MWA9093; Booth & Powell 2006).

Non-Aggregate Areas

A mosaic floor within a probable substantial villa was uncovered at Pillerton Priors (MWA9191) and it is likely that it developed from an Iron Age precursor (D Sabin pers comm).

A villa site at Radford Semele (MWA1905), also on the southern edge of Dunsmore, was tested by limited excavation although very little data was recovered (Haigh *et al* 1978).

At Billesley Manor Farm mid-way between the urban centres of Alcester and Tiddington, a settlement which included two substantial stone buildings and two corn driers was constructed adjacent to the Roman road (MWA7277) and is thought likely to have a specialised purpose, possibly related to the corn driers (Palmer 2003a).

A Romano-British enclosure was identified at Barnrooden Farm, Priors Marston (MWA4743/12132) although no meaningful fieldwork was undertaken (Coutts, 2000, WMA 43 97-8).

Evidence for extensive Romano-British settlement and field systems has been located around Long Marston (MWA9139; Thompson 2006; Network Archaeology 2003). Small-scale excavation at Dorsington revealed part of an enclosure complex without trace of any buildings (Cooke pers comm).

Fieldwalking over, and limited excavation in, a crop mark enclosure at Broadwell, Leamington Hastings indicates an isolated rural settlement (MWA8285).

5.3.4.2.4 Summary Discussion

Evidence for Romano-British settlement is generally more widespread than that of the preceding periods. The higher ratio of known sites is likely to be a result of a combination of factors. Firstly, it is widely recognised that there was a gradual increase in the population throughout the Romano-British period; numbers probably akin to later medieval period are thought likely. Secondly, there was an increase in durable material goods during the period with perhaps less reliance on organic materials for cooking, tableware etc and these have been easily recognised especially on the surface of fields as pottery scatters.

Nevertheless, there appears to be a marked increase of sites in non-aggregate areas, or at least areas of geologies other than gravel. Whereas this might be taken as a reflection of a broadening of the agricultural base and a diversification of industrial activity, especially the ceramic industry which requires enormous quantities of fuel and raw materials, it remains possible that the ratio is biased due to the vagaries of survey strategies and ease of identification, although as Esmonde Cleary (2006) states in respect of the discrepancies in the visibility of sites across the West Midlands region, it must correlate to 'choices made in the past'.

Currently there is stronger evidence in the south of the county for the adoption of the displays of Romano-British culture prevalent in the Southern and Eastern Britain than in the north. This is most obvious in the number of villa sites and the types and range of finds recovered in the south. Occupation north of the Avon may well have been more pastorally inclined and this could have been a reflection of local cultural mores, which may be tribally distinctive. The exact tribal boundaries are unknown although it is reasonably certain that the south was Dobunnic, the north Corieltauvian and the northwest Cornovian.

Most of the settlement sites excavated have been in the southern region and were predominantly agrarian in nature, perhaps focussed on the production of cereals. Currently though there is insufficient evidence for their trading patterns to be established but it is possible that the region was heavily involved with the export to the military frontiers (cf Esmonde Cleary 2006).

Environmental evidence for the period is woefully inadequate having only been recovered from a few sites. Evidence of pollen and macrofossils from waterlogged contexts are particularly poorly served (Moffett 2000); examples from a well in Alcester (Colledge 1978) and a waterlogged ditch at the villa site in Salford Priors (Greig 2000; Smith & Langham 1999; Monckton 2000) providing only limited details of what was apparently an open treeless landscape in the Lower Avon area. North of the Avon, the limited evidence from Mancetter and Harborough Magna suggest a bias towards open grasslands (Greig 2006).

Industries involving the manufacture of pottery and tiles are well represented in the study area although too few of the sites examined have been fully published. Some, such as the Mancetter kilns had a national market whilst others such as the Bubbenhall/Ryton-on-Dunsmore/Wappenbury wares and Tiddington wares were evidently traded locally.

There is an almost total absence of briquetage, the crude ceramic vessels used to transport salt, in the county which is of particular interest given the proximity of the important salt production centre at Droitwich, Worcestershire. The Salt Road that passed through Alcester and Stratford upon Avon was of major importance in the medieval period and is thought to have been in existence in Romano-British times.

A possible glassworks was identified at Mancetter but evidence for the working of metal has yet to be found

There is still no complete plan of a Romano-British settlement.

For a summary of the research topics for the Romano-British period, see Section 6.1.4.

5.3.5 Post-Romano-British and Early Medieval (AD 410 – 1066)

For a summary of the research topics for the post Romano-British and early medieval periods, see Section 6.1.5.

5.3.5.1 Introduction

This period runs from the end of Roman Britain to the Norman Conquest, conventionally within the HER AD 410 to AD 1065. The period to c AD 800 is referred to as the Migration period in the HERs, when Anglo-Saxon material culture, practices and language appear in the region. The following two and a half centuries are described as the early medieval period because of the affinities between this and the following period.

Thematically, a tripartite division is probably more useful. In the earliest Anglo-Saxon period, to about AD 700, the extent of continuity between the Romano-British period and the Migration period, the nature of that migration and the form of the relationships between the existing population and the new arrivals forms a key set of questions. In the middle period to about AD 850, there is a drop in visibility in the archaeological record and there is consequently uncertainty about the form and structure of early Anglo-Saxon society including its settlement pattern and economic organisation, though this period is important as it is transitional between the earlier and later periods. In the period following the Danish Wars, society appears to have stabilised somewhat and many of the later medieval institutions probably have their origins in this period, though much uncertainty remains (eg Gelling,1992, 141-4, Hooke, 2006, 57-8).

Within the HERs, it is frequently difficult to differentiate sites of the early Anglo-Saxon period (Migration), from those of the middle and later periods (early medieval). There is consequently considerable overlap between these periods and the distribution across the County and the districts is virtually identical for both periods. The average monument density for the County as a whole is 0.11 per km^2 for both periods (See Table 4). Solihull shows the highest density in both periods (0.34/0.43 Migration/early medieval, though this is a distortion, see below) followed in order by Stratford (0.12/0.13), Warwick (0.11/0.07), Rugby (0.06/0.04), North Warwickshire (0.04 in both), and Nuneaton & Bedworth (0.03/0.00).

In both the earlier and later Anglo-Saxon periods the monument density in aggregates areas is above the average for the County as a whole (0.17 and 0.18 respectively, see Table 6). The highest monument density for this period was seen in Stour (0.44 both periods) and Lower Avon (0.26/0.26). The values for Blythe/Tame and Central Arden are similar to those for Lower Avon (0.23/0.24 and 0.26/0.32 respectively) but these have been distorted by Solihull as discussed below and should probably be considerably lower (probably slightly above average for the County). Arrow Alne and Feldon are also above average in the migration period (0.17 and 0.12 respectively), the value for Feldon being particularly significant as its values for all other periods are below average. Industrial Arden and Cotswold Fringe are average in the migration period and High Cross Plateau, Dunsmore and Anker are all below average at this time (0.09, 0.08, 0.04). In the post medieval period the density of monuments in Anker rises sharply and is above average (0.15), Cotswold Fringe remains average, Feldon and Arrow/Alne both drop in density to below average (both 0.09) and High Cross Plateau amd Dunsmore remain below average (0.07 and 0.06). There are no known sites of early medieval date in Industrial Arden.

The figures for Solihull are misleading however as of the 78 monuments 43 are only known from APs and are undated, though a prehistoric or Romano-British date seems most likely. Another three monuments[15] have very poor dating and a further two sites are considerably more likely to be medieval than early medieval in date[16]. In addition, the majority of the remaining 30 sites, which are more certainly from this period refer to the possible (or probable) early medieval origins of sites that are known from the medieval period rather than sites that are securely dated to the Anglo-Saxon period. These remaining monuments give a density of about 0.18 monuments per km^2, closer to the average (though the average would obviously be lower if the Solihull figures were lower) and in actual fact this density should probably be even lower. There is clearly a need to improve the dating of records, particularly crop mark sites.

As noted above the disproportionately high number of monuments in Solihull, principally arising from poor dating, has distorted the average for the study area producing a figure of 0.11 monuments per km^2. A more representative average (discounting Solihull) would be about 0.08 monuments per km^2. Stratford and Warwick districts in the south of the county both have densities above this figure (c 0.12 and 0.11 respectively) whereas North Warwickshire, Nuneaton & Bedworth, and Rugby in the north all have densities below this (c 0.04, 0.02 and 0.06 respectively). This north/south divide will reflect differing patterns of discovery but may also represent genuinely different patterns of activity. Within the study area, the main areas of gravel extraction have been along the Avon and it is this that has revealed many of the known monuments from the period (such as the cemeteries at Alveston, Baginton and Wasperton). It has also been shown however, that there was a clear distinction between Feldon in the south and Arden in the northwest. The former was open and generally relatively intensively exploited, probably from at least the later Iron Age, the latter had more extensive land-uses such as wood pasture (Gelling 1992: 11-14).

5.3.5.2 Current State of Knowledge

5.3.5.2.1 Early Anglo-Saxon Period

See Figure 27.

At this time it appears that Warwickshire sat across the boundary between two distinct cultural areas. The Avon Valley and the area to the south and east seems to have been distinct from the area to the north and west and the pattern can be seen in the distribution of cemeteries (see for example Hooke 2006, Fig 3.4) and settlements (Roberts & Wrathmell 2002, chapter 3). As such a detailed analysis of the Warwickshire evidence could provide information of regional significance.

5.3.5.2.1.1 Cemetery evidence

Early 'pagan' burials provide information on the dating and nature of the early Anglo-Saxon presence in Warwickshire. The most significant new rite was cremation though inhumations continued to be more common. Both were frequently accompanied by grave goods including fittings for clothing as well as weapons such as knives, swords, spear heads and shield bosses, or jewellery, typically pendants, beads necklaces, rings and brooches (Lucy 2000).

No Anglo-Saxon burial sites are known in Solihull[17] but within the Warwickshire HER 40 are recorded for the migration period. Of these however, one record is a duplicate and another seems more likely to be Romano-British[18]. Many of these sites are known only from antiquarian sources or chance finds of single or very small numbers of burials and their dating must be treated with caution. Despite this, 22 seem to be reasonably secure and plotting these sites shows a distribution across the south of the county with the main cemeteries in the river valleys and a 'background' scatter of single and small groups of burials. The distribution of the uncertain sites is consistent with this suggesting that they may form part of the same pattern.

[15] One hoard of undated silver coins (MSI9468) and two field banks identified from earthworks (MSI5669 and MSI5728).

[16] MSI5660 and MSI5663, both lynchets, one with a hollow way.

[17] Though three fragments from a large, crudely-made vessel, possibly a pagan Anglo-Saxon cremation urn, were found at Maidens Bower, Solihull (MSI850), well away from aggregates areas

[18] MWA415 and MWA417 respectively

Cotswold Fringe

Over several years in the mid 19th century, in the same general area to the east of the Rollright stones, an accompanied female inhumation and male cremation, several brooches and several unassociated burials were found. The minimum number of burials from this area was c 17 though it is likely that there were more (Meaney 1964, 260, MWA2396)).

An accompanied male inhumation was found in the 1950s just outside the western rampart of Meon Hill (Meaney 1964, 261). More recent fieldwalking in the area has produced small fragments of bone comb strengthener that could indicate a further burial (Price & Watson 1982), though this could represent a settlement site (MWA5461).

In 1927, during ironstone quarrying on Napton Hill, an accompanied male inhumation was found The actual number of burials is uncertain as a later letter mentions 'a few skeletons' and there may have been two shield-bosses (Chatwin 1930, 304, MWA739).

An extremely unusual cemetery was discovered in 1908 on Mount Pleasant in the Burton Dassett hills. Remains of about 35 large (male?) skeletons were discovered during ironstone quarrying at a depth of about 1m. They were laid out in two head to toe lines in two e-w trenches. One skull was 2m from the rest of the body and one had apparently been pierced by a weapon. They were unaccompanied but one trench contained pottery dated AD 500-700. North of these trenches, at a depth of 1.20m, were the remains of a man accompanied by a seax of the same date (MWA649). The burials were thought at the time to be the victims of a nearby battle. Other burials have been recorded in this area, some of which were thought to be judicial killings due to the association with Gibbet Hill (now quarried away), but these are undated (Westacott 1927, 58-9, MWA648, MWA650).

Stour

The largest known cemetery away from the Avon Valley was excavated in 1969-1971 at Stretton-on-Fosse (MWA1832). The complete cemetery of 53 accompanied male, female and child inhumations was revealed. The burials were dated to between AD 495 – 600 and the size, distribution and date range all pointed towards it being the burial ground for a small community, perhaps only a single family (Ford 2003). This cemetery immediately post-dated a small settlement (see below).

Three burials have been discovered on the Stour close to the bridge at Halford (VCH (1), 259-20, MWA2293). There is also a charter reference to ‘heathen burials’ on a ridge above the Stour (Hooke 1999a, 127, MWA2122) though these could be prehistoric (Lucy 2000, 126-8).

Feldon

In a small valley near Compton Verney, three skulls in a row were dug up in 1774. With two of the burials were pendants, probably of seventh century date, suggesting that they were female (VCH (1), 264-5, MWA1185).'

About two kilometres to the south-east of these burials, a small cemetery consisting of ten inhumations was found on a ridge in 1861 (Meaney 1964, 217, MWA1169). Romano-British pottery was found with these burials but two iron weapons (a spearhead and a sword) suggest that at least one may have been Anglo-Saxon.

Two skeletons were found c 1840 in Lighthorne parish embedded in some curious dark substance with their skulls protected by three stones. They were apparently accompanied by some hanging bowl escutcheons and found on the brow of the hill in a pagan Anglo-Saxon cemetery but the details are far from clear and no other records refer to a cemetery (Meaney 1964, 217, MWA680).

Lower Avon

Probably the largest cemetery in the county has been revealed within central Bidford, on river terrace gravels but excluded from the study area as it is within the town. Over 250 and probably nearly 400 burials have been discovered since the 1920s, though a complex and piecemeal history of discovery has meant that the full extent of the cemetery is uncertain. Over 200 inhumations have been discovered including men, women and children, just over a third of which did not have any grave goods. There were also 30 cremation burials in urns, as well as up to 120 more that survived only as scattered fragments. The cemetery appears to have had a long life during the period AD 450-700 (Meaney 1964, 258, MWA605, Ford 1971b, 21, MWA608). The lack of early cruciform brooches from these burials has been taken to suggest that this cemetery

may be slightly later than cemeteries to the east (Ford 1996: 73). On the eastern edge of the cemetery, the unaccompanied remains of four individuals were recovered. Parts of two of these were submitted for C14 dating producing dates of 160 BC to AD 230, and AD 660 to AD 980 cal (MWA602). These results suggest that at least some of the unaccompanied inhumations from this area date to the periods before and after the early Anglo-Saxon period, which may indicate continuity, or at least deliberate reuse of the same site, from the Romano-British period, through the early 'pagan' period and into the Christian middle Anglo-Saxon period.

At Alveston Manor, near Stratford (on river terrace gravels but again excluded as in a built up area), another cemetery has been discovered (Meaney 1964, 262-3, MWA5162). Since the 1930s, at least 96 inhumations and 41 cremations have been uncovered and further burials have recently been excavated (Jones & Coutts, 2003). Preservation was poor but the inhumations included men, women and children with the cremations scattered between the graves. The cemetery was bounded by a palisade trench to the south and west (Ford 1970, 41, Ford, 1971b, 21, MWA5163) but this may have been associated with a later settlement rather than the cemetery (see below). Less than 100m north of this site two further burials were found (The Times 2/1/1926, MWA870), that may be part of this cemetery. Other burials less than 500m to the northwest (MWA1014, 6268) are not likely to be Anglo-Saxon or associated (Palmer N, pers comm). Less than 1km to the north but on the far side of the Avon, a single burial has been recorded (MWA873).

At Wasperton, an Anglo Saxon cemetery was excavated from 1980-1985 in advance of gravel extraction (MWA5504). There were a total of 200 inhumations and 24 cremations. Forty of the inhumations were Romano-British (MWA5503), 116 of the inhumations and all of the cremations were Anglo-Saxon and the remaining inhumations undated. Bone preservation was poor but of the accompanied inhumations, it seems that 45 were female and 35 male (Palmer N, 1984, 296). Recent stable isotope analysis on burials from this cemetery has demonstrated that of five burials with Anglo-Saxon grave goods that proved suitable for analysis, all were of local origin, in marked contrast to the Romano-British burials (M Carver, pers comm).

Another cemetery was discovered near the Avon south of Warwick in 1875 during gravel digging (MWA1982). Several skeletons were found with some laid indiscriminately on others. A wide range of grave goods was found indicating both male and female burials. From these, it seems likely that about 12 burials were disturbed but the excavation only covered a small area and the cemetery may have been larger (Meaney 1964, 261). The supposed site of the cemetery was examined in 1968 but nothing was found and the location remains uncertain (Taylor 1968, 20).

During the 1850s, a female inhumation was discovered in Warwick during gravel digging (accompanied by an impressive brooch known as the Myton Brooch; VCH (1), 258, MWA1982). In 1921, again while digging for gravel at Emscote about six further graves were discovered. The skeletons were poorly preserved but the finds suggested both male and female burials (Chatwin 1926, 39-40).

Arrow/Alne

Two single, probably female, burials have been found in this area, the first, one kilometre south of Arrow, and the second at Glebe Farm west of Aston Cantlow (Meaney 1964, 262, MWA1517, VCH (1), 265, MWA1542). In addition, two burials were found at Kinwarton (MWA1562). These are all within a few kilometres of the Avon.

Dunsmore

On the Avon, just upstream from Warwick, two burials were found that were thought to be Anglo-Saxon but the dating is uncertain (Ford 1971b, 21, MWA2539). Further up the Avon, near the bridge at Bretford, a cremation burial has been discovered (VCH (1), 256, MWA3654).

In the course of working Hall Pit, Baginton, in the Sowe valley, south of Coventry, at least 73 burials were found and it is likely that the cemetery has not been fully exposed (MWA2679). In contrast to the other cemeteries, most of the burials were cremations but there were also at least 13 inhumations, although little in the way of bone survived. About 60 urns were recovered and several of the cremations were in bronze bowls including one of late 5th/early 6th century date. Personal items indicate both male and female burials (Edwards 1948, 48-53).

Recent metal detecting finds near Wolfhampcote on the upper Leam strongly suggest a cemetery here but no further details are known (A Bolton, pers comm).

Nineteenth century finds from south of Princethorpe, including weapons, brooches and pottery, probably from cremation vessels, suggest that this might be the site of a pagan Anglo Saxon cemetery (Meaney 1964, 262, MWA5375). The finds indicate a minimum of one male and one female inhumation and several cremation burials.

Several graves with grave goods were discovered in the 1870s when digging gravel at the summit of the hill between Snowford Lodge and Burnt Heath Farm, half way between Leamington and Long Itchington. At the time, the labourers stated that one of the spearheads was found driven vertically through a body. Romano-British coins were also found (VCH (1), 256-7, MWA2222). The finds suggested at least one male and several female burials.

Three urned cremation burials were discovered c 1849 at Marton when cutting through an artificial mound during the construction of the Rugby and Leamington Railway (VCH (1), 255, MWA3153). The grave goods suggested both male and female burials.

An Anglo-Saxon vessel was found in 1864 when digging for stone within half a mile of the village of Long Itchington, 'upon a high mound presumed to be a barrow'. The exact site is uncertain and the mound is no longer extant. Bones of an adult of over 25 years, or possibly parts of two adults were also found but it is not clear what form of burial this was (Meaney 1964, 217, MWA1706).

Two burials are also known from the possible ritual site at Blacklow Hill (Ford 1971b, 21-2; MWA2539; below)

High Cross Plateau

In 1843, eight or ten skeletons were found just below the surface by labourers filling an old quarry 600m north-west of Newton Lodge in Clifton upon Dunsmore (MWA5038[19]). Grave goods indicate only female burials. They were initially dated as Romano-British but the jewellery was later identified as Anglo-Saxon and the whole find is probably of this date. A bronze bowl handle from a Romano-British skillet was also found (VCH (1), 252-3).

A cemetery was found in 1823-4 when repairing Watling Street (the modern A5) between Bransford Bridge and Gibbet Hill (Bloxam 1855, 56-8, MWA2785). Skeletons were found on both sides of the road as well as in the centre, and were recovered from an area that extended for half a mile (800m) to the south-east of the bridge. A cremation urn was also discovered, associated with a sword and spearhead. Further finds were made in 1958 when parts of four or five skeletons were found[20] (Meaney 1964, 259, MWA5342). A variety of finds, including two very early cruciform brooches were recovered. The cemetery contained men, women and children and must have contained at least twelve burials though the described extent suggests it was probably much larger. A pagan period brooch is also known from this area suggesting another burial (MWA8794). A single, undated burial has been suggested as associated with this cemetery (MWA7868) though the discovery of Romano-British finds from the same immediate area suggests that it may be from that period, though associations between Anglo-Saxon burials and Romano-British sites have been described above. These burials are closely associated with tributaries of the upper reaches of the Avon and in terms of distribution could be seen as part of the general distribution along, or near, the Avon itself.

Industrial Arden

An isolated barrow burial of a male was found on the igneous ridge north-east of Hartshill, dated from a blade and shield boss (VCH (1), 219; MWA6001).

Central Arden, Blythe/Tame, Eastern Arden, Anker

These areas have no known pagan burials.

Non Aggregate Sites

Few burial sites are known that are not on aggregates though several sites are excluded as now within built-up areas. Whilst quarrying for limestone in the 1870s, close to Tomlow in Bascot (within Feldon but not on aggregates), an inhumation was found at the same time as several Anglo-Saxon weapons, though it is not clear if these were associated (Meaney 1964, 257;

[19] Note that MWA4158 is a duplicate of this record that has been wrongly located.

[20] One was described as being accompanied by an iron sword, a bronze ring and an Anglo Saxon annular brooch. Annular brooches are not generally found in burials containing swords, which suggests that in fact two burials were discovered at this time.

MWA1641). A small cemetery may have existed in the fifth and sixth centuries less than two kilometres from Bidford just south of Marlcliff (just off the southern edge of the Lower Avon study area), as a number of metal objects, of types normally associated with burials, have been recovered (Hingley 1987b, 41; MWA5687). This may have been associated with a settlement (MWA5101) but the dates do not match well. On the Roman road about half way between Alcester and Stratford, a single Anglo-Saxon burial (Palmer S, 2003a; MWA9574) was discovered on the site of a Romano British settlement (MWA7277). The inhumation was excavated from one of the defunct corn-dryers and the grave goods included a spear, a shield boss and two buckles. This suggests deliberate reuse of a Romano-British site.

Individual Find Spots

Overall, the distribution of stray finds indicating possible pagan burials, specifically brooches and weapons, reflects that of known burials. The majority have been found along the Avon Valley and those of its tributaries, particularly the Arrow and the Stour (the cluster near Alcester is particularly clear). A few finds in the north of the County however, suggest some burials. Two pagan Anglo-Saxon brooches have been recorded in the Anker Valley a few kilometres east of Mancetter (MWA7379, MWA10058) and a third, less well-dated example was found further north between Seckington and Newton Regis (MWA7368). Another poorly dated example was found south of Water Orton on gently rolling ground between the Rivers Tame and Cole (MWA9810, just west of the Blythe/Tame study area) and another example on high ground east of Meriden (Eastern Arden) has been recorded by the Portable Antiquities Scheme. These finds however, are sparse, generally not securely dated and do not fundamentally alter the distribution seen in the pattern of burials.

5.3.5.2.1.2 Settlement

Cotswold Fringe

No early period settlements are known on the edge of the Cotswolds. Field walking just outside the western rampart of Meon Hill however, has produced small fragments of bone comb strengthener that have been taken to indicate a burial, but which might represent a settlement site in the vicinity (Price & Watson 1982, 78-82, MWA5461).

An annular loom weight and quernstone from Lark Stoke 1.50km to the southeast might indicate a settlement in this area but the dating is not tight enough to be certain it is from this period (Dyer 1995a, 3-4, MWA7475).

Stour

At Stretton-on-Fosse (MWA1832/4752), a group of two sunken featured buildings (SFBs) and a rectangular post-built structure pre-dated the cemetery described above (Ford 2003). Two possible phases of occupation were identified suggesting a reasonable period of occupation before these structures were deliberately dismantled and backfilled before the cemetery was established in about AD 495. This clearance and the domestic nature of the finds suggested a small domestic settlement rather than any association with the cemetery. The cemetery probably represented the burial ground for a single extended family group and it is possible that the settlement moved to the site of the later village (Ford 2003: 30) though areas to the immediate north and south of the site do not appear to have been examined.

Feldon

There are no known settlement sites in this area.

Lower Avon

A SFB has recently been discovered at Barford (MWA10256), on the edge of the river terrace above the Avon flood plain. In the absence of any evidence to the contrary it is likely to have been a domestic building and close dating evidence is awaited (Palmer, S, forthcoming f).

The possible SFB recorded during the early 1970s when a pipeline was constructed through a possible high status site indicted by crop marks at Hatton Rock (MWA960), 3km north-east of Stratford-on-Avon (Hirst & Rahtz 1973) dated AD 875 +/- 88 (corrected, lab code not given, ibid, 177) seems more likely to have been a rubbish pit given its late date.

The excavation of an evaluation trench in 2002 to the south of the main area of burials at Alveston Manor recorded the remains of early Anglo-Saxon features possibly associated with a settlement

to the southwest (WMA 2003: 140). These features were probably dated to the sixth or seventh centuries apparently immediately following the cemetery (C Jones, pers comm).

At Tiddington, on the site of the small Romano-British settlement (on aggregates but excluded as within the urban area), enclosure ditches and some associated postholes contained Anglo-Saxon pottery of the late fifth to sixth centuries and the quantity of pottery suggested that there was settlement in the vicinity (MWA6398, MWA9920). However, as no certain structural remains were revealed, the nature of occupation is unclear, and it is uncertain if one phase followed directly on from the other (Palmer, N 1997, 25).

Arrow/Alne

Excavations in advance of road-building on a hill top at Broom, Salford Priors in 1993, revealed a group of three SFBs, associated with smaller pits post-holes and a post-built hall. A large assemblage of Anglo-Saxon pottery, including stamped pieces, dated to the 6th century was recovered from these features. Other finds included two loom weights, slag, and animal bone. This seems to have been a small, unenclosed, settlement, probably occupied by a single family group (Palmer S, 2000e, 197-210; MWA7230).

Dunsmore

At Baginton, a probable SFB was recorded in a gravel pit, though as it was seen only in section its size could not be determined (MWA5303). Anglo-Saxon pottery found throughout the fill included one vessel dated to c AD 500 (Wilkins 1975).

At Brandon Grounds, a salvage excavation in advance of gravel extraction revealed another probable SFB, which contained probable Anglo-Saxon pottery and a loom weight. Several other features also produced possible Anglo-Saxon material (Bateman 1978b; MWA5653).

Anker

A loom weight has been found to the north of Atherstone (excluded as urban) that might just suggest a settlement here, though it is not closely dated (MWA261).

Central Arden, Blythe/Tame, Eastern Arden, Industrial Arden, High Cross Plateau

There are no known settlement sites in these areas.

Non Aggregates sites

Again very few sites not on aggregates are known that indicate early Anglo Saxon settlement. There are hints of possible early settlement at the small Romano-British town at Chesterton where two fires with broken pot indicate casual occupation and the discovery in the topsoil of a large and ornate weaving comb, plus a fragment of another, points to more permanent settlement or burials, in the vicinity (Taylor 1967, MWA5708).

5.3.5.2.1.3 Ritual Sites

Dunsmore

A possible ritual pagan site on a spur at the east end of Blacklow Hill, north of Warwick, has been described as ‘one of the most enigmatic sites in the Anglo-Saxon corpus’ (Crawford, S 2002: 4). Excavations in advance of road construction revealed over 200 pits extending over the crest of the spur. The pits appear to have been contained within two parallel arcs of square postholes that defined an outer sub-rectangular enclosure and a circular inner enclosure to the east. In a central situation immediately west of the inner arc were two inhumations, one with a seax. The site has yet to be satisfactorily analysed (Ford 1971b, MWA2539).

Cotswold Fringe

A further pagan ritual site is suggested at Harrow Hill, Long Compton (MWA2380). The word 'Harrow' is possibly derived from the OE *hearg*, meaning 'pagan shrine' or 'temple' (Gelling 1988) and it has been argued that a typically *hearg* site “occupied a prominent position on high land and was a communal place of worship […] perhaps at particular times of year” (Wilson 1992).

Another pagan place name is Tysoe or the *hoh* 'spur' of the war god *Tiw* (Gelling 1992, 92). This is a recognisable projection from the Edge Hill escarpment on which a turf cut figure of a horse is thought to have existed[21] although there is little other corroborative data.

5.3.5.2.1.4 Summary

Traditional models of early Anglo-Saxon settlement have emphasised the disappearance of a native populace and the domination of the region by Anglo-Saxon invaders; however, this is no longer considered tenable (eg Higham, 1992; Lucy, 2000 particularly chapter 6; Hamerow, 1994). Yet the lack of identifiably British settlement sites or sites which can be shown to be continuously occupied after the formal withdrawal of Roman administration across much of the country is a major problem.

Some sites within the County suggest some interaction between a continuing British population and Anglo-Saxons. Continuity of burial ground use has been clearly demonstrated at Wasperton and is probable at Bidford. The Anglo-Saxon cemetery, and settlement at Stretton-on-Fosse lies less than 100m from the Romano-British settlement and cemetery (Ford 2002; MWA1838/1833) giving rise to the suggestion that there was "a period of contemporary burial between the latest of the Romano-British and the earliest of the Anglo-Saxon graves" (Ford 2003: 106).

On the basis of stature alone, Ford (2003: 107) attempted to link the tall, robust male burials and the small, gracile female burials at Stretton-on-Fosse to conclude that it was evidence of intermarriage between native females and incoming males. This type of racial stereotyping is though considered unsafe (Lucy 2000: 74) but modern techniques of genetic and isotope analysis might allow for the testing of the geographical origins of those buried in these cemeteries.

Place-name evidence also suggests that British speaking communities persisted into the Anglo-Saxon period. Examples include Mancetter, which retains a Romano-British name recorded in the Antonine Itinerary[22], a number of British river names that survived the transition to OE including Alne, Anker, Arrow, Avon, Cole, Itchen, Leam, and Tame as well as Meon, the only local British hill name that survives (Gelling 1992: 55-8). There are also a few Anglo-Saxon place-names that refer to British people. Two places are named Exhall, one on the lower Arrow (MWA9033), and one north-east of Coventry. These names contain the OE element **ecles*, which probably referred to British Christian communities in areas dominated by pagan Anglo-Saxons. They are likely to pre-date the 8th century when the Anglo-Saxons of the area were Christianised and emphasise the likely survival of 'Celtic' Christianity amongst the British (Gelling 1992: 58). Two places refer to the 'cottages of the Welsh', Walcot (on the Alne) and Walecote (on the Leam). This name form probably arose in the 8th century to denote places where welsh was still spoken[23]. Overall, the density of British place-names is lower than counties to the west and north but higher than in those to the east and south, which is consistent with a model that sees numbers of Anglo-Saxons migrants diminishing away from the south and east of the country.

There is clearly an association between known Anglo-Saxon settlement sites and aggregates areas. The principal reason for this is likely to be that aggregate extraction has focussed on areas outside modern settlements, in the very places where early Anglo-Saxon settlement is likely to have developed.

Ford (1976, 277) suggested that the earliest Anglo-Saxon occupation of Warwickshire was confined to a few sites along the Avon valley followed by a period of integration with existing native Romano-British settlements along the major tributary valleys (Ford 1976, 277). Whilst this bears a superficial comparison to the supposed development and spread of prehistoric settlement within the county (Ford 1976, 288-92), it too may be a reflection of survey and identification strategies; most prehistoric and early Anglo-Saxon settlement sites have after all been identified during gravel extraction from these same river terraces (Palmer forthcoming d). Given that the gravels were perhaps of only marginal quality by the later Roman period (Esmonde-Cleary 1982, 25-27), it is possible that early Anglo-Saxons were only able to settle on inferior farmland This implies that the process of settlement was negotiated rather than imposed. This model could also explain the

[21] The earliest reference to the 'red horse' appears to be 1607 (Camden's *Britannia*).

[22] With the addition of the OE element –ceaster typically applied to a RB site where the ruins were still impressive (Gelling 1992, 55)

[23] Though the element *wealh* came to have more pejorative meanings such as 'slave' or 'foreigner' suggesting a certain amount of, if not hostility, at the very least disrespect (Faull 1975).

absence of later Saxon settlement on the gravel terraces, as well as the later spread of heathen place-names in the woodlands and heathlands north of the Avon (Ford 1976, 277; Palmer, S, forthcoming f).

5.3.5.2.2 Middle-Saxon Period (AD 600 – 900)

See Figure 28.

This period straddles the junction between the migration and early medieval periods used by the HER. What is most notable is that there are very few records for this period.

5.3.5.2.2.1 Landscape

It is generally accepted that place-names containing the Old English element *lēah* (usually surviving in the modern form ~ley) refer to woodland The element has a range of meanings, which may reflect chronological development, from 'forest' through 'glade' or 'clearing' to 'meadow' or 'pasture' and it is generally applied to minor names. The most common sense in settlement names was probably 'clearing' (though Hooke (1997: 102-3) prefers 'wood pasture') and such names frequently occur in clusters. Isolated examples are more likely to have the earlier meaning 'forest' or the later meaning 'meadow/pasture' (Gelling 1992: 6).

In Warwickshire *lēah* are generally common but not evenly distributed. South of the Avon there are only five whereas to the north there are over 60 (Gelling 1992: fig 5, 12). They are particularly concentrated in the area of high ground forming the watershed between Arrow/Alne and Blythe/Tame and the upper reaches of those rivers as well as the area between Blythe/Tame and Anker. They are not common on the High Cross plateau, suggesting that open heathland was probably more common here than woodland

This distribution clearly reflects the division between Feldon in the south of the county and Arden in the north-west which is still visible today. Arden is a British name meaning 'highland' that survived as the medieval Forest of Arden, a forest in the literal sense (rather than the medieval legal sense). It is unlikely that this woodland was continuous however, though it is probably reasonable to see cleared areas sitting within a generally wooded landscape. The actual area dominated by woodland was probably larger than the distribution of *lēah* names suggests. In Domesday Book (DB), manors with extensive areas of woodland cover a wider area and Weston-in-Arden is in an area without *lēah* names but which was clearly in the Forest of Arden during the medieval period; Henley-in-Arden and Hampton-in-Arden show that it continued westwards towards the county boundary with Worcestershire. In terms of this project's study areas, Arden would have included Central, Eastern and Industrial Arden together with the upper reaches of Arrow/Alne and Blythe.

Feldon is the area of the county lying to the south of the Avon. The name is not recorded until the medieval period but is derived from the OE word *feld*, 'open land' (Hooke 1996: 102). This area formed the most extensive area of open field agriculture and nucleated settlement in the county.

5.3.5.2.2.2 Territorial Organisation and the Early Church

Minsters/Folk groups

The earliest organisation of the Anglo-Saxon church, developing from an initial missionary phase, seems to have taken the form of minsters with extensive parochiae[24] within which groups of priests conducted a peripatetic ministry. It is generally assumed that they date to the earliest Christianised period and that these parochia reflect early Anglo-Saxon groups that were likely to be primarily based on an internal sense of identity, such as kinship, rather than geographical areas (Gelling 1992, 183-4). Their association with heartlands of 'folk' areas might prove useful in identifying these areas and in turn suggest the location of high status settlements of this period.

Central Arden/Arrow-Alne

Wootton Warwen was an early minster site (MWA1596) with a foundation charter of the early eighth century which stated that it was in the region which 'from ancient times is called the *Stoppingas*' and was clearly sited to serve their territory across the headwaters of the upper Alne (Hooke 1999a: 3). The present church preserves large areas of Anglo-Saxon stonework of several phases (Bassett 1984, 1987, 1988, 1990).

[24] Both minsters and later churches referred to the territories they served as parishes. The Latin form 'parochia', 'parochiae' is generally used to distinguish the earlier form of organisation from the later.

Between this area and Stratford (below) was the land of the *Arosætna* mentioned in the Tribal Hidage (see for example map in Gelling 1992: 84). No minster is known in this area but it is probable that there would have been one at Alcester. This area was assessed at very close to 100 hides in DB, circumstantial evidence that it was an early administrative unit (Hooke 1997: 102).

Lower Avon

Stratford was served by a minster that was certainly in existence by the 9th century though it was probably also present in the 8th (Hooke 1996: 102). The extent of its parochia is unknown. The remoteness of the medieval Holy Trinity Church (MWA1022) from Stratford town centre is probably explained by the conjecture, mentioned by Leland, that it occupies the site of a monastery that existed in Stratford in this period. Twenty hides of land belonging to Ethelhard, sub-king of the Hwiccas, were granted to Egwin, third Bishop of Worcester (693-714) for the foundation of what was most likely a minster. References to the monastery occur in the 9th century with the last reference in 872 (VCH (3), 221, 258; MWA1026).

Bidford sits between Alcester and Stratford and the possible 'productive site' here (see below) suggests that it was a centre of some importance but nothing is known of any territory based upon it. If this was a 'productive site' it may actually have been deliberately chosen because of its position on a boundary though this only a possibility.

Stour

Tredington church (MWA2748) is assumed to be a minster and was possibly stone built in its original form (Gelling 1992: 187). The present building preserves sidewalls of an Anglo-Saxon nave of 'unusual size and interest' (VCH (Worcs), 547-8). Additionally a large ditch sealed by a layer containing 12th/13th century material, which may mark a precinct boundary, was found during 2003, 100m to the south-west of the church (Coutts & Gethin 2003, MWA9721). If it was indeed a minster then it seems likely that it served at least a part of the Stour Valley, quite possibly the area which was a detached portion of Worcestershire at the time of DB.

The place-name Alderminster, 6km to the north and within this area, is misleading and actually was *Aldermanneston*, 'farm of the chief or nobleman' in 1169 (Hooke 1999a: 70-1).

Rest of the County

Few minsters have been identified across the rest of the county. The territory of the Tomsaete, the peoples of the Tame, whose heartland was in the area of Tamworth, must have extended into the north of the county. Coventry was probably a minster (Bassett 2001). There is the site of a possible eighth or ninth century church at Hatton Rock (MWA6292, see below) and it is possible that this was a minster site rather than a high status civil site (Hirst & Rahtz 1973). A cross fragment was discovered close to Rugby Church in the early 20th century that seems to have been carved from local stone and decorated in a style similar to the pre-Viking crosses of Northumbria and northern Mercia (Cotterill 1935, MWA3355). It has been suggested that the church of All Saints in the precincts of the Norman castle at Warwick may have been an unrecorded early Anglo-Saxon minster church (Slater, summarised in Gelling 1992: 156) though its location on the boundary of the Hwicce seems to weigh against this.

Dioceses/Early 'kingdoms'

Larger dioceses developed from these smaller units and Warwickshire sits across two of these territories. The south-western part of the county, including Stour, Lower Avon and Arrow/Alne together with most of Central Arden, Cotswold Fringe and part of Feldon, was in the diocese of Worcester. This was established in the mid 7th century to serve the kingdom of the Hwicce whose territory covered the lower Severn and Avon and is thought to have been coterminous with the diocese (Hooke 19976: 100). The rest of the county was in the diocese of Lichfield, similarly established to serve the original core of Mercia around the focus of Tamworth.

5.3.5.2.2.3 High Status Sites

Lower Avon

Crop marks of a possible high status site were partially examined in a pipe trench at Hatton Rock, (Hampton Lucy) during the early 1970s (MWA960). One of at least two phases was radiocarbon dated to c AD 875 (see above). The date of origin of the settlement is unknown but one building was tentatively identified as a possible church (MWA6292) so the main phase seems likely to be

Christian. It may have been a civil site (a 'palace') but may also have been an Episcopal residence (Dyer in Hirst & Rahtz 1973: 170), or even an early monastic site, as there appear to be substantial buildings on the same alignment, an arrangement seen elsewhere that has been identified as indicating the churches of early monasteries (eg Jarrow - Aston 2000, 50). Eighth century charters exist for this site, or at least land in this immediate vicinity (Hooke, 1999).

Wellesbourne is referred to as a royal estate in a charter of AD 840 and there is also a possible reference to a *witenagemot* (assembly or council) there in another charter, there is no known physical evidence of a palace (Hooke 1999, 3) although Hooke has very tentatively suggested a possible site close to Wellesbourne Bridge (MWA3363).

Cotswold Fringe

The place-name 'Burton' (Dassett) implies some kind of fortified centre, possibly on the high ground near the church. The medieval earthworks around the church (MWA656) are enclosed on the south and east by a modest boundary dyke (MWA6190). The location of the church, on the uppermost margin of medieval cultivation on such an inconveniently steep slope, strongly suggests a pre-conquest site (the Domesday account includes mention of a priest). It also lies very asymmetrically within the present parish and only 0.6km from the Avon Dassett boundary. Its position may derive from a time when the whole Dassett estate still possessed some unity, being located midway between its two principal settlements (Bond 1982, 160).

Dunsmore

Crop marks at Snowford Bridge in Long Itchington were erroneously interpreted as a Romano-British villa but are more likely to be a site akin to Hatton Rock (MWA1648).

Anker

Seckington may have been a Royal estate as the Anglo Saxon Chronicle records that King Æthelbald died there in AD 757 though it did not have this status at the time of DB. The Norman motte and bailey here may have been deliberately sited on a former royal estate to emphasise the new order and nearby Newton Regis could have been deliberately laid out at around the same time to further reduce the status of Seckington.

5.3.5.2.2.4 Settlement and Land-Use

Earlier Pattern

No certain middle Anglo-Saxon period settlements are known in Warwickshire and even less is known about land-use at this time. A few possible settlements have been identified though their dating is often poor or their nature uncertain.

Settlements were probably held as 'multiple' or 'composite' estates within which a main centre was served by a series of outlying holdings (eg Jones GRJ, 1976). These minor holdings paid tribute into the central *caput*, which had a redistributive role that allowed the lesser holdings to specialise to a certain extent (Faith 1997, 11-14, Aston 1985, 32-6). These subsidiary holdings could form a discrete block of land around the caput but sometimes could be at some distance forming detached blocks. In heterogeneous landscapes, this would rarely be necessary but in more uniform areas, certain types of land-use, such as wood pasture, might not be available in the immediate vicinity of the caput (Hooke 2006, 41). The links between estates in Feldon and Arden described above could have had their origins in this system.

This model has been based on a range of evidence such as later historical sources, place names, tenurial patterns and religious organisation and is consequently not easily susceptible to archaeological proof. The model does however suggest that certain place-names might indicate status and roles within these multiple estates and could in turn suggest foci for further research. For example it has been argued that settlements with names based upon large topographic features, such as Stratford or Alcester, are early and refer to important places such as estate centres (Cox 1975, 6, Gelling 1988, 118-29). In contrast the place name element *wick* is thought to indicate subsidiary status and is often seen compounded with elements that indicate the product of the holding, for example Cheswick Green south of Solihull probably had the original meaning 'subsidiary cheese farm' (Gover, Mawer & Stenton, 1936, 293). Locational names, such as Weston or Southam, are also thought to have their origins in multiple estates indicating their position relative to the caput.

Cotswold Fringe

The only hints of settlement from this period are the loom weight and quernstone from Lark Stoke mentioned above (MWA7475), which might indicate a settlement of this period.

Stour

A possible settlement site has been suggested by scatters of pottery 700m northeast of Willington in the Stour valley (MWA8803).

Lower Avon

Just to the north of Bidford Bridge, a complex of ditches, pits and postholes, sealed by a thick plough soil, was revealed by excavation (Webster & Cherry 1980, MWA6132) close to the site of the pagan Saxon cemetery (above). The site was clearly out of use when the overlying plough soil began to accumulate but a medieval date for this appears to have been assumed. This site could well represent a mid Anglo-Saxon settlement that went out of use when the open fields were laid out.

About 1km to the north-east of this site a range of middle Saxon finds, of the eighth and early ninth centuries have been recovered from a discrete area (MWA4027). They are thought to indicate a 'productive site' or trading centre (Wise & Seaby 1995, 60) but many finds are now known from a wide area around the eastern side of Bidford and a closer examination of the finds, their dating, and the overall pattern of prospection that has produced them is needed before any firm interpretation can be made[25]. It seems clear however that Bidford was an important focus in the early and middle Anglo-Saxon period.

At Alveston Manor to the south-east of Stratford, excavations in 1970-1 revealed four north-south palisade trenches thought to be suggestive of settlement (MWA5613). The trenches extended south and east and appear to be part of a series of conjoined enclosures dating from the end of the early Anglo-Saxon period and into the middle period. Several phases of replacement palisades had been erected which indicates a considerable lifespan for these enclosures. Further excavation in 2003 revealed a series of boundary gullies, ditches and posthole alignments that shifted over time but appeared to be focussed on an area to the south and west where there may have been a settlement site (Jones & Coutts 2003).

In the late 1980s, a concentration of Anglo Saxon pot, slag and animal bone was noted during field survey (MWA5101) close to the possible pagan Anglo-Saxon cemetery at Marlcliff (MWA5687 above). This has been suggested to be a settlement and, from the pottery and two sceattas, thought to be dated to the late seventh and eighth centuries (Hingley, Pickin & Seaby, 1987).

Central Arden

A farmstead called 'Wyn's Worth' is mentioned on the Oldberrow boundary (AD709 (bounds probably 840-52), in Central Arden area but not on aggregates) the name of which appears to be preserved in the field names 'Hither-', 'Middle-' and 'Further Wazor' in the area of SP130603 (Hooke 1999a: 31-6).

Anker

The only hint of a settlement of this period is some loom weights that were found next to the church at Atherstone (area excluded as urban) might just suggest a settlement here, though they are not closely dated (MWA261).

Settlement Reorganisation

By the late Anglo-Saxon period, nucleated villages with open fields were emerging as the dominant settlement form across much of the Feldon of southern Warwickshire in contrast with the Arden to the north. The origins of these settlements remain largely unknown before the 10th century, which suggests that some translocation occurred beforehand, although Arnold and Wardle (1981), looking at sites to the east, have suggested that it occurred during the 7th and 8th centuries.

[25] Bidford falls outside the main distribution of such sites, which is mainly East Anglian, and the known assemblage is one of the smallest of those accepted as productive sites (Blackburn 2003).

In the Arden, many settlements were situated in locations that may have had extremely long histories of occupation although each will need to be examined on a case-by-case basis.

The earliest clear evidence for open field arable within Warwickshire generally comes from Anglo-Saxon charters and leases of the tenth century. However, the charter bounds of 757 AD for Tredington (Stour) mention 'headlands' on the northern boundary[26]. This is earlier than is generally accepted but recent work in western Cambridgeshire has suggested that elements of a 'proto' open field system, of about this date, are preserved in the valley of the Bourn Brook (Oosthuizen, 2005).

More reliable are references to rights to shares in the arable at *Clifforda,* probably Milcote south of Stratford, where there is mention of 'every third acre of beanland' (AD 966, S1311) and at Bishopston, in Stratford there is a reference to 'shareland' (AD 1016, S1388). Hooke also suggests that the term *furh*, 'furrow', in bounds represents areas where the open arable reached the estate boundary so that it was demarcated by a ditch. These are mentioned in the bounds of the leases for Tidmington (AD 977, S1330), and Bishopston (above). They are also mentioned in the probable later bounds to the 10th century lease of Longdon in Tredington (AD 969, S1321), and the unaccompanied boundary clause to Wormleighton (undated, S1574).

The relatively straightforward reference to 'every third acre' cited above seems to show that by AD 966 people were already familiar with the concept of mixed strips and given that by AD 977 open arable appears to have already reached the boundary of Tredington, it seems likely to have been well established by this time across much of Feldon.

The Danish Presence

The area of Warwickshire (within Mercia) seems to have remained free from Viking raiding until the Danish army remained in mainland England all year round By AD 876 the Danish border ran along Watling Street and by AD 883 King Alfred of Wessex had installed Ealdorman Æthelred effectively annexing it (Gelling 1992: 125-7).

Archaeological evidence for a Danish presence within Warwickshire is minimal, consisting of a possible 'Viking' axe head (MWA438) and half a dozen place names mainly on the High Cross Plateau: Griff, Wibtoft, Copston Magna, Monks Kirby, Thurlaston, Toft, and *Holm* (now Biggin Mills), though there may be a few others (Gelling 1992: 137). Such names are thought to indicate settlements by Old Norse speakers in land under-used by the English in the late ninth century (ibid. 131).

5.3.5.2.3 Late Saxon Period

See Figure 29.

From the end of the Danish Wars to the Norman Conquest, the Anglo-Saxon state continued to develop, Warwickshire was created, Warwick established as the county town and the hundreds put in place. The vast majority of the manors described in DB became established, manorial churches would have become common and the parish system largely replaced the minsters and their parochiae. In addition, most of the nucleated villages of Feldon and their open fields had probably been laid out, many, if not most, of the settlements in Arden were in existence and the pattern of communications and the relationships between Feldon and Arden were established.

5.3.5.2.3.1 The Origin of Warwickshire

The failure of the previous structure to provide adequate defence against the Danish army engendered the creation in the early 10th century of a new system of fortified military centres called 'boroughs'. The 'borough' at Warwick is recorded as being built in 914 (Gelling 1992:128) but the nature of any settlement that existed here prior to this is far from clear (ibid. 155-6).

The shires had their origins in the territories assigned to the maintenance of these fortified centres but it is unclear at which point the boroughs became administrative centres and the shires the areas that they administered. Opinions vary between the early tenth and the early eleventh centuries. Gelling favours the later part of the reign of Edward the Elder, shortly after 920 AD. After his aggressive expansion of direct English control from his Wessex heartland north to the Humber, during which he received the submission of the Welsh and the East Anglian Danes, he was in a position to override old loyalties, which later rulers were not. Gelling describes

[26] A 'headland' was the area at the end of a strip of land left for turning the plough, which suggests arable strips, one component of an open field system.

Warwickshire as 'an aggressively arbitrary creation' and the siting of Warwick on the ancient boundary between the Hwicce and the Mercians as perhaps 'intended to emphasise the demise of the older arrangements' (Gelling 1992: 141).

Hundreds

The hundreds were subdivisions of shires concerned with more everyday administration. They may have originated at the same time as the shires were established but their origins are far from clear. They appear to have been relatively fluid and probably because of their close association with local administration were frequently reorganised to suit changing tenurial patterns. By the time of DB Warwickshire had ten hundreds. Their names are of interest as they frequently indicate the name and nature of the hundredal meeting place. Brinklow and Pathlow survive and are both typical meeting places situated away from main settlements on the boundaries of surrounding estates and in these cases marked by barrows or other mounds (Pathlow = MWA6082). *Tremlau* is a similar lost name probably meaning '(at) the three barrows'. Also lost are *Honesberie,* which probably refers to a small round hill (*beorg*), and *Fexhole* and *Ferncumb*, which are unusual in referring to topographic features, a hollow and a short broad valley (*cumb*) of a type rare in Warwickshire. Barcheston, Coleshill, Marton and Stoneleigh bear the names of settlements to which the meeting had been moved by Domesday rather than the original meeting place (Gelling 1992: 142-4).

5.3.5.2.3.2 Settlement and Land-use

Many medieval settlements probably had their origins in this period (if not the middle Anglo-Saxon period) but continuity of occupation has reduced the opportunities for archaeological investigation. Dyer's 1996 review of rural settlement identified a problem with village origins, there being a relative lack of sites with demonstrable 10th and 11th century activity when open fields and nucleated settlements should be developing. This may be due to the peripheral location of excavated sites, the relative paucity of ceramic material or the general uncertainty of dating. Deserted and shrunken settlements are, on the other hand more vulnerable but available for study.

Sites with finds and features of this period include Coton where settlement began in the mid-10th century (Maull 2001, MWA2778) and Ettington where an archaeological evaluation revealed medieval ditches, some of which may have been tenth century in date (Mudd 1995, MWA7431). Probable early 11th century features have been found on sites such as Goldicote (P. Thompson, pers comm, MWA1259), Pillerton Priors (JSAC 1998, MWA9482) and Flecknoe (OAU 1992, Jones 1996, MWA3042/7492).

Most are known from archaeological evidence but a herdsman's wick (subsidiary farmstead) is mentioned in the Southam charter bounds of AD998 (south of Long Itchington, just within Dunsmore; Hooke 1999: 72-3).

5.3.5.2.3.3 Later Church

Parish churches

During this period, lords were establishing churches on their manors; tithes were being paid to these churches and parishes established, primarily to provide pastoral care but also in order to define the area that should pay tithes to each church for the maintenance of its clergy (Morris 1989, 140-167, 228). The older minster parochia were consequently breaking down though the minsters themselves frequently held on to various rights over the new churches that can be traced in the historic record. These manorial churches were likely to have been small timber built structures and were usually rebuilt at some point in stone. This usually obscures any early remains and their continuing importance means that opportunities to investigate their origins archaeologically are very limited. Several churches, in addition to those mentioned above, have material evidence for existence during this period.

At Whitchurch (near Alderminster in Stour) two Anglo-Saxon cross fragments of possible 10th or 11th century date have been discovered over the years (Hingley, Hunt & Stokes, 1995, MWA8409), most recently in 2004 (Mason & Jones 2004) together with a probable Anglo-Saxon grave slab.

The first church of St Nicholas in Elmdon Park (Central Arden) may have been a timber Saxon church whose presence has been suggested by the occasional discovery of various Anglo-Saxon church artefacts over the years (Fletcher n.d., MSI744).

Early monastic sites

Wootton Wawen continued to be a significant religious centre though its exact status is uncertain (MWA1596/9). No other early monastic sites have been identified in aggregate study areas. Coventry was founded in the tenth century from Abingdon (Aston 2000: 67 and map: 68) and was probably the most significant monastery in this period. Though it was outside the study area, its influence will have been much wider. The Medieval church of St Nicholas in Warwick was first recorded in 1123 and though little is known about any earlier building, Rous (d.1491) asserted that the chancel had been the choir of a nunnery, destroyed in 1016 (VCH (8), 522, 530-2, MWA1944). Documentary evidence suggests that there might have been an early medieval monastery beneath the present Holy Trinity Church, Stratford on Avon (VCH (3), 221, 258, MWA1026). Polesworth Abbey (VCH (2), 62-5, MWA203) almost certainly had a pre-Conquest origin but the details are not known. All of these are within urban areas and so excluded from this study though their influence will have been wider than simply that of their precincts.

5.3.5.2.3.4 Industry

Very little is known about industry during this period. Though many mills are mentioned in DB, only one is known to have existed before this; at Alveston, where a mill is mentioned in a document of AD 966 though its site is uncertain (Booth 1978, 42, MWA1038). Several sites have produced pottery from this period but no local production sites are known. A Saxo-Norman iron production site is recorded at Mancetter but the entirety of the record is a handwritten note on a map held in the HER and no further details are known (MWA8090).

5.3.5.2.3.5 Trade and Communications

A footnote in DB records that Archbishop Aldred had market rights in Alveston before 1066 (Morris 1976, 3,4, MWA9136).

Salt was a special case of traded goods with a long, though not necessarily continuous, history back into the Romano-British period and quite possibly the Iron Age. A saltway is known to have run north of the Avon during the tenth century, linking the Avon Valley with Droitwich in Gloucestershire (Hooke 1999b, MWA8217).

A 'herepath' (military road or highway) was referred to in a boundary charter of AD 922 (MWA8635, Lower Avon/Stour). It probably followed the boundary between Milcote and Clifford parishes, running north-east along the bank of the Avon towards a ford at Clifford Bridge (MWA1067), to continue as the present Clifford Lane and probably continued on towards Stratford (Hooke 1999a: 56-7).

Other routes are known from various sources including a route way in Bickenhill (Bishop, 1976; MSI149), and a greenway or ridgeway running through Shipston on Stour and Barcheston (MWA2119/2120). Numerous other tracks probably going back to this period have been identified with many running generally NNW-SSE linking Feldon with Arden[27] (Hooke 1999b). A few fords are also known such as Dodda's Ford, Alveston (MWA952/8636) and Tiddington Ford (MWA1055).

5.3.6 Medieval (AD 1066 – 1540)

See Section 6.1.6 for the research framework.

5.3.6.1 Introduction

Across the County, the medieval period has the second highest density of monuments of any period at 1.64 per km^2 (See Table 4). Solihull has by far the highest density at 3.88, incidentally the highest density of any period in any district, Warwick District also has a high density of 2.02. The remaining districts are all low (Stratford (1.36), North Warwickshire (1.34), Nuneaton & Bedworth (1.33) and Rugby (1.21)), though in all cases the monument density is by some way the highest for any period discussed so far.

The monument density on aggregates during this period is slightly above that of the county (1.95, see Table 6). The highest density of medieval monuments is in Stour (4.01) which is over twice the average for both the county and aggregates areas. This is followed by Arrow/Alne,

[27] MWA8637, 8638, 8639, 8640, 8641, 8642, 8643, 8644, 8645, 8646/7, 8648, 8649, 8650, 8651, 8652, 8653, 8654, 8655, 8656, 8657, 8658, 8659, 8660, 8661, 8662, 8663, 8665, 8666, 8667, 8668, 8669, 8670

Blythe/Tame and Arrow/Alne (3.33. 2.72, 2.52). Note that the latter two study areas are split across the two HERs which means that their values may have been distorted by Solihull, though it is likely that they were both still above average. Industrial Arden, Dunsmore and Lower Avon all have densities near the County and Anker, High Cross Plateau, Feldon and Cotswold Fringe were low (1.03, 1.30, 1.04, 1.08).

5.3.6.2 Current State of Knowledge

5.3.6.2.1 Castles

See Figure 30.

Thirty-nine castles and possible castle sites are known in Warwickshire and Solihull though the distinction between castles and the larger moated sites is not always clear. To a certain extent, this is a problem of definition, usage, and context within the tenurial framework concerned (John Hunt, pers comm). The majority of castles are located to the north of the Avon, and as a whole Feldon is notably low in castles. Of these 39 castles, only 12 are within the Project Area, though given that several have been excluded from this study as they are now within urban areas that some may have provided an initial developmental focus for, this is perhaps not surprising. Most castles will have been built at the caputs of honors and to this extent the distribution pattern can be understood (Hal Dalwood, pers comm). Twenty-three castles are recorded as having forms such as ringworks or motte and bailey closely associated with the period immediately following the Norman Conquest; eight of these are in aggregate areas. Many of these early castles were located to emphasise Norman lordship and were sited at existing Saxon caputs to reinforce this (Liddiard 2006, 247). To a certain extent therefore the siteing of castles can be related back to the previous late Saxon tenurial pattern which also explains some elements of their distribution.

In recent years increasing emphasis has been placed on the landscape context of castles (Liddiard 2005). They have important roles as consumers and have an impact beyond the immediate structures. They also frequently lie within extensive designed landscapes designed to enhance their role as status symbols as well as defensive structures and are often associated with a range of other features such as parks, gardens, lakes and fishponds. Kenilworth for example was surrounded by an artificial mere that covered several hectares and which had a dock that would have allowed boating (Renn 1991). These features could lie at some distance from the castle themselves but would be vital in fully understanding both the role and impact of castles. It is these features , which need to be understood in their context, that are potentially vulnerable to development of all forms.

Major castles within Warwickshire are not likely to be at risk from extraction and as such, whilst their landscape contexts are a vital part of their interpretation and their impact will extend beyond their immediate area, the castles themselves lie outside the scope of this study. Castles in this group will include Warwick (MWA1922 etc) and Kenilworth (MWA3200 etc). Many other castles however only remain as earthworks or are only suspected from fieldnames or documentary evidence. These sites are potentially more vulnerable.

One of the best studied of the minor castle sites is Boteler's Castle south of Alcester (MWA543, Arrow/Alne) where excavations in the associated settlement revealed three timber buildings, occupied from the 11th/12th to the early 13th centuries, together with property divisions, tracks and activity areas. Occupation here was determined to be a defended settlement, though closely associated with the castle, that appears to have been abandoned at about the same time as the castle, probably because of competition with Alcester (Jones et al 1997).

Baginton Castle is a remarkable example of Norman castle on the edge of a plateau on the Fosse Way. It has a large motte, building foundations, a double court and clearly defined moat. The site itself has been much disturbed, the area to the north by gravel quarrying. There is also an artificially terraced area with a 19th century summerhouse and the scarp slopes on the west and south are relics of a wartime tank testing ground Minor work to survey the standing masonry was undertaken in the 1990s (Moore & Palmer, 1994; MWA2676/5296, Dunsmore).

Brinklow Castle (MWA3656, Dunsmore) is a substantial motte and bailey that occupies a prominent position on a short elevated ridge, also on the Fosse Way. . No archaeological work is known on the site and therefore it is not possible to confirm suppositions (VCH (1), 360-2) that the eatrthworks supported a palisade of wood.

Brandon Castle (MWA4251/5547; SAM21550; Dunsmore) survives well and is free of modern development. Excavation has shown that the tower keep and its wards retain important information concerning the construction of the castle and related activities and that partly waterlogged deposits exist that are potentially important as sources of environmental information. It was moated and appears to sit within extensive associated earthworks (Chatwin, P, 1955).

Ratley Castle (MWA692; SAM21622; Cotswold Fringe) is a motte with double bailey that occupies a commanding position where the ground falls away steeply (towards Oxon. rather than Warks.). Small-scale excavations between 1968 and 1973 have provided evidence for the occupation of the castle and artefacts recovered include 12th and 13th century pottery. Only a small proportion of the site has been excavated and substantial deposits probably survive undisturbed. Further evidence of medieval structures and for the economy of the castle's inhabitants is likely to still exist (SAM description).

There is a ringwork castle at Aston Cantlow but, apart from small excavations in the area during the 1930s, no work has been done here (MWA1568; SAM21669; Alne/Arrow).

Several other sites have been suggested as castles but their status is uncertain. A possible castle mound has been identified at Coton deserted settlement north of Rugby (MWA2779 High Cross Plateau). Another possible castle site has been suggested near Newbold Church, west of Rugby (MWA3337) and there is a possible castle site in Thurlaston, southwest of Rugby (MWA3323). Two possible castle sites have been identified to the east of Kenilworth (MWA2591, MWA4871) and there is a possible castle site south of Wootton Wawen church (MWA4533, Alne/Arrow). Another possible castle site has been identified further south, to the northwest of Halford church (MWA2287, Stour). All of these sites are potentially vulnerable and investigations to determine their nature would be valuable.

Several castles are not on aggregates including castles in the Feldon area (Kineton) Anker valley (Seckington), and Arrow/Alne valley (Beaudesert, which has seen some recent excavation (mentioned in Hunt forthcoming)). There are two in the Blythe/Tame valley (Kingsbury Hall, Bickenhill), two on the Cotswold Fringe (Brailes, Whichford), two in the Lower Avon valley (Temple Hill, Fulbrook), and three in the Eastern Arden area (Maxstoke, and two in Fillongley (MWA321, 330)). No castle sites known in Central Arden.

It is possible that not all castle sites have been identified as work in advance of a gas pipeline in Staffs identified a possible motte that had not previously been recorded (Hunt 2005 and ref therein). Work elsewhere has also identified contemporary designed landscapes around castles that had not been recognised previously (ibid.). These are likely to be potentially more vulnerable than the castles themselves and should be identified where possible.

Detailed work on the castles of Warwickshire is required. For many of these sites, little is known of their exact dating and sequence of development and little work has been done examining their development across the county as a whole. Work is also required to better characterise many sites and to distinguish between the larger moated sites and castles.

5.3.6.2.2 Manors and Moated Sites

See Figure 30 – Medieval: High Status Sites.

Across Warwickshire 100 manor houses, or their sites, have been recorded though three have not been located accurately enough to map. About a third of these are within aggregates areas, which is roughly proportional but there are several areas that appear to contain fewer manor houses than might be expected and these areas are generally not on aggregates. It therefore seems that further work to identify manor house sites might be more likely to locate sites off aggregates than on, and this would decrease the proportion of manor houses in these areas. Note that within the HER there is not always a clear distinction between manors and manor houses. The former was the territorial unit over which lordship was exercised, the latter the centre of this unit, the building(s) occupied by the lord or his representative.

Most are located in the east and north of the county though, as already noted, there are several areas where manor houses are apparently under-represented. The largest of these is Feldon, to the south of the Avon Valley. Other areas apparently low in manor houses (though smaller) include: the Alne Valley and the area towards Kenilworth; the area between Coventry and Rugby; the area around Fillongley north-west of Coventry; and most of the Anker Valley. In these areas many parishes do not contain any known manor house though some have moats (see below) that may have been manor sites. Several parishes also contain known post-medieval manor houses

and the same site might have remained in use for some time with later buildings obscuring the site of an earlier manor house. These sites could be a useful focus for study in order to fill in these gaps. This might still leave several areas without known manor houses however, which would require some explanation. Manors, as opposed to manor houses, are likely to be reasonably well documented, for example in VCH, and work to compare manors known from documentary evidence with manor house sites would provide a useful framework for this study.

Across Warwickshire and Solihull, 243 moated sites and possible moated sites have been recorded. Of these 243 moated sites, 137 are in aggregates areas, which is a considerably higher proportion than might be expected. Whilst some form a part of other monuments such as castles, the vast majority are discrete sites. They are likely to be quite diverse, not only being associated with castles and manor houses but also possibly including colonising homesteads, hunting lodges, monastic granges or even garden features and work is clearly required to refine their classification. Within Lower Avon, Stour, Feldon, Dunsmore, and High Cross Plateau they are relatively widely spaced and closely associated with manor houses, churches or nucleated settlement, isolated examples being rare. Few have been identified in Anker or Industrial Arden, in eastern Arden and Blythe/Tame; they are more common with isolated examples being reasonably common. In Central Arden and the upper parts of the Blythe and Arrow Valleys, they are very frequent, particularly on the outskirts of Solihull and here there are numerous isolated examples, apparently in areas where settlement intensity increased during the 13th and 14th centuries (Roberts, 1977).

Work on moated sites has included excavations by Solihull Archaeological Group at Old Knowle Hall (MSI536, Blythe/Tame), and at Burton's Farm, Kingshurst, where the entire platform was stripped revealing a possible medieval stone building, although there were few finds (MSI547, Blythe/Tame). Work at Netherstead Farm moat demonstrated its medieval origins despite extensive remodelling during the imperial period. This work also revealed the remains of a medieval timber bridge preserved in anaerobic conditions at the base of the moat (Palmer, S 2003f; MWA580; between Arrow/Alne and Central Arden, not aggregates). Smaller scale work has taken place at Coughton Court (MWA9008, Arrow/Alne), Baddesley Clinton (MWA5351, Central Arden but just off aggregates), and Chilvers Coton Manor (MWA2776). At Exhall, an evaluation uncovered the remains of substantial walls likely to be of medieval date; the moat was shown to have been revetted with sandstone and medieval glazed tile and pottery was recovered, which suggests that the platform was occupied by a building of some status (MWA1650). BUFAU have carried out geophysical survey and documentary research on Old Berry Hall (MSI486).

All these are Arden sites; the only Feldon moat excavated recently is at Cawston, Dunchurch (Palmer, S, 1999c; forthcoming c; MWA4144; Dunsmore), earlier work at Hunningham (MWA2529, Dunsmore) is still unpublished.

Many moated sites were likely to have been seigneurial sites, and need to be considered within the context subinfeudation and assarting. The unresolved problem remains one of distinguishing seigneurial sites from homestead sites, and perhaps also why some lords opted for moated manor houses and others did not. To what extent is there a pattern across the county underlying this decision? Are there particular sets of characteristics associated with one group or another, such as continuity of pre-Conquest manorial centres, manorial re-organisation, or patterns of assarting or other land-use? (John Hunt pers comm)

5.3.6.2.3 The Countryside

The medieval period is the first for which it is realistically possible to attempt to map the entire landscape. The progression of HERs to GIS based systems offer possibilities that are only beginning to be explored. Much basic mapping is still necessary however, including settlements, woodland, parks, and commons.

Few recent fieldwalking projects have revealed much of significance for the medieval period, but notable parish-based documentary and fieldwork survey projects have been carried out by Chris Dyer in Admington (unpublished documents held in the HER, parts within Cotswold Fringe) and Compton Verney (Dyer 2000, large areas in Feldon). Much of Barston parish was fieldwalked during the late 1980s revealing several medieval pottery scatters, generally around the settlements of Barston, Eastcote and Walsal End (Burnett 1989; MSI305 etc.; mainly Central Arden).

5.3.6.2.3.1 Rural Settlements

See Figure 31.

It is clear that the holdings detailed in DB existed in 1066 and it is likely that they had been in existence for some time by this point; the same names occur in earlier Anglo-Saxon charters and DB. The standard Domesday holding was the manor, a legal unit of tenure that did not necessarily equate to a nucleated settlement. In some cases the holding may have been a single nucleated village surrounded by its open fields, a situation likely to be common in Feldon but in others the nucleated settlement was divided between manors and in others it would have been an area with several small dispersed settlements farming land held in severalty and without a clear centre, which would be more common in Arden. It is also clear that many holdings contained units not identified in DB, but which almost certainly existed, were included in the main named entries, and which emerge into the historical record soon after.

Just fewer than 600 rural settlement sites are recorded in the HER, though this figure is likely to be low as Arden appears to be underrepresented. For example the HER records two settlements in Tanworth-in-Arden but a detailed map of medieval land-use and settlement (Fig IV in Roberts 1968: 111) shows several other groupings that could be classed as hamlets. Of these 285 are extant settlements, 111 are classed as shrunken and 205 as deserted though there is some overlap between categories. About 115 of the current, 50 of the shrunken and 95 of the deserted settlements are on aggregates. The proportion of all these settlements on aggregates, though particularly shrunken and deserted settlements, is higher than the county average.

The distinction between extant, shrunken and deserted settlements is likely to be somewhat artificial, as most settlements will have experienced periods of shrinkage, and growth and some will have shifted. Deserted settlements are merely extreme examples and extant settlements are likely to have had any evidence for shrinkage obscured by subsequent expansion. To fully understand medieval (and later Anglo-Saxon) settlement patterns it is necessary to take a 'long view' of rural settlement and to look at townships, manors as estates, and movement within parishes, rather than simply concentrate on the core settlement. To look at core areas of settlement represents only a partial picture and it is really necessary to look at all types of rural settlement within a whole landscape. (John Hunt pers comm)

Systematic air survey in the early 1990s showed that it is still possible to find unrecorded, mainly shrunken, settlement earthworks in Feldon (N Palmer, pers comm). In Arden, unrecorded dispersed settlements can also be identified and their mapping has hardly begun[28]. Settlement sites are being added to the HER, but further aerial photography is necessary.

Extant settlements are not likely to be vulnerable to mineral extraction and work associated with the development of quarries is unlikely to provide information on their development, which is more likely to be derived through the normal development control process. This will also apply to settlement earthworks on the edge of extant settlements since it is unlikely that extraction will be allowed close to settlement. There has been pressure from extractors however, to remove the current buffer of 200m around settlements, as required in the existing minerals local plan, replacing it with a case-by-case evaluation that may allow development closer to settlements and potentially encroach upon these earthworks. The preferred option at present (Policy Principle 25) is to "set no minimum predetermined buffer zone distance which precludes mineral development but leave the applicant to demonstrate that they can carry out the extraction and other operations in close proximity to settlements and sensitive properties […] There will be no stated minimum stand off distance between Mineral Developments and settlements, sensitive properties or other land use activities." (WCC 2007, 111).

Deserted settlements however, are available for research, occur with greater than average frequency in aggregate areas and are potentially vulnerable (though many are scheduled). It is far from clear though, how representative deserted sites might be of settlements as a whole and any investigations would need to be set against what is known about patterns of medieval settlement more generally (see for example Roberts & Wrathmell 2002).

At Burton Dassett Southend, in the Cotswold Fringe, excavations from 1986-91 examined a series of properties occupied from the mid-13th century to 1497. Plans of 20 houses including a smithy, largely stone built, and 10 outbuildings, more frequently of timber, were recovered (Palmer, N, 1988a,b, 1989a,b; MWA660 etc.).

[28] Notwithstanding Della Hooke's Arrow Valley work (unpublished documents in HER) and individual parish studies such as that by Roberts (1968).

At Goldicote deserted settlement on the edge of the Lower Avon south-east of Stratford, trial trenching followed by area excavation in 2000 revealed evidence for the form and extent of the settlement Including buildings, yard areas, drains and a lane. The main period of occupation here was dated to the 13th and 14th centuries (Thompson, P, 2000; MWA1259; Lower Avon).

Northamptonshire Archaeology has excavated virtually the whole of Coton on the Wolds (Maull, A, 2001; MWA2778; edge of High Cross Plateau). Here occupation began in the 10th/11th century; the site was re-planned in the late 12th century, before abandonment in the late 13th or early 14th century. Over 20 post-built buildings were recorded.

Other medium scale excavations have taken place at Spernall (Palmer, N, 1995; MWA550, Arrow/Alne), Ettington (MWA1262; Stour), Loxley (Jones 1998; MWA8387; Lower Avon), Fenny Compton (Eyre-Morgan 1994b; MWA668; not aggregates), Ufton (Bateman 1996; MWA9538; Feldon) and Bascote (Litherland & Ramsey 1996; MWA1702; not aggregates). Small-scale excavations at Compton Verney (Warwickshire Museum 1991; MWA1187; Feldon) and Admington (Dyer 1995a; MWA6458/8974; not aggregates) have been enhanced by wider parish surveys (eg Dyer & Bond 1994; Dyer 1995a; 2000); and Flecknoe has seen a number of small-scale excavations (eg MWA3042; not aggregates).

The excavated sites present a complex pattern. There are several relatively short-lived sites: Coton on the Wolds showed desertion or eviction in the late 13th or early 14th century; Spernall, experienced shrinkage during the middle and late 14th century as did Loxley. These contrast with a more familiar pattern of mid-late 15th century shrinkage and desertion as seen at Goldicote, Compton Verney, Ettington and Burton Dassett Southend.

These sites have mainly produced partial building plans in a variety of forms. Compton Verney and Long Itchington had 12th century post-built buildings succeeded by others with stone footings and walls. At Burton Dassett, Fenny Compton and Goldicote the buildings were probably of stone, while those at Loxley were probably timber framed on stone footings. This distribution may reflect the availability of building materials. What is really needed here is an assessment of building types across a range of sites in order to identify regional patterns and traditions.

Medieval remains have been identified within several settlements[29] that have helped to confirm their extent and date their development. At other sites, however, negative results are equally valuable in defining the extent of settlement and these tend to be overlooked in favour of those sites that have produced positive results. For example at Coleshill, observations in 2003 found no medieval deposits other than well developed plough soils, indicating that the extent of medieval settlement lies some way inside the currently defined limit (Newman & Palmer, 2002; MWA8782; Blythe/Tame). Similarly on Southam Road in the south of Dunchurch trial trenching revealed ridge and furrow within the supposed limits of the medieval settlement (Stevens, C, 2003; Dunsmore) and at Ettington evaluations on the recreation ground and in Rookery Lane, both supposedly within the medieval settlement, failed to find any medieval remains (Thompson, P, 2002; MWA7431; not aggregates). In these cases it might be beneficial to re-examine the boundaries of the medieval settlement as defined in the HERs.

Most of the sites that have been subjected to some form of excavation lie in a band across Feldon; in contrast, very little work has taken place on settlements in the Arden. Trial trenching revealed 13th to early/mid 14th century occupation and a partial post-built building at Spernall (above), and recent work on the M6 Toll has revealed only a hollow way and 12th-13th century pits at Hawkeswell near Coleshill (unpublished documents in HER; MWA9100-6, Blythe/Tame), and medieval pits and a 13th/14th century building associated with fishponds at Wishaw to the north (ibid; MWA7362; also Blythe/Tame but just off aggregates).

A few detailed earthwork surveys of individual settlements have taken place, for example at Baginton Castle just south of Coventry (Moore et al 1993; MWA2964; partially on Dunsmore) and Hunningham north-east of Leamington (Palmer, N, 2001; MWA9523; Dunsmore).

5.3.6.2.3.2 Field Systems

See Figure 32.

Detailed mapping of ridge and furrow open field systems for representative groups of parishes across Warwickshire was carried out in early 1990s. The aim was to map complete systems

[29] eg Withybrook (MWA4221), Wibtoft (MWA6471), Broadwell (MWA9071), Willoughby (MWA6395), Ettington (MWA7431), Dunchurch (WMA 2003: 85), Pillerton Priors (WMA 2003: 95).

using mainly 1940s air photographs. About 93 out of 260 parishes were eventually completed. These transcriptions have been scanned and it would be useful if they were incorporated into the HERs together with digitised extents. It would also be valuable to complete this work for the remaining parishes. Formerly ploughed areas would indicate where remains from former periods are likely to be less visible but still potentially present.

More recently, the Midlands Open Fields Project has mapped the best surviving ridge and furrow across the region (Hall, D., 2001). This project has identified a series of parishes with the best surviving field systems in the region with a view to ensuring their preservation. In Warwickshire, only Little Lawford west of Rugby is on aggregates (Dunsmore). Though Tysoe, Radway, Warmington, Ladbroke and Napton-on-the-Hill have been identified as having well preserved ridge and furrow and have areas of aggregates within them (Cotswold Fringe), the aggregates are not, for the most part, coextensive with the ridge and furrow. There appears therefore to be a negative correlation between aggregates areas and surviving ridge and furrow but it is not clear whether this is due to differing patterns of medieval exploitation or differential survival. Lack of knowledge of the original extent of the field systems is a problem here. This report also emphasises the speed at which ridge and furrow is being lost.

One problem with these projects is that field systems usually relate to vills (townships) rather than parishes and the township boundaries have not been systematically identified and recorded. Some research has been done on this (Hooke, manuscript maps held in HER) but systematic coverage of the county is required and this should also be incorporated into the HERs.

Mapping the extent and form of field systems is one thing, but much more work is necessary to understand what they represent and to look in more detail at their development. Ridge and furrow has been identified archaeologically at Bubbenhall (WMA 2003: 125), as have headlands at Rowington (WMA 2003:, 136), and medieval plough marks have been seen at Bidford (WMA 2003:, 124). At Seckington the motte and bailey earthworks overlie the ridge and furrow, suggesting a pre-Conquest origin for the field system here (MWA167, Anker but off aggregates). Though difficult, more work on dating these features might reveal how field systems developed, particularly if peripheral settlements were brought into the main system after its initial creation, necessitating rearrangements.

Enclosure started towards the end of this period in many places. At Compton Verney (Feldon), detailed analysis has demonstrated a complete change from a township in the late 13th century that was 90% arable, to one that was 90% pasture by the late fifteenth century (Dyer, 2000: 78). Other such analyses are required to determine the extent to which this was the norm or if this parish was particularly early in this transition[30].

5.3.6.2.3.3 Commons, Woodlands, and Parks

Very little common land has been recorded within Warwickshire's HERs[31]. It formed an important component of the rural landscape right through the medieval period into the 18th and 19th centuries allowing for the grazing of substantial numbers of livestock. The identification of common land, and the understanding of the processes by which it was used and became enclosed, is important in order to understand the agricultural use of the countryside as a whole. Whilst common land is generally identified by documentary research and map regression analysis, field survey is also vital. Given the limited information in the HERs it is impossible to assess the relationship between common land and aggregates.

There were no Forests, in the legal medieval sense, in Warwickshire, but as has already been highlighted there were well-wooded areas of the county, principally the Arden in the north and west. During the medieval period a range of terms were used for woodland with quite specific meanings. The two most important terms were *silva*, and *grava*, which refer to two distinct traditions of woodland management during the medieval period: wood pasture and coppicing respectively. These practices were probably well established by the 11th century (Wager 1998: 193).

Only 29 medieval woodlands are recorded in the HERs, all in the area south of Solihull/Coventry and north of the Avon. As such it is clearly under-represented and work that has been done on

[30] Though it was in the late 15th century that Rous was writing about the loss of settlements suggesting that the change from arable to pasture was relatively commonplace.

[31] 6 sites in two parishes.

mapping these landscape elements (Wager, 1998 and Hooke, unpublished documents in the HER), needs digitising and incorporating into the HER. A significant omission is that of Sutton Chase which covered the area to the north and west of the River Tame. Until this work has been undertaken it is difficult to understand the nature of the relationship between woodland and aggregates. Little woodland was recorded in the area south and east of the Avon in DB, which has led to the view that this area was virtually devoid of woodland This seems unlikely as it appears that *silva* (wood pasture) was recorded in DB, whilst the groves (coppiced woodland) were generally omitted. It is therefore probable that Feldon actually contained a reasonable amount of woodland in the 11th century, though not of the same order as Arden (Wager 1998: 23). Elsewhere in the county, there appears to have been much more woodland, most of which was either wood pasture or coppice. It was consequently likely to be "open and accessible rather than dense and forbidding" (Wager 1998:193). During the medieval period there was an association between assarting and wood pasture that resulted in the loss of much of the *silva* by the end of the medieval period, probably because this type of land was easier to clear and the felled trees more valuable (Ibid: 140).

Thirteen medieval parks have been recorded in Warwickshire's HERs, all in the west of the county. A rapid assessment of the maps in Wager (1998) showed at least twice this number and only those parks with significant areas of woodland are mentioned there. It therefore seems clear that further work is required to identify and map these landscape features across the county. Considerable work on this has already been completed by Hooke (ibid.) for Stratford district and this needs to be incorporated into the HER. An association has been noted elsewhere between parks and industrial activity and the latter should be born in mind when parks are examined (John Hunt pers comm).

5.3.6.2.3.4 Fishponds

See Figure 32.

Fish provided an important source of protein, particularly through winter, and fishponds are first known from the medieval period. They may consist of single (often rectangular) ponds or complexes of ponds with leats and interconnecting channels. They are sometimes associated with moated sites and are occasionally mistaken for them. They were also commonly associated with monastic sites. It is likely that other sites such as millponds were also used for raising fish though only on a small scale.

Within Warwickshire 136 sites with fishpond earthworks have been identified to date, of which 65 are on aggregates, which, at almost 50%, is a higher proportion than might be expected. Within aggregates areas they appear to be less common on the river terraces along the main valleys than on higher ground, which may be because of the difficulty of constructing ponds on the free draining gravels, but could equally be because the rivers themselves provided an adequate source of fish without an investment in large scale construction. More work is clearly required on their locations, both topographically and within the estates of which they were a part. Though DB imlies their existence no river fisheries, with their weirs or fish traps, have been identified archaeologically within Warwickshire though they must have existed as eels are mentioned in 11 DB entries[32]. At Wishaw, fishponds with associated buildings have been excavated (MWA6124) and shown to have been in use from the mid-13th to the early 14th century, though it is unclear how representative this site is. The only other excavations of fishponds have been confined to small-scale work on Combe Abbey ponds (MWA3728). Relatively little is known about their development, and they are potentially vulnerable to extraction. They made an important contribution to the medieval diet and economy, represent a considerable investment in construction and maintenance and conferred significant status upon their owners; as such they deserve further attention.

5.3.6.2.4 Churches and Chapels

See Figure 33.

There are 324 medieval churches and chapels of all types, or their sites, recorded in the HERs, of which 123 are in aggregate areas, roughly the proportion that might be expected. There were 265 19th century parishes in Warwickshire, a pattern that was likely to be broadly similar in the medieval period, though small-scale changes would have been common. This figure includes

[32] Alveston, Aston Cantlow, Atherstone on Stour, Barford, Binton, Salford, Spernall, Stratford, Wasperton, Wixford and Wootton Wawen (Darby and Terrett ,1971)

Coventry and several areas now outside the modern county and 15 parishes completely or mainly outside the study area can be excluded reducing the figure to 250, though the overall number is likely to have been somewhat nearer to 200 as parishes appear to have fragmented somewhat in the post medieval period. Several of the churches and chapels in the HERs are associated with monastic sites (see below) and so probably lay outside the parochial system.

Most parishes would have contained a church or chapel and parishes without either are unusual. In most such cases they are likely to be areas split off from earlier parishes, though they could also be the result of segneurial requests. The former would appear to be the case at Little Wolford (probably originally a part of Great Wolford), Dorsington (probably Welford-on-Avon), Bushwood (Lapworth), and Oldbury (possibly Mancetter). The situation is less clear at Stretton-under-Fosse, Pailton, Easenhall, Little Lawford, Long Lawford, Wills Pastures, Watergall, and Lighthorne. Parishes containing only a chapel are likely to have been subsidiary to a mother church, often representing a township that was split off from the parish later. Conversely parishes containing more than one known place of worship will often indicate separate townships within a single parish. An examination of these issues would best take place within the context of an examination of the medieval township and manorial structures (see above).

The majority of parish churches are likely to have originated in the late Anglo-Saxon period as manorial churches, though it is likely that some will have longer histories as minsters, for example Wootton Wawen. However, there do not appear to have been any major pieces of work profiling the origins and chronology of parish churches in the west midlands and whilst this is a reasonable model to apply it cannot simply be assumed (John Hunt, pers comm). Little archaeological evidence for these origins has been seen as later rebuilding in stone has obscured earlier structures and deposits, and most remain in use. Many small-scale developments have been observed within standing churches and chapels but little of significance has been revealed. At Wootton Wawen part of the north porticus was recorded (Bassett, S, 1987, 1988, 1990; MWA1596), and early foundations have been seen at Merevale and Temple Balsall. Occasional datable medieval burials have been located but no reasonably sized skeletal groups have been available for study.

It is recorded in a footnote in DB that Archbishop Aldred had the right to the church-tax in Alveston before 1066, suggesting the presence of a church here. Sixty-two entries in DB mention priests[33] and these have been taken to demonstrate the existence of a church though it is possible that they were landholders. The main Alveston entry does not mention priests so it is probable that there were more churches present than were recorded. The overall impression is that it is the more populated places that are recorded as having priests, although a holding with as few as three people is recorded as having one.

Sites that are in use are extremely unlikely to be affected by development of any sort and the majority of known sites are also protected. They do have considerable significance in terms of understanding the overall development of the landscape however and can inform the wider landscape context of other more vulnerable sites.

5.3.6.2.5 Monastic Sites

See Figure 34.

Within Warwickshire, 74 monastic sites have been recorded in the HER. These are slightly misleading figures however, as many of the main monastic houses consist of several entries, detailing the overall site as well as key structures such as churches, chapels, cloisters and any other standing buildings that have survived. In total 33 separate monastic houses are known within the county with 23 associated granges. Of the monastic houses, 15 (45.5%) are on aggregates as are 13 (56.5%) of the granges. The granges however were essentially farms and as such would have covered reasonably sized areas so even those at some distance from aggregates areas may have held land in those areas.

[33] Two priests are recorded in Domesday Book at Bilton, Long Itchington, Stoneleigh, and Upton, and one at Aston, Aston Cantlow, Atherston on Stour, Austry, Avon Dassett, Barford, Billesley, Bishop's Tachbrook, Burton Dassett, Burton Hastings, Butler's Marston, Caldecote, Claverdon, Coleshill, Compton Verney, Dunchurch, Ettington, Fillongley, Hampton in Arden, Hampton Lucy, Harborough, Harbury, Haseley, Ilmington, Ipsley, Ladbroke, Leamington Hastings, Leamington Priors, Lighthorne, Long Compton, Loxley, Middleton, Moreton Morrell, Napton, Pillerton Hersey, Rowington, Ryton-on-Dunsmore, Sherbourne, Snitterfield, Stratford, Stretton on Fosse, Studley, Temple Grafton, Tysoe, Ulverley, Whitchurch, Wishaw, Wolfhampcote, Wolford, Wolston, Wolvey, Wootton Wawen, and Wormleighton.

At the time of the Conquest there were very probably monastic houses in Coventry (Bassett, S, 2001; John Hunt, pers comm) and Polesworth and possibly in Warwick and Stratford.

Many of the earliest Norman monastic foundations were Benedictine alien priories dependent on monasteries in Normandy. Wootton Wawen Priory (MWA1599) was founded soon after the Conquest, as was Wolston Priory (MWA3143). Towards the end of the 14th century, alien houses were falling out of favour and in the 1390s both passed to the Carthusians of Coventry. Other Alien priories were at Monks Kirkby (MWA4242), also founded soon after conquest and which later passed to the Carthusian priory of Axholme, Lincolnshire, and Warmington (MWA610) which was probably founded in the early 12th century and was later given to the Carthusians of Wisham, Somerset.

Other Benedictine houses were founded somewhat later. Alcester Abbey (MWA534) was an independent foundation of 1140. Alvecote Priory (MWA176/7/8/9), was granted to Great Malvern Priory (Derbyshire) in 1159, but appears to have been founded as a small Benedictine house before this. There were also several Benedictine nunneries in Warwickshire. Polesworth Abbey (MWA203/6, 5646, 7495) was very likely to have had a pre-conquest origin and seems to have had a cell at Oldbury, (MWA256). Wroxall Priory (MWA2609, 5347/8) was founded towards the end of the reign of Henry I (c AD 1130). Henwood Priory (MWA282) was a later foundation of the mid 12th century as was Nuneaton Priory[34] (MWA1655, 6313, 6373, 6391). There was also a small, short-lived nunnery at Bretford (MWA4260) that was founded after 1154 and dissolved before 1167.

Hermitages have generally been associated with Celtic monasticism of the early medieval period (Aston 2000: 30-45). It is known however, that many were living in the wilder parts of Britain during the 12th century and probably for a hundred years before that, possibly in reaction to the increasing affluence of the established monastic orders, possibly a pre-cursor to the reforms of the Carthusians and Cistercians (Aston 2000: 86). Little appears to be known about these later hermitages however. Examples have been recorded at Wolvey Heath close to Wolvey (MWA3577), south of Alcock's Arbour, on a hilltop near Alcester (MWA1525) and at Silesbourne Farm in open country near the Alne (MWA1618). None of these locations can be described as particularly remote.

The Cistercians were a Benedictine order that arose on the continent in response to the perceived laxness of the Cluniac order (John Hunt, pers comm). They arrived in England in 1128 and preferred isolated locations for their monasteries; Stoneleigh moved from its original sites twice due to disturbance, and both Stoneleigh and Combe are recorded as having depopulated settlements in their immediate vicinity to ensure a sense of isolation (Aston 2000: 88). They reinstated manual labour into their order and were involved with extensive landscape improvements and other works, as demonstrated at Bordesley Abbey and testified by Giraldus Cambrensis (John Hunt, pers comm). Stoneleigh Abbey was associated with extensive assarting (Aston 2000: 134).The earliest Cistercian house was Pinley Priory (MWA1769), a nunnery founded between AD 1068 and 1125. Merevale Abbey (MWA137) was founded in 1148 from Bordesley and Combe Abbey (MWA3739) was founded in AD 1150. Stoneleigh Abbey (MWA2905, 5289, 7251), a few kilometres east of Kenilworth, was an early Cistercian foundation of 1155. It was relocated from Radmore (Staffordshire) due to disturbance by foresters, initially to a different site, possibly at Cryfield (MWA8351), where they were again disturbed by a nearby road. Cookhill Priory, originally in Worcestershire (MWA548) was founded before 1227, probably in the twelfth century.

The Canons' houses, particularly the Augustinians, were probably the most numerous of the new foundations during this period. Their origins are uncertain but they were priests and generally took a more pastoral role within the community, usually preferring urban or sub-urban sites (Aston, 2000: 94). Kenilworth Abbey (MWA3201, 5384-6) was established as an Augustinian priory in AD 1122, only later attaining abbey status. Studley Priory (MWA572, 6166), originated as a priory of Augustinian Canons at Wicton, Worcestershire, and was transferred to Studley c AD 1155. A house of Augustinian canons (MWA175) was founded c AD 1260 near Shuttington but was not mentioned again and presumably failed. Arbury Priory (MWA1683) was founded c AD 1155 as was Holywell Priory (MWA4169) which was dissolved in 1325. Maxstoke Priory (MWA334) was established in the AD 1330s and Atherstone Priory (MWA267) was founded in AD 1375. A

[34] "Fontevraultine houses were originally double, but from early on the number of brethren seems generally to have been small, and for the most part they were essentially nunneries" (Andrews et al, 1984: 61)

virtually independent sub–order of Augustine Canons were the Canons of the Holy Sepulchre who had houses at St Sepulchre Priory, Warwick (MWA1958), and Thelsford Priory, (MWA1116) which had a grange at Barford (MWA3686; Aston 2000: 94).

The houses of the Knights Templar and Hospitaller were more akin to contemporary manor houses than monasteries, acting as collecting centres for their estates which were generally worked by peasants to produce goods or rents and presumably will not be distinguishable archaeologically from other manor houses (Aston 2000: 93), though chapels may have been present (John Hunt, pers comm). They arrived in England in 1128 followed by the Knights Hospitaller in 1144 but the pope suppressed the Templars in 1312 and their lands passed to the Hospitallers. There were preceptories of the Knights Templar at Temple Balsall (MSI702, MSI896) and Castle Park, Warwick (MWA1960), and a preceptory of the Knights Hospitaller at Grafton Court, Temple Grafton, Stratford (MWA1752).

As with the Cistercians the Carthusians originated on the continent and attempted to move back to the original monastic ideal. They looked more to the tradition of isolation however, and their original foundations tended to be remote. Within Warwickshire the main Carthusian house was that at Coventry, outside the study area, founded in the 1340s. It was granted the houses at Wootton Wawen in 1398 and Wolston in 1394 (see above). This is a late foundation however, and by this time, the original aims of the order appear to have been lost.

The foundation of houses of friars began in the early 13th century; they represented an attempt to return to the ideal of poverty that characterised the early stages of most monastic orders and concentrated on teaching and preaching. As a result they preferred centres of population and within Warwickshire there were Franciscan and Carmelite friaries in Coventry, outside the study area and a Dominican Friary in Warwick, (MWA1959) that was founded c AD 1260.

Monastic farming was conducted through granges, which were farms that were held and managed by the main religious houses. They consisted of a normal (if often somewhat grand) range of farm buildings, though there may have also been a chapel. In general, they are distinguished by their tenurial status and might be indistinguishable from any other agricultural holding. As such they have generally been identified from documentary evidence. Monasteries have frequently been associated with innovations in agriculture and industry, or at least their early adoption (Aston 2000, 101, 144-9), and careful study of granges and a comparison with surrounding holdings should be able to throw light upon this.

Nuneaton Priory had a grange at Horeston less than 2km to the east (MWA5142). Merevale Abbey had a grange at Ouston, Lea Marston (MWA6126). Combe Abbey had a grange in Wolvey (MWA3706). Stoneleigh Abbey had a home grange adjacent to the precinct (MWA2941) and further granges at Cryfield (MWA2852), King's Hill (MWA5292), Millburn (MWA8364), and Bockendon (MW5355), all in the general vicinity, and Radway over 20km to the south (MWA752). Studley Priory had a grange at Lower Skilts about 4km to the north (MWA6172). Kenilworth Abbey had a grange at Rudfyn Manor (MWA3264) and possibly Idlicote House (MWA2270) almost 30km to the south. Pipewell Abbey (Northamptonshire) had a significant role within the county through its extensive network of granges. It had two at Thurlaston (MWA3087/9), and one at Biggin Hall (MWA3087), Bilton Grange (MWA4134), Cawston House (MWA4124), and Newbold (MWA3338), as well as possible granges at Cawston (MWA4144), Rugby School Close (MWA3651), and Herbert Grey College, Rugby (MWA5392) all in the east of the county.

In addition to those noted above where granges have been identified with the house holding them, a grange has been identified at Newlands Hall just north of Coventry (MWA9603) but it is not recorded which monastic establishment it belonged to. There may also have been a grange at Grange Farm, Balsall but other than the name there is no evidence (MWA499). A site at Ryton on Dunsmore has been suggested as a monastic site from fields called Monk's Mow and Monk's Meadow (MWA4287) but these names seem more likely to refer to ownership and imply at most a grange.

Other than Stoneleigh Abbey (Bearman, R, 2004), Warwickshire's main monastic sites have generally not been examined archaeologically. The major recent projects have been at the Cistercian houses of Stoneleigh (MWA2905 etc.) and Combe (MWA3739), both in relation to conversion of the successor houses. At Stoneleigh, extensive salvage excavations have added details of the church and cloister, and outer court buildings, but without extensive excavation. At Combe further evidence produced for plan of claustral buildings and some remains of the 15th

century cloister were recorded. Neither produced significant finds assemblages or other evidence except for unstratified floor tiles from Stoneleigh.

Elsewhere in the County, at Polesworth Nunnery (MWA203 etc.) where even the plan of the claustral buildings is uncertain, there has been small-scale work in the cloister, and survey of the Vicarage suggests its cellar belonged to a medieval range. Scattered observation on the site of Atherstone Friary (MWA267) has revealed only demolition rubble. At Nuneaton Priory (MWA1655) quite a lot of small scale work within the precinct has revealed numerous wall fragments east of the church, across the cloister area, and in the outer court at Manor Court House and Manor Hospital. Kenilworth Abbey (MWA3201 etc.) was extensively excavated in the 19th and early 20th century. Excavations of ancillary buildings south of the river in 1989 have been published (Palmer, S 2000a), but new work has been confined to a resistivity survey (as part of on-going work by Kenilworth History and Archaeology Society), and scattered observations of fragments of the outer court buildings. At Warwick Priory (MWA1958) recent work has found little evidence for medieval structures and a re-examination of unpublished work undertaken in 1971, has questioned the previous interpretation of the plan. Warwick Blackfriars (MWA1959) is represented only by occasional burials. Studley Priory (MWA572) in the Arrow Valley has been the subject of a resistivity survey and observation has recorded an isolated wall fragment, and Alcester Abbey (MWA534) and Maxstoke Priory (MWA334) have been surveyed by the former RCHME.

The key sites themselves are well protected from development however. More likely to be vulnerable to exploitation is the landscape context within which the monasteries sit. Ancillary structures such as fishponds, leats etc often lie outside the protected area.

Monasteries however, had an impact outside their precincts, however widely drawn; they were major landowners and innovators. Apart from their granges, which have already been discussed, they held other lands as well as often being endowed with towns and churches that provided a source of income. They were often responsible for town planning and plantation, the development of markets and fairs, and the development of a wide range of industries. As such, detailed work needs to be done to identify and map their holdings, examine their landscape exploitation strategies and compare these with surrounding holdings. Relationships to other sites such as granges or towns and the nature of those sites themselves also need to be examined as does their association with mineral extraction, the brick and tile industries, and with metal production sites.

5.3.6.2.6 Towns

The HER does not record large features such as towns systematically, principally because of previous limitations of database technology. The increasing use of GIS now enables this to be done however and they should be added in a systematic fashion. A list of settlements and their values is given in the Exchequer Lay Subsidy of AD 1334. This tax distinguished between rural communities that paid a fifteenth of their 1332 tax assessment and urban areas that paid a tenth. On this basis, 34 settlements can be considered towns within the County[35].

The development of Warwick and the smaller towns of medieval Warwickshire that are still extant today, such as Henley-in-Arden, Polesworth, Alcester, Solihull, Nuneaton, Atherstone, Rugby and Stratford, lies outside the scope of this assessment. The landscape contexts of towns however, will be crucial to understanding their development and they were focal points that will have affected their surrounding areas. The relationships between towns and their hinterlands therefore need to be understood.

Some sites ultimately failed and were abandoned. Within Warwickshire, these include Bretford, and possibly Brinklow. Other sites appear to have had significant status during the medieval period but are now relatively minor places, such as Aston Cantlow, Churchover, Kineton, Monks Kirkby, Snitterfield, Temple Balsall and Wolvey. Because of limited development or even shrinkage or desertion, these sites potentially have areas of archaeological deposits on their margins that have not been disturbed by modern development and therefore available for research.

[35] This figure excludes Alspath, Birmingham, Coventry, and Sutton Coldfield, which are no longer part of the County.

5.3.6.2.7 Markets and Fairs

See Figure 35.

There are 37 sites recorded as having either markets or fairs, usually both, in the County, though there were 43 in the historic county. Their distribution largely reflects that of urban centres identified above though they were also a feature of non-urban places. Warwick market probably goes back to its foundation in 914 or shortly after though it is first mentioned c AD 1100. There is the implication in DB of a market at Alveston before 1066 (above, MWA9136). Kenilworth, Coventry, Birmingham and Beaudesert are first recorded in the 12th century with the majority in the 13th century (28) and the remainder in the 14th century (6). It is likely that many of these charters were simply confirming rights arising from markets that already existed and that they were well established by the time of the charter.

Markets were generally held within the settlement and so are not likely to be affected by aggregate extraction. It has generally been assumed that medieval markets were held on the same site as the current marketplace within the medieval core of existing settlements, though this probably needs demonstrating. Fairs on the other hand were typically held outside the settlement on open ground and so it might be possible to locate these by field-walking or metal detection surveys. They are also potentially vulnerable to aggregate extraction so identifying their locations would be valuable. In the case of many larger settlements, however, later developments will cover these sites. So for example, at Alcester, Nuneaton, Rugby, Solihull, and Stratford the sites of their medieval markets were probably the same as the currently identifiable market places but the fair sites are likely to have been lost to more recent settlement growth. Alcester, Bidford, Coleshill, Henley in Arden, Kenilworth, Shipston on Stour and Polesworth are also probably in this category but there are open areas close to the medieval cores that might be worth investigation as possible fair sites. The fair site in Warwick probably lies under the racecourse. This is also known as Lammas field; Lammas day is the first of August and the earliest fair Charter for Warwick refers to a fair held on 1st August.

Both the market and fair sites may not have been developed and so could be available for study at Hampton in Arden (MSI829, Blythe/Tame), the shrunken settlement of Hillmorton on the eastern outskirts of Rugby, Stoneleigh Abbey (MWA3357 and MWA295, both Dunsmore), Atherstone on Stour (MWA9044, Stour Valley) and Temple Balsall (MSI896, Central Arden). The fair sites at Wolvey, Monks Kirby and Churchover (MWA8905, MWA8897, MWA9506, all High Cross Plateau), Brinklow (MWA9496, Dunsmore), Thelsford Priory (MWA1116, Lower Avon), Long Compton (MWA8968, Stour Valley), and Aston Cantlow (MWA9082, Arrow/Alne) are likely to be available for study. Other potentially significant sites just off aggregates include Beaudesert (MWA1220), the deserted settlement of Oldberrow (MWA1210) and Snitterfield (MWA9121).

Along the Cotswold Edge various sites such as Brailes and Tysoe had markets and fairs. In both these cases, the site is not known but they are unlikely to be on aggregate areas given the steep nature of most of this study area. There was a market and a fair at Burton Dassett and the sites for both might be available archaeologically but have probably either already been affected by the M40 or extraction, or lie off aggregates.

The value of studying markets and fairs, as well as the routeways between them, is that they will throw light on local and regional trading patterns, and with detailed chronological analysis reveal economic patterns across their period of use. Information from the Portable Antiquities Scheme may help with the location of possible market and fair sites by identifying concentrations of casual losses that might be expected at such busy, regular gatherings of people.

5.3.6.2.8 Transport

Warwickshire has many medieval bridges but these are unlikely to be directly affected by aggregates extraction, though they are potentially vulnerable to increases in HGV traffic.

Most of the main rivers were likely to have been navigable to small craft and used to transport a wide range of goods. As such, there must have been a considerable number of jetties, landing stages, wharves, quays and so on, not to mention boatyards or the boats themselves, but only one site of this type has been identified, at Kenilworth Castle. This aspect of medieval life has clearly been seriously neglected and almost any work would be a significant advance. The material remains of such activity are unlikely to be affected by aggregates extraction though removal of approaches might affect their detection and interpretation.

5.3.6.2.9 Industry, Material Culture and Economy

See Figure 36.

Many industrial activities, such as cloth production, are not likely to leave much trace in situ and many others, such as tanning or metalworking, appear to be closely associated with towns and therefore not directly relevant to this project.

Within the countryside, it seems that there was not such a clear distinction between industry and agriculture as is the norm today. Many industries were undertaken on scattered sites across relatively large areas, often in woodland where fuel was immediately available. They are also likely to have been undertaken in conjunction with small-scale agriculture and to have been seasonal in nature and factors such as these may in part explain why they have been hard to locate. The relative difficulty in their identification does not however decrease their significance and their study should not be neglected.

There appears to be an association between many industries and Monastic control. This may have been because of their role as consumers, for example of high quality building materials such as stone, roof and floor tiles, but also as producers (see below). An association between industry and parkland has also been noted elsewhere and the latter should be examined with such activities in mind (John Hunt, pers comm). To a certain extent most large institutions and corporations, including towns and castles, also had an impact on industrial activity.

5.3.6.2.9.1 Mills

Watermills

Watermills are known to have their origins in the Anglo-Saxon period and were common by the eleventh century. The majority were used for grinding corn but in the 13th century, fulling mills, used in cloth production, became common,. Water mill sites are typically associated with extensive earthworks including weirs, leats, millponds and tailraces.

Within the county, 169 possible medieval watermills are recorded within the HERs[36]. They were regularly recorded in medieval documents as they were a significant source of income; consequently many mills are known from documentary sources that cannot be accurately located on the ground Not surprisingly those whose locations are known are concentrated along the main river valleys though they can also be located on quite minor watercourses.

The majority of these sites (98) are within aggregate areas particularly along the Stour, Arrow/Alne and the Upper Avon within Dunsmore and they are reasonably common along the Anker. They are not common along the Lower Avon and Blythe/Tame (though they become more dense along the upper Blythe) presumably because these rivers valleys are too broad and do not have sufficient gradient to make it easy to generate sufficient height to power mills on many sites.

There are several areas with very few mills identified such as Eastern Arden in the north of the county and across Feldon in the south. Whilst a lack of suitable sites may in part explain this there do appear to be enough larger streams and small rivers to have been able to power a mill in most manors. Given their value (as mentioned above) any lack of a mill within a manor requires some explanation and these areas would probably repay study.

Only eight sites have been identified as medieval fulling mills. This is likely to be because they are not significantly different on the ground to corn mills, often being converted from them, and so require documentary research to identify them in the absence of excavation. This should be a priority area for research and multidisciplinary approaches are likely to be the most successful.

Given their clear association with aggregates areas, water mills as a class are potentially vulnerable to the effects of extraction. Their association with the main rivers, however, means that they are not likely to be directly affected. Mills on minor tributaries are potentially more vulnerable but again their sites are likely to be avoided. Their ancillary structures however are likely to be much more vulnerable and their study may be able to shed light on the dating and development of the mills they served though as the best mill sites remained in use for considerable periods this is not likely to be straightforward. For example, building recording and archaeological work at Hemlingford Mill, Kingsbury (MWA3, Blythe/Tame) revealed many of the earthworks associated with the current mill but failed to locate any medieval deposits or features (WMA 46, 2003: 130).

[36] 228 watermills are recorded within the HERs but Booth (1978) identifies 243 in his survey and several have been added since. Work is therefore required to update this area of the HER.

Other than this no significant work has been carried out on any medieval mill site, with only minor work at being undertaken at Whitnash Mill (MWA1486). Any opportunity to examine a mill site or its associated structures would therefore be extremely valuable.

Windmills

Medieval windmills were post mills, where the mill was mounted on a vertical post that was set on buried crossbeams. This was typically sited on a mound constructed from upcast from a surrounding ditch and medieval windmill mounds have occasionally been mistaken for barrows and even small mottes (John Hunt pers comm). There is no evidence for windmills in England before the twelfth century. At the very end of the medieval period tower mills were introduced but these were rare and none are known from this period in Warwickshire.

Forty possible windmills or mounds within the county have been identified as medieval (of 186 in total[37]) although two of these have not been accurately located. Nineteen of these were in aggregates areas. Given their requirements for as reliable a wind as possible they tend to be located on higher ground and are not common in the river valleys. None have been identified in Anker, Lower Avon or Arrow/Alne and only one each in Stour and Blythe/Tame. Not surprisingly they are far more common across Central Arden, Dunsmore, and High Cross Plateau but most examples have been identified in Feldon, though not on aggregates. A few examples have been identified on the Cotswold Edge. What is perhaps surprising is that no examples are known on the Nuneaton ridge (Industrial Arden), or in Eastern Arden, both of which would appear to be ideal locations. This could be explained by the presence of woodland in the medieval period, though several windmills are known in Central Arden which was probably at least as well wooded at this time.

5.3.6.2.9.2 Cloth Production

Wool and woollen cloth was one of the most valuable English exports during the medieval period. The south of the county was a significant area of production. Despite its importance, significant material remains of wool production in this period, apart from fulling mills, which have already been mentioned, have not been identified (but see Hurst, D, 2002, re: Cotswolds sheepwashes, Dyer, 1995b, re: Gloucestershire sheepcotes). An interdisciplinary approach will probably be required. The remains of domestic production can probably be identified (spindle whorls, loom weights etc.) and many pits across a wide range of sites have been tentatively identified as being used for such activities as dying so a reassessment of excavation reports specifically addressing this issue might also prove valuable.

5.3.6.2.9.3 Pottery, Brick, Tile

There is not a close association between the known pottery, brick and tile production sites and aggregates areas, probably because they tended to be situated close to sources of clay.

The pottery production area of Chilvers Coton, near Nuneaton (eg MWA1792 and a group about one kilometre to the north-east), was one of the most prolific in the county with pottery production from the early 13th century (Mayes and Scott 1984). Raw materials, in the form of clay, coal and water, were abundant locally. The early clay-working sites concentrated along an outcrop of Etruria Marl (Gooder 1984, 3), and there is a reference to a clay-working site at Chilvers Coton of the late 13th century as *Muddimansland* (ibid 14). The Heath End area of Chilvers Coton is probably the 'Potter's Coton' mentioned in a document of 1374. Potters names are attested in the area in documents dating from the early 13th century onwards. The pottery range begins with fine white wares in the 13th century and develops through red, sandy wares to the later Midland Purple and Cistercian wares.

This is not on aggregates however, but a review of the pottery industry is needed in light of recent consumer assemblages, many of which have been recovered from sites in aggregates areas. The largest recent pottery assemblages have come from Burton Dassett (37,750 sherds), Coton (9507), Boteler's Castle (5271), Goldicote (c 3000), Fenny Compton (810), Bascote, Park House, and Warwick (Palmer, N 2003).

A Warwickshire medieval and post medieval pottery type series was produced in 1998 by Iain Soden and Stephanie Ratkai (1998). Some work needs to be done for this to be more widely distributed and some updating is necessary to incorporate the results of recent work.

[37] Seaby's gazetteer (1978) identifies 269 windmills. As with the watermills it seems clear that further work is required.

Apart from the tile kilns associated with Chilvers Coton or in the immediate vicinity, tile kilns have been recorded just outside Polesworth (MWA276), at Stoneleigh Abbey (MWA7251), and on the edge of medieval Warwick (MWA9704). No specific brick kilns have been identified.

5.3.6.2.9.4 Metalwork

No medieval ironstone quarries have been identified, probably because of continuing extraction in later periods, but it is very likely that the ironstone of Cotswold Edge was exploited.

Medieval iron works have been identified close to Merevale Abbey (MWA3954/7865), on the outskirts of Baginton (MWA5300), and substantial quantities of iron slag have been found near Whatcote suggesting an iron-working site in the vicinity (MWA7852), and near Wood Street, Stratford (MWA7872). It is necessary to distinguish between industrial and domestic production and more work is clearly needed in this area.

Medieval smithies have been excavated on the village sites at Burton Dassett (MWA6191) and Cawston, possibly a grange of Pipewell Abbey (MWA4144), although the Cawston smithy extended beyond the excavated area. No other smithies are known but they must have been ubiquitous.

Apart from Burton Dassett most of the recent excavation projects have produced relatively small collections of metalwork and other artefacts. At Coton this perhaps reflects the period of occupation and a real relative poverty. Later sites do produce a wider range of objects and some chronological trends are beginning to emerge, see for example a study of the distribution of medieval coins using HER records (Dyer 1998).

5.3.6.2.9.5 Quarrying

Quarrying was a vital industry but very few quarry sites have been located. Evidence of quarrying for building stone and roofing material, local production of spindle whorls, mortars and metalworking moulds, and coal mining has come almost exclusively from consumer sites rather than production sites. Of the nine quarries recorded in the HERs, seven are securely dated and two are highly speculative. More research is clearly required and an interdisciplinary approach that includes geological techniques might be beneficial.

5.3.6.2.9.6 Coal

The history of the Warwickshire coalfield has been studied by Dr Eric Grant (Grant 1979, 1982) and more recently by Alan Cook (*pers comm*). Documentation of the industry begins in the 13th century. The apparent initial focus in the environs of Nuneaton may reflect the better survival of documents relating to holdings of Nuneaton Priory; it would be surprising if the deposits around Bedworth and further south were not worked at this period. There seems no reason to think that the pattern of exploitation was any different to that of surrounding counties and research elsewhere could be used to indicate possible areas of early mining within Warwickshire.

5.3.6.2.10 Faunal and Environmental Remains

The collection of meaningful animal bone assemblages is difficult in Warwickshire given the general slight acidity of the soils across the county. From recent excavations significant groups have come only from the village sites at Coton, Burton Dassett Southend and Boteler's Castle. More groups are needed, particularly urban ones (and castle/moated and monastic).

Environmental evidence in the form of charred remains is easier to collect, although there can be problems of extraction from Lower Lias clay soils. Significant recent assemblages have come only from the rural settlements at Coton, Burton Dassett, Oversley and Goldicote. Medieval waterlogged plant and insect assemblages are also rare, being limited to those from the suburban fringe of Bridge End in Warwick Castle Park and the Cawston DMV. Waterlogged remains are likely to be preserved in the medieval deposits from the Mere at Kenilworth Castle (MWA5379). Auger sampling here could provide closely dated environmental information without significant damage to the general archaeological integrity of the site (Palmer, N, 2003).

5.3.7 Post-Medieval (AD 1540 – 1750)

5.3.7.1 Introduction

This period, conventionally within the HERs AD 1540 to AD 1750, runs from the end of the medieval period through to the start of the industrial revolution.

It begins after the major shift in ideology and power of the reformation, and the consequent redistribution of ecclesiastical wealth. The middle of the period sees a turbulent political and ideological struggle, whilst the end of the period is one that is on the brink of the transition to an industrial society. It is the period of the 'great rebuilding', and from which many buildings remain more or less intact. It is a period from which we have a profusion of documents, including the first useful maps and illustrations, and in which the documentary records refer to a wider range of social classes than previously, with the biographies of the 'middling sort' as well as the gentry visible via probate inventories and the like. The first detailed history of the County, that by William Dugdale, was written during the middle of the period[38]. It is also a time that sees significant changes in the variety and nature of material culture (Parkhouse, 2003).

Many of the changes during the post medieval period persist into the modern era and are consequently shown on the increasingly reliable 18th and 19th century mapping and increasingly ubiquitous documentation. This has meant that there has been at times a prevailing attitude that archaeology has little to offer to the study of this period. The impression is left that archaeology has been under-performing in its contribution to what we know about this time. There have been few targeted excavations; much of what has been recorded has been incidentally discovered on the way down to earlier layers beneath.

Within the Warwickshire and Solihull HERs, there are over 2600 records for this period but this includes records for sites that have their origins in earlier periods, and standing buildings, most of which will be protected by listing. Excluding these two groups of records leaves a little over 1000 entries of which 964 have been mapped. Of these 418 are within aggregates study areas but 70 are findspots leaving just under 350 archaeological sites.

The density of monuments across the County drops slightly in the post-medieval period to 1.24 per km^2 (See Table 4). Across the districts the density pattern is very similar to that of the medieval period above. Solihull again has by far the highest density at 3.23 and Warwick District is again the only other district with a density above that of the county as a whole at 1.66. The remaining districts were all below average for the period and all are in the same order of diminishing density (Stratford (0.98), North Warwickshire (0.99), Rugby (0.86) and Nuneaton & Bedworth (0.56)). The post medieval period has a very similar pattern to the medieval period when study areas are examined, as it did for the districts. It also has slightly above the County average density of monuments in aggregates areas (1.43, see Table 6). The pattern across the study areas is also almost identical, with Stour, Arrow/Alne, Blythe/Tame and Central Arden having a high monument density again (3.05, 2.25, 2.66, 1.91), Dunsmore and Lower Avon being close to the county value and Anker, High Cross Plateau, Feldon and Cotswold Fringe once more being low (0.53, 0.71, 0.58, 0.85). The one exception to this repeated pattern across the two periods is Industrial Arden which drops from just above average in the medieval period to well below average in the post-medieval (0.55).

These figures are far more to do with the pattern of research activity and the quirks of the HERs than any real pattern, perhaps more so than for previous periods. What is needed is a systematis approach to the recording of sites to ensure as far as is reasonable possible that any distributions seen are genuine. However this is to treat the HER as a research tool which is perhaps unfair. It is a planning tool primarily and so a weighting in favour of areas of development is actually an advantage rather than a failing.

5.3.7.2 Current State of Knowledge

5.3.7.2.1 The Countryside

See Figure 37.

Historic Landscape Characterisation (HLC) for Warwickshire and Solihull is in progress with the pilot areas complete. These cover over 200km^2 in High Cross Plateau/Dunsmore and Lower Avon (with parts of Central Arden and Feldon). Results at this stage however are principally methodological, and detailed synthetic analysis of the historic landscape will not be attempted until the mapping stage has been completed in 2008 (Ben Wallace, pers comm).

Whilst the HLC provides a clear indication of the historical dimension to the current landscape it does not map that historic landscape, including the numerous elements that have changed or

[38] The first edition of *The Antiquities of Warwickshire* was published in 1656, the second in 1730

been lost, directly. As noted above, from the medieval period onwards it should be possible to map many aspects of the historic landscape across the entire county and with the improving documentary record, this should become possible for a wider range of themes and in increasing detail.

5.3.7.2.1.1 Pre-Parliamentary Enclosure

One thing that is striking to anyone looking at post-war APs of the County, and not only the classic Feldon area, is the extent of surviving ridge and furrow, though this is rapidly diminishing. The preservation of the final open-field layout is due to a change from a predominantly arable economy to one that was predominantly pastoral, an important revolution in the countryside that it is easy to overlook.

The process of enclosure, which began during the later medieval period, really began to take hold during at this time. Early enclosure was generally piecemeal and whilst some left a record, for example in legal cases or estate records, much left no explicit evidence. The firm identification of areas of pre-parliamentary enclosure is reliant upon detailed analysis of documentation and is therefore related to survival of early maps; thus pre-parliamentary enclosure has been mapped at places such as Cawston (Dunsmore), Clifton on Dunsmore (Dunsmore) and Sherbourne (Lower Avon).

Under the Verneys, the transition to pasture at Compton Verney was virtually complete by the end of the 15th century and the former open fields divided into eight large closes. Enclosure continued through the post-medieval period and by 1738 there were 50 fields of about 30 acres each (Dyer, 2000: 80). It appears that by the time of the Parliamentary Enclosures the parish was already fully enclosed. Peter Temple of Burton Dassett (Cotswold Fringe) was one of the new entrepreneurs building up a business based on sheep farming as well as a variety of other ventures from the 1550s to 1570s (Alcock 1981), though enclosure actually was already taking place here by 1497 (ibid: 33). The Spencers at nearby Wormleighton (Feldon) were also engaged in similar activities (Thorpe, 1965). The enclosure of these estates however, appears to have been occurring somewhat later than at Compton Verney. More studies such as these, and the incorporation of their results into the HERs, are required to place the processes described into context.

The earliest formal enclosure agreement known covered Woolscott and dates to 1615 or possibly 1621 (Tate, 1949: 91). This was followed by another 11 agreements before 1750, mostly across the south and east of the county[39]. Warwickshire was one of the earliest counties to adopt enclosure by Private Act with the first Act (Lighthorne and Lighthorne Heath) dated to 1720-3 (ibid: 74). In total over 8300ha were enclosed before 1750 (ibid: 78-9), about 3.6% of the modern county (including Solihull and excluding Coventry). All these early enclosures appear to refer to open fields. Parliamentary enclosures are discussed in more detail below.

As a matter of policy, enclosures of this period are not recorded within the HERs (Emma Jones, pers comm). One of the outcomes of the Historic Landscape Characterisation (HLC) project however, will be a preliminary identification of these areas and the HLC will form an integral part of the HER.

5.3.7.2.1.2 Agricultural Improvement

The period was one of agricultural improvement (Thirsk 1967, 1984), with the introduction of new crops, livestock and methods. As the landscape was being enclosed new farms were established to operate the newly enclosed fields and existing farms were being rebuilt to incorporate new ideas. At the same time, some farms and settlements in areas no longer viable in the new environment, often on the outskirts of existing villages, were being abandoned (see below).

Expanding markets for meat and dairy products allowed investment in improved lowland pasture. One of the most important developments seen elsewhere was the construction of water meadow systems, principally during the 17th and 18th centuries. Prior to this project, none were known in the county but the NMP work has identified one certain example south of Whiteacre Heath in Blythe/Tame and a few other possible smaller examples elsewhere in the area. Now that one example has been identified the possibility of others is strengthened and systematic survey would

[39] Clifton on Dunsmore (1648), Wellesbourne (1654), Bilton (1656), Leamington Hastings (1667), Wolston (1692), Stretton on Dunsmore (before 1704), Dunchurch (1709), Radford Semele (1716), Claverdon (1721), Thurlaston (before 1728) and Preston Bagot (before 1742).

be valuable though ongoing HLC and NMP work may identify others. The example mentioned above has been destroyed by aggregate extraction and these systems are clearly vulnerable.

5.3.7.2.1.3 Woodlands

Little work has been done on woodlands in the post medieval period. Though Wager uses maps of this period in her study of woodland in Warwickshire (1998) she does not examine the period after 1500.

The general decline in woodland identified in the medieval period appears to have continued, and many features of existing woodland, relict woods and field boundaries, particularly hedgerows, can be valuable in identifying the former extent of woodland Many of the woodlands that were preserved had clear economic purposes for the production of wood and wood products, particularly for industrial uses such as charcoal for fuel.

Only 21 post-medieval woodlands are recorded in the Warwickshire HER, none in Solihull. These are those woods where detailed studies have taken place, as HER policy is not to record ubiquitous features (as noted above in respect of enclosures, and similar comments regarding the additional data that will be incorporated into the HERs as a result of HLC apply here).

In addition, WCC Ecology Unit holds data on extant ancient woodland (shown to be wooded since AD 1600) from English Nature's register, as well as additional data on species rich hedgerows that may be remnants of more extensive woodland Work from the NMP undertaken as part of this assessment has identified areas with soil marks from probable charcoal burning sites on open land, which are likely to indicate areas of former coppice woodland (all in Blythe/Tame, see Section 10.4). Additional work to identify and map the former extent of woodland would be highly valuable.

5.3.7.2.1.4 Settlements

The vast majority of settlements of the post-medieval period continued in use and form the cores of many towns and villages today. Though increasing affluence led to expansion and rebuilding, because of their position within existing settlements they are not the focus of this assessment.

A few settlements have been identified as originating in this period, principally on the basis of 19th century mapping that suggests that they had been established within areas of former open fields. Of the nine settlements identified only two (Edgehill, Cotswold Fringe, MWA8997, Dunnington, Arrow/Alne, MWA9039) are on aggregates. Only two sites have been examined archaeologically, one in Warwick (MWA5528) and the other at Bascote (MWA9039), both from late in this period or quite possibly from the Imperial period, and neither on aggregates. New settlements in this period might well repay study.

Desertion and shrinkage of settlements continued. For example, Dugdale states that the southernmost of the two hamlets of Broom, between Broom Court and the river, was depopulated during the reign of Elizabeth I (1558-1603; MWA592, Lower Avon) and at Spernall (Arrow/Alne), a Throckmorton Estate map of c1695 shows properties on four sites within the settlement; only two of these buildings were still extant on a map of 1746 and all had disappeared by the time of the 1844 Tithe Map (Palmer, N 1995).

Some interventions have produced features from the period, such as timber structures and associated cobbled surfaces and ditches at Willey (MWA8852, Jones & Palmer 2000, High Cross Plateau), but the extent of such evidence is limited. A presumption in the past that desertions were late medieval is likely to have led to lack of recognition of later desertions and a consequent under-representation of the post-medieval period in the data. More emphasis on shrunken settlements might produce more in the way of 16th and 17th century evidence.

5.3.7.2.2 Country Houses, Gardens and Parks

5.3.7.2.2.1 Country Houses

See Figure 38.

The period saw the emergence of the country house, which was the residence of a gentleman, as distinct from the manor house of the medieval period, which was the residence of the lord of the manor who had a place in the feudal system. The former developed out of the latter but there was a shake-up of landed society in the 16th century with the old medieval nobility collapsing and being replaced by families who rose from the gentry (Tyack 1994: xviii). The gentry, particularly those in the south of the County, had been amassing wealth through sheep farming since the late

15th century and during the 16th century the 'great rebuilding' was financed with these profits[40]. The dissolution of the monasteries also lead to an influx of new landed families some of whom built new houses on the sites of old monasteries[41] or their granges[42] often incorporating parts of them into their new houses. Many of the existing gentry were also able to profit from the dissolution[43] and some of these families acquired estates for their younger sons to set up their own dynasties[44]. Yeoman farmers were also able to profit during this period and several were able to acquire enough wealth to allow them to live in the style of gentlemen[45] (Tyack 1994: xiv).

By the Civil War landed society had settled into a pattern that changed relatively little until the late 19th century. There were about 120 recognisable country houses in the county, most of which had had some building work in the previous century (Tyack 1994: xix-xx). The Civil War had a more significant impact on Warwickshire than many other counties and lead directly to the abandonment of at least four major houses[46]. Several others were damaged in skirmishes[47] and several Royalist families were forced to sell their estates[48]. The period following the restoration saw much new building, including several large houses in the classical style[49] as well as many more compact, brick built houses[50] (ibid: xx). This period of development continued into the early 18th century[51] (ibid: xxi).

There were improvements to existing buildings, complete rebuilding on the sites of earlier manor houses and new buildings on new sites. In the absence of good historical records, building recording or excavation it is not easily possible to distinguish between these three cases however. Less than 30 country houses have been recorded as such within the HERs, 12 on aggregates. There are however, approximately 50 entries within the HERs that are described as manor houses but that do not appear to have medieval origins and should therefore probably be classed as country houses (17 on aggregates). Overall this is a slightly higher proportion than might be expected and suggests that the new country houses were slightly more likely to be on aggregates than existing manor house sites.

5.3.7.2.2.2 Manor Houses and Moated Sites

At Charlecote, Thomas Lucy demolished the house on the site that his forebears had occupied since the 12th century and built a new house of brick with stone dressings in the 1550s. This was originally a two-storey hall block with side wings, which was substantially remodelled during the second decade of the 18th century. Elements of Thomas Lucy's work have been revealed during observation of works in the north wing, including timber framing and parts of early doorways (Coutts 2001).

As noted above, Compton Verney (Feldon) appears to have been at the forefront of landscape changes in the late medieval and early post-medieval periods and the same seems to have been true of its house. The restoration of Compton Verney House (Brindle, 2000) has provided an opportunity for archaeological recording. Here the medieval manor house was succeeded by a

[40] eg Wormleighton (MWA3694, Feldon), Weston-under-Wetherley (MWA10296, Dunsmore)

[41] Arbury Hall (MWA6258, Eastern Arden), Combe Abbey (MWA3739, Dunsmore), Stoneleigh Abbey (DWA4851, Dunsmore)

[42] eg Lower Skilts, (MWA578, Central Arden)

[43] eg Charlecote (MWA7586, Lower Avon)

[44] eg Claverdon House, MWA1101/6282, Central Arden)

[45] eg Packwood House (MWA7156, Central Arden)

[46] eg Kenilworth, Wormleighton, Milcote (MWA1340, Lower Avon)

[47] eg Packington Hall (MWA408, Blythe/Tame)

[48] eg Honington (MWA2140, Stour), Farnborough (MWA7158, just below Cotswold Fringe), Clifford Chambers (MWA7329, Lower Avon)

[49] eg Ragley Hall (MWA7108, just off Arrow/Alne), Combe Abbey

[50] eg Honington Hall, Alveston House (MWA8452, Lower Avon)

[51] eg Umberslade Hall (MWA1076, Central Arden), Stoneleigh Abbey, Meriden Hall (MSI392, just off Blythe/Tame), Newbold Ravel (MWA3557, High Cross Plateau), Foxcote (MWA7548, Cotswold Fringe), Alscot Park (MWA7548, Lower Avon), Ettington Park (MWA8554, Stour), Compton Verney (MWA1188, Feldon)

large Jacobean country house. By this time the medieval village of Compton Murdak had been swept away. The house was rebuilt under the direction of an unknown architect in 1714 for Lord Willoughby de Broke. Various architectural elements of this building have been archaeologically recorded during the renovation works, such as the original 3m high door openings on the first floor. However, the major changes resulting in the house's current form post-date 1750 (Adam's plans are 1760).

Many moated sites were still occupied of course, and some sites have shown post medieval phases. This is the case at Old Knowle Hall, the subject of work by the Solihull Archaeological Society (MSI536), and at Kingshurst (also Solihull), where recent work by John Moore Archaeological Associates has revealed the presence of a post-medieval structure (date uncertain) overlying traces of another. In general however not enough work has been undertaken to say how widely occupied they were in the post-medieval period.

5.3.7.2.2.3 Monastic Sites

Refer back to Figure 34.

Between 1530 and 1540 the monasteries were dissolved by Henry VIII, their buildings and lands were sold off or leased and were replaced by "secular estates in a secular landscape" (Aston, 2000: 160). They were acquired by members of the king's court, Dissolution officials and the *nouveau riche* and the majority were transformed in some way into country houses (ibid: 161). It seems likely however, that the monastic granges simply continued to operate as before but under new owners, although in some cases new houses were built such as at Skilts, a grange of Studley Priory (Tyack 1994: xix).

Buildings at Pinley Abbey Farm (DWA5391, Central Arden) appear to incorporate a 15th century timber framed house containing elements of the buildings of Pinley Priory (MWA1769).

Alvecote Priory (MWA176/7, Anker) was converted into a house that was rebuilt c 1700 to create Alvecote Priory House (MWA179). Also in the Anker valley but excluded as within an urban area Polesworth Abbey (MWA203/6, 5646) was converted into or replaced by a private house (MWA207) and Atherstone Hall (MWA270) directly replaced Atherstone Friary (MWA267).

Monks Kirby Priory (MWA4242, High Cross Plateau) may have been replaced by a private house (MWA3521).

Major restoration work at Stoneleigh Abbey (DWA4851, Dunsmore) has resulted in a programme of recording, the standing fabric by Oxford Archaeology and below ground works by Warwickshire Museum. The upper part of the west wing is 16th century while the lower part was the west range of the medieval cloister. In four years of intermittent fieldwork at Stoneleigh Abbey only a handful of fragments of pottery of post-medieval date have been recovered – all of them residual. Some of the stone-lined drains adjacent to the west wing may be 16th century but they may equally be medieval. The grand Georgian range (1714-26) in white, contrasting markedly with the more rustic red sandstone of the medieval and Elizabethan build, overlies the ground where the west range once lay and all above ground trace of this range appear to have been razed (Morris, 2004). There is thus plenty of evidence for the period in the form of the buildings themselves but below ground revelations have been disappointing, although more fruitful for the monastic period (Coutts, pers comm).

There has also been work at Combe Abbey (MWA3739, Dunsmore) which after the dissolution passed through several owners; there were several major building phases through the 17th and 18th centuries, substantial remodelling in the 19th, and partial demolition in the earlier 20th century (Soden 2001).

Wolston Priory (MWA3143, Dunsmore) was replaced by a 16th century private house (DWA1381)

Priory Farm, Studley (Arrow/Alne) appears to incorporate elements of Studley Priory (MWA572/6166).

5.3.7.2.2.4 Parks and Gardens

Another major change was the development of formal landscapes of parks and gardens, usually associated with the country houses discussed above. Many parks of this period had medieval origins as deer parks and hunting chases but were redesigned at this time to incorporate formal elements, often in imitation of continental practice. Some however, were newly created or

expanded and often earthworks of medieval settlement and land-use have been preserved within their bounds.

Whilst not on aggregates, excavations at Castle Bromwich Hall, Solihull (Currie and Locock 1992, 1993), provide a good summary of developments through the period and an indication of what can be achieved with environmental sampling. Works have revealed evidence for four main phases of garden developing from the medieval demesne. These were a formal layout of plant beds laid out between areas of sand and gravel in the 16th or early 17th century, a parterre garden in the 18th century, a scheme by Bridgeman unfinished at his death in 1747 and further development in the 19th century. The work here showed the scope of what archaeology might reveal; botanical sampling, whilst giving relatively limited information on plants cultivated in the garden, provided additional information on management of the gardens and the outlying estate; for example the plant beds were improved with animal dung and ash.

A substantial review of the parks and gardens of Warwickshire (excluding Solihull) has been undertaken for English Heritage (Lovie, 1997). This adds considerable detail to the historic development of the 27 sites on the Register, recommends a further 25 sites for inclusion and identifies a similar number of a secondary status. He identifies a considerable imbalance on the register with 20 of the 27 sites being in Warwick and Stratford districts in the south. His recommendations only partially redress this imbalance however, with 24 new sites in the north (principally of secondary status) and 36 in the south. Given the exhaustive nature of this work it seems likely that this imbalance reflects a genuine preference for the south of the county possibly as the north was beginning to show signs of industrialisation (below) and the south would be more convenient for London.

Within Solihull, there are eight records for parks and gardens though this includes two records for Elmdon Park. This is relatively low but broadly in keeping with the number of sites identified across the northern part of the county. The southern part of the district does not have any identified parks or gardens however and there are several sites just to the south of Solihull district within the north-western parts of Stratford and Warwick districts. This suggests that other parks could be identified within this part of Solihull. Indeed a very rapid check of Greenwoods map (1822) shows at least two parks that have not been included indicating that a project along the lines of Lovie's should be undertaken here, though the ongoing HLC work may identify some potential sites.

When combined, there are 103 mapped records of which 72 are in aggregates areas. This is a much higher proportion than might be expected, clearly demonstrating that aggregate areas were preferred locations and reflecting the distribution of country houses already noted (the percentage here is even higher than for country houses but this is probably because parks are larger and so more likely to intersect with aggregates areas). As already noted the vast majority of these parks and gardens are in the southern and western parts of the county with 56 in Central Arden, Arrow Alne, Lower Avon, Stour and Cotswold Fringe and an additional two Feldon sites very close to Lower Avon.

A study of the post-medieval landscape at Compton Verney (Tyack 2000) identified three distinct stages in the development of the landscaped park there. The first, shown on an engraving of 1656, shows an unmistakable park with trees dotted around otherwise relatively open ground, a possible prospect mound and a smaller version of the the artificial lake. This was remodelled in the early 18th century with extensive formal gardens and the enlarging of the lake to form a 'canal'. The third phase of development took place in the early Imperial period (below).

At Exhall, an evaluation examined the moat (MWA1650, not on aggregates but grounds probably extended into Eastern Arden). The recovery of needles from Cypress trees suggests that the building was set in landscaped grounds some time after they were introduced in the 16th century (WMA 2003: 87).

An assessment of Clopton Park (Owen and Phibbs 1995), demonstrates the conversion of the 16th century deer park to a designed landscape in the late 17th century.

5.3.7.2.3 Religious Sites

See Figure 39.

There are very few new religious sites of this period: only 39 of which 11 or 28% are on aggregates.

Most parish churches were of course already built by the 16th century, and there is little in the way of new sites, although repairs, extensions and rebuilding took place. Four new parish churches are recorded in the HERs, three of which are on aggregates[52], but these were generally rebuilding on medieval sites. Four chapels of this period have also been recorded (one on aggregates[53]) but they may be late medieval. Most are also on manor sites that could have medieval origins. Other sites include several crosses and a cemetery.

Three Roman Catholic chapels have been identified from this period, one in a private house, of which two are on aggregates[54]. It is difficult to make any comment on this high proportion as the sample is so small that distortions due to chance are highly likely.

Surviving nonconformist chapels have been surveyed by the Royal Commission on Ancient and Historic Monuments in England (RCHME 1986). There are a few buildings of Old Dissenting traditions from the period including ten Quaker, three Presbyterian and two Baptist meeting houses. Most of these are however within modern settlements and none are on aggregates.

5.3.7.2.4 Transport

5.3.7.2.4.1 Road network

In general, it appears that the medieval road pattern persisted. New roads were being constructed however and others abandoned, though the main changes appear to have been occurring late in the period. For example, a new road was constructed early in the 18th century (before 1739) crossing Compton Verney parish from the southeast to the northwest ignoring the existing field pattern (Dyer 2000: 79-80) and the Old Banbury Road, to the south of Warwick was abandoned when the area was emparked in 1744 (MWA4615).

By the 17th century development was beginning to be hampered by poor transport, it was becoming difficult to bring enough food and fuel into the expanding towns and prices were consequently rising. There was no direct action by central government, but the Turnpike Acts enabled local authorities to contract out the necessary work. Turnpike trustees were able to sell shares or borrow capital for road making, and then to levy tolls to repay the investment and finance maintenance. Although the first of these Acts was passed in 1663, only a few Turnpike Trusts were created over the next hundred years.

The earliest turnpike in Warwickshire ran from Old Stratford (Northants) to Dunchurch and was constructed under an Act of 1706/7. It was later extended to Meriden via Coventry by an Act of 1723-4. This was followed by: a road between Birmingham and Edgehill via Stratford (1725-6, MWA4775); a road south of Stratford to the top of Long Compton Hill via Shipston (1729-30); a road from Dunchurch towards Crick (1738-9, MWA4785); an extension to the road from Lichfield to Coleshill (1743-4); and a road from Birmingham to Stonebridge (1744-5). The greatest numbers of turnpike Acts however, were passed after 1750 (Cossons 1946: 84-7); the number of Acts predating 1750 amounts to less than a fifth of the total, or less than a quarter of the total mileage. Works at this time included not only roads but also tollhouses and gates.

The main river crossings were already bridged by this time. A preliminary survey of County road bridges was undertaken by Warwick Museum in 1997 (unpublished; archive at Warwick Museum). The bridges currently in use and the sites of bridges over the main rivers of the county are not likely to ever be directly affected by aggregates extraction though any increase in HGV traffic will hardly be beneficial and therefore some may need strengthening. There are some minor bridges and bridge sites that are potentially more vulnerable, such as the probable site of a packhorse bridge at Maxstoke (MWA341, Blythe/Tame).

5.3.7.2.4.2 Rivers

During the 1630s William Sandys made the Avon navigable for barges of up to 30 tons as far as Stratford, inserting weirs and flash locks and possibly pound locks (MWA4340-6). The extent of his work is not entirely certain, but further improvements were made during the 17th century, for example by Andrew Yarrington (Hadfield and Norris, 1962). Given the uncertainty surrounding these improvements any examination of the structures would be valuable but it is unlikely that they

[52] MSI430, MWA2203, 2611

[53] MWA5241

[54] MWA2192, 2709

will be affected by aggregates extraction, unless more use is made of waterways to carry aggregates (see WCC 2007, Policy Principle 23: 'Safeguarding of railheads and wharves').

5.3.7.2.5 Industry, Material Culture and Economy

The most important industrial evidence for this period comes from the north of the county where ceramic and extractive industries were based.

Thirsk has suggested an association of industry with wood pasture regimes, where lower labour demands of a pastoral economy allowed workers to take on additional employment (Thirsk 1969). Whilst it is true that the pottery industries and coal mining take place away from the classic arable area of the Feldon this is as likely to be a result of opportunism resulting from local economic geology.

Overall, there is a lack of archaeological evidence for the early stages of industrialisation that preceded, and laid the foundations for, the following 'revolution'. This may in part be because it is difficult to identify early phases on sites that continued to be exploited, and exploited on increasing scales, into later periods. It may also be because there has been a focus on the period of the 'Industrial Revolution' however, and this has lead to the earlier period being neglected. In either case, it does seem that the industrial developments of this period require more attention than they have received.

Work on assemblages from consumption sites might serve to identify local industries and indicate their general locations and level of output. Documentary research could provide similar information. This work could in turn allow an assessment to be made of the extent of any gaps or omissions in the record and provide clear targets for research. For example, only two possible glass-working sites are known in the county but it is not known if glass production within the county was significant; these sites may have been all that there were. An analysis of consumer assemblages and documentary research could answer this question and focus archaeological research.

5.3.7.2.5.1 Sources of Power

See Figure 40.

Watermills continued to be the main source of power during this period. Within the HERs for this period, 160 have been mapped. Of these 85 are within aggregates areas and many more are only just outside them. This is a high proportion but not surprising as they are generally situated in valleys on river terrace gravels. They have a very similar distribution to the medieval period (above) being most common on the Stour, Arrow/Alne and the Upper Avon (within Dunsmore) and reasonably common along the Anker. Many of the same sites remained in use, probably because of the limited number of suitable locations and the investment in earthworks. Towards the end of this period, many were converted to industrial uses. For example, Bidford Grange mills was initially converted from corn milling to fulling but later to other uses including paper milling by 1729 (Collins et al 1991; MWA607).

Windmills originated in the medieval period but came into their own at this time. Within the HERs 92 have been mapped of which 34 are in aggregates areas. Again, their distribution is similar to that for the medieval period with most examples being on elevated sites above the river terrace gravels in Central Arden, Dunsmore, High Cross Plateau and several along the Cotswold Fringe. There are numerous examples across Feldon but the majority of these are not on aggregates. Though about half of the known medieval windmill sites went out of use, the new sites were established in similar areas, which suggests that the post-medieval pattern is a development of the medieval pattern. In general, the distributions of watermills and windmills are mutually exclusive. In contrast to watermills it seems that the vast majority were corn mills and remained so (Seaby 1979: ii, estimates 95%), possibly as the intermittent power supply was not well suited for other applications (see steam power below).

The low density of watermills and windmills identified across the north of the county may be due to a lack of research rather than their historic absence. For example, a rapid examination of Beighton's map of the Atherstone area (surveyed in 1725) identified five windmills where only two are recorded for this period within the HER.

Horses were used to provide stationary rotative power in agriculture and industry before the middle of the nineteenth century and though most of the physical evidence dates to the industrial

period horse mills are known to have been used in the sixteenth century and been common by 1700 (Crossley, 1994: 123). No examples of this date are known within Warwickshire however.

5.3.7.2.5.2 Mining and Quarrying

See Figure 41.

The history of the Warwickshire coalfield has been studied by Grant (1979, 1982) and more recently by Alan Cook (pers comm). The period between the 16th and 18th centuries saw an increased demand for coal, stimulated by the Coventry market. By the end of the 17th century shaft mining was beginning to replace open works and bell pits. There is documented evidence (Grant, 1982) for mining in a more or less continuous strip from Dordon down to Wyken, north-east of Coventry (generally between Eastern Arden and Industrial Arden, eg Holly Park Mine, MWA143). At this point however, there is little field evidence demonstrably of the period, much will have been obscured by later and more extensive works, but detailed fieldwork might produce results.

The only workable ironstone in Warwickshire is the Marlstone Rock Formation in the south of the county. It was dug briefly for iron ore on the Burton Dassett Hills in the 19th century but has been mainly used as a source of building stone, ornamental stone and aggregate (Dr Jon Radley, pers comm). Not surprisingly therefore no ironstone extraction sites are recorded in the HERs.

Quarrying for building stone must have been a significant activity. Wood-Jones (1963) suggests that the style of buildings in the Banbury region was constrained by the availability of suitable marlstone. In some regions, stone would have had to have been imported. It is interesting to note that much of the bridge over the Stour at Halford, in the Lias area, is constructed of oolite, with some Warwick stone (Palmer N, 1998). However, much remains to be done in identifying the location and extent of the small-scale quarrying which would have taken place to satisfy local needs.

In limestone areas, lime burning became a rural industry of some importance from the sixteenth century onwards as demand grew for lime for soil dressing as well as building (mortar) and tanning. Many farmers quarried and burned their own lime on a small scale, but where fuel and transport were available larger scale industries developed (Crossley, 1994: 208). Only four lime kilns and one lime works have been recorded within post-medieval Warwickshire although this number increases significantly in the following period and again it may be that this is due to the difficulty of identifying early phases on continuously exploited sites. Only one of these sites is on aggregates (MWA5415) though this is scarcely remarkable as superficial aggregates will generally overly and obscure any sources of limestone.

5.3.7.2.5.3 Pottery, Brick, Tile

See Figure 41.

As noted above the known pottery industries were not closely associated with aggregates areas. Only six post-medieval pottery production sites are recorded in the HERs. These include three clay pits, which are clearly difficult to date, and which could equally have served brickworks, though one is suggested by the field name 'Potters Pit Close' (MWA7297, Arrow/Alne but just off aggregates). There are also three sites associated with the Chilvers Coton pottery industry (MWA5045, 5058, 7370), another in Polesworth (Melton & Scott, 2000; MWA8128) and a possible clay tobacco pipe factory northeast of Long Itchington (MWA5074), none of which are on aggregates.

Building in brick had gradually been coming into vogue during the late medieval period (the earliest major brick building in Warwickshire was probably Fulbrook Castle (MWA835), built by the Earl of Bedford in the early 15th century and already ruinous by 1478), and the demand for brick accelerated during the post medieval period. Across the project area, two possible brickworks[55] and eight brick kilns[56] have been identified as well as a brickyard suggested by a field name[57]. One of the brickworks (MWA3762) and four of the kilns (MWA2873, MSI20, 800, 802) are on aggregates. It is possible that the kiln sites represent brickworks that have not been identified and

[55] MWA2094, 3080. 3762

[56] MWA277, 2078, 2528, 2873, MSI20, 800, 802

[57] MWA293

there is likely to be a certain amount of overlap. The existence of other production centres may be inferred (Locock 1991).

Within Solihull, to the north of Copt Heath (Central Arden) there is a group of three possible brick kiln sites (MSI20, 800, 802) all within 1.2km of a clay pit identified on the first edition OS 6" map (MSI763). The dating of all these sites is uncertain but as they are situated close to Ravenshaw Hall (MSI487) and Berry Hall (MSI486), both of which have early brick elements, it is possible that they are associated with post-medieval work on these houses.

In Spernall village on the River Arrow, an Esmond Dyes occupied a cottage with a brick kiln in 1662 and had an adjoining close called 'claypitts'. This house was almost certainly 'The Tyle House' noted on a 1695 map and which survived until the late 19th century. Individuals producing bricks in the parish are recorded in 1668 and 1740. The 1695 map shows 'The Tyle House Croft' and a cottage standing within the croft with an outbuilding (probably the kiln-house) beside the road. The 17th century outbuilding is at a much lower level than the croft and a raised platform in the latter, with a rectangular depression alongside, represents the former house site. Traces of clay working exist in the fields around the croft (MWA3762).

Drainage works at Compton Wynyates (just below Cotswold Fringe) at the beginning of the 20th century revealed traces of the kilns for the bricks used to build the house in the 16th century (probably the earliest major brick survival in the county), situated some 200m to its north (MWA2094). Another site further to the northeast (also just off Cotswold Fringe) has been suggested by a fieldname (MWA2078).

The only kiln of this period investigated archaeologically was at Atherstone (MWA277, Scott and Ory 1980, Anker but within built-up area). A possible brickworks has been identified in Cubbington parish from the field name 'Brick Kiln Close' (MWA2528), though this should probably be entered as a brick kiln. A brick kiln at Leamington Hastings that may date to this period has been located on a map of 1768 (MWA3080). None of these sites is on aggregates though.

5.3.7.2.5.4 Metals

See Figure 41.

Warwickshire was not a significant area for the production of metals. Only 15 metal industry sites from this period are identified within the HER, six of which are in aggregates areas though a few others are very close. These sites include a single iron smelting site near Middleton (MWA4198) and a slagheap indicating a second (MWA7852), two forges (MWA3783, 6269) and a needle mill (MWA567). The remainder (c 10) are smithies[58]. Most villages would have had a smithy from the medieval period (see for example the excavated site of Burton Dassett Southend described above) and they seem to be underrepresented in the record though this is probably partly because it has not been possible to determine the origin of those identified later (below).

Documentary evidence shows that there was an ironworks in Middleton around the end of the 16th century that was essentially medieval in character being based on bloomeries but the exact location is not known[59] (MWA4198, Blythe/Tame). Ironstone came from Walsall and charcoal was produced locally. Sir Francis Willoughby established a water-powered hammer mill that was operating in 1577. In 1590 there was a blast furnace (presumably charcoal based) and a forge operated by water-power, probably that established by Willoughby (Smith 1967: 91-103). No bloomeries of this period have been identified archaeologically however.

In 1670 a corn mill at Clifford Chambers was demolished and an iron forge built by Francis Watts (MWA1035/6269, Lower Avon). The iron was brought to the mill by barges on the River Avon, the shipping probably only being possible because of the improvements to the navigation described above. It was leased to Thomas Archer in the 1680s and continued to operate as a forge until the 1730s. After this time it seems to have reverted to corn grinding.

The needle-making industry in the Arrow Valley has been studied by Collins (1994). Most of the development of this industry belongs to the late 18th and early 19th centuries but the industry was

[58] There is some confusion of definition within the HER; forges were connected with the industrial production of wrought iron whereas smithies produced small-scale products for local markets yet the two sometimes appear to be used interchangeably.

[59] Though the lake and dam at Middleton Hall may relate to this industry.

certainly in existence by the 1730s, when Washford Mill in Studley (MWA567) was converted from a corn mill to needle making.

Boring mills were important for the production of hollow items such as pipes and cannons or guns; none are known in the County however. Copper alloys (brass, bell and gun alloys) were also important industries but again no sites are known in the County.

5.3.7.2.5.5 Other Industries

See Figure 41.

Eleven cloth production sites are recorded within the HERs including nine fulling mills (five on aggregates: MWA1041 & 3824, Stour; MWA1584, Arrow/Alne; MWA2686 & 3371; Dunsmore), a silk mill (MWA4252, Dunsmore) and a possible textile production site known only from field names (MSI6935, Central Arden). This appears to be a low number and the distribution is strongly skewed towards the south of the county. It is possible that later developments have obscured the early history of industrial textile production in which case careful fieldwork and detailed documentary research may help to add to our knowledge.

Only five leather industry sites are recorded, all tanneries within or on the edge of urban areas and therefore excluded. No other sites of livestock related trades, such as horn or bone workshops, have been identified; these were also likely to have been concentrated in settlements however, and so would be excluded from this study.

Three watermills are known to have been used for paper production at some time (MWA607, 1584, 4252, the latter two on aggregates, see above).

No powder mills or other gunpowder manufacturing sites have been identified.

Two probable glass works sites have been identified by excavation, both in the area between Warwick and Coventry. One is near Kenilworth but is not on aggregates (MWA2593), the other is just north of Warwick on the edge of Dunsmore (MWA5279).

5.3.7.2.6 Military Works

See Figure 42.

During this period, there were three main phases of military construction nationally. At the very beginning of the period, the emphasis was on the coast and largely passed Warwickshire by. The Civil War saw a large number of temporary works thrown up across most of the country, and later, under Charles II, many existing fortifications were upgraded (Crossley 1994, 106).

There was significant building work during the earlier post-medieval period at Warwickshire's two largest castle sites, Kenilworth and Warwick, although relatively little archaeological work relating to this period has been undertaken and neither is directly relevant here. There are also two sites described as castles that were constructed at this time although they should probably be referred to as fortified houses (Weddington Castle – MWA1658 and Swearing Castle, Willington – MWA7169). Again, neither is on aggregates.

The Midlands was an area of key significance during the civil war. A number of the larger houses were garrisoned and some were attacked[60], but the various skirmishes and troop movements through the County have left relatively little that has been encountered during archaeological investigation. Two possible batteries from this period have been identified at Upper Shuckburgh (MWA864) and Nebsworth, Lark Stoke (MWA2704). Other signs of these troubled times are to be seen in repairs to Clopton Bridge outside Stratford, where a single arch of the bridge had been destroyed by parliament (Tennant 1996). Halford Bridge was also slighted at this time, although as no trace of obvious damage is evident from the fabric it may be that the carriageway was taken up but the parapet preserved, in order to facilitate repair more readily in peaceful times (Palmer 1998). On 23rd August 1642, a skirmish took place at Southam, in the direction of Bascote, between the King and the Parliamentary forces. A cannon ball and an inlaid spur have been discovered on the site (MWA774) and a cemetery thought to be associated with the battle has been identified (MWA759). The big set-piece battle in the county, though inconclusive, was that of Edgehill on 23rd October 1642 (MWA1198). A local barn was used as a hospital by the Royalists

[60] eg Compton Wynyates (below Cotswold Fringe, see Figure 38) was captured for Parliament after a siege in 1644; the church was destroyed, but there was little damage to the early Tudor house (Rigold 1971).

(MWA10188) and two cemetery sites have been associated with this battle though largely by tradition (MWA1401/6289). None of these sites are on aggregates however.

The only military sites of this period on aggregates are two possible battlefield sites. One is indicated by stray finds near Walton in Lower Avon and thought to relate to a skirmish following Edgehill (MWA1121). The other is in Tanworth, Central Arden, and known from human and horse remains associated with swords and cannonballs (MWA1086).

5.3.7.2.7 Recreation

See Figure 43.

Apart from the parks and gardens mentioned above the following sites are of note:

One of the five oldest bowling greens in the country was apparently located at Halford in the Stour Valley (MWA2290). A Warwickshire antiquary, Mr. Henry Ferrars, spoke in 1595 of the "Great Bowling at Hawford".

Cockfighting was a popular recreation and four probable cockpits are known within the county all within relatively minor settlements. Two are on aggregates one in Halford, in the club house attached to the bowling green above (MWA2290) and one at Fell Mill Farm, Honington (MWA2339), both within Stour. It is probable there were many more.

The earliest known attempt to hunt a fox with hounds was in Norfolk, in 1534, where farmers began chasing down foxes with their dogs as pest control. By the end of the seventeenth century many organised packs were hunting both hare and fox, and during the eighteenth century packs specifically for fox hunting were appearing. Only one kennel of this period is known (at Stoneleigh, Dunsmore MWA2927) but it is not known if this was for hunting hounds. In general fox hunting is thought to have had a significant impact on the landscape with many small woodlands (coverts) preserved or planted to provide cover for foxes, though this would have been more significant in the Imperial period.

Formalised racecourses begin to emerge towards the end of this period. The Warwick meeting is amongst the oldest in the country. The oldest known race card is at the Woolpack Hotel and dates to 1775 but it is believed that the races started long before this. A newspaper cutting in the HER refers to Bailey's Magazine, published in 1728, which states that the first proper race meeting in England was held here in 1709 (MWA1974, Lower Avon).

5.3.8 Imperial to Modern (AD 1750+)

5.3.8.1 Introduction

The monument density for the County reaches its highest value during the Imperial period at 1.73 per km^2 (See Table 4). The pattern across the districts is however very different than for the preceding two periods. The highest density is seen in Nuneaton & Bedworth (3.14), the only period for which this is the case. Solihull and Warwick District both have densities above the County average (2.78 and 2.27 respectively) but whilst the Warwick District density increase is roughly proportional, the Solihull density is lower than that for the post-medieval period, the only district that sees a drop. Rugby District and North Warwickshire have average monument densities (1.85 and 1.65 respectively) and Stratford District has a density below this (1.15). This pattern of density appears to closely reflect that of development during this period, particularly during the 19th century.

The average monument density on aggregates is only fractionally above that for the County as a whole (1.74); however this hides considerable variations across the study areas. Industrial Arden has a monument density approaching three times that of the county as a whole (4.75), considerably higher than any other study area, though this is possibly not surprising due to the amount of industrial development here. The other study areas with above average monument densities in this period are Dunsmore, Stour, Arrow/Alne and Blythe/Tame (1.91, 2.44, 2.91 and 2.66). Anker and Central Arden have roughly average figures, though slightly low (1.63 and 1.56), High Cross Plateau, Feldon, Cotswold Fringe and Lower Avon all have below average monument densities (1.49, 0.76, 1.28, 1.30). The cautions voiced above regarding Solihull's figures again apply to Central Arden and Blythe/Tame.

The modern period has an average monument density of only 0.38 per km^2 across the County. This is probably because most archaeology from WWI and later has only recently come to be

considered valuable and worth recording. As a result recording of modern archaeology is in its infancy and has been dominated by a few relatively specific initiatives such as the Defence of Britain project. Across the districts Solihull and Warwick District have an above average density (0.65 and 0.57 respectively), Rugby and Nuneaton & Bedworth have average densities and North Warwickshire and Stratford are below average (0.19 and 0.27).

The average monument density on aggregates was also fractionally above the average for the County in the modern period (0.39). The highest value was seen in Dunsmore (0.48) followed by Cotswold Fringe, Lower Avon (both 0.46) and Arrow Alne (0.43), all above average. Stour, Blythe/Tame and Central Arden all have average values and Industrial Arden, Anker, High Cross Plateau and Feldon all had below average densities (0.22, 0.08, 0.22, 0.18).

5.3.8.2 Current State of Knowledge

5.3.8.2.1 The Countryside

5.3.8.2.1.1 Parliamentary Enclosure

Whilst the first enclosure Act was in 1602 in Dorset (Tate 1949: 49), the systematic enclosure of land by private act of parliament took place mainly during the period AD 1750-1830 (Turner, 1986). The acts generally dealt with large areas and allowed the laying out of large regular fields with straight boundaries, in marked contrast to the enclosures of earlier periods. Documentary survival is uneven but can provide a window on the pre-existing pattern as well as the planned changes. These changes were not always implemented immediately, however, and the actual pattern of enclosures did not always closely match the planned layout. Taken with the establishment of new farms and the introduction of new farming methods associated with them this was the last great change in the countryside prior to mechanisation in the post-WWII period (Crossley, 1994: 18). One consequence of the enclosures was that many agricultural labourers were forced off the land into the rapidly expanding cities.

It has been calculated that 175 parliamentary and 18 non-parliamentary enclosures have been recorded for Warwickshire (Tate, 1949: 74) although boundary changes since that date will affect these figures slightly. As noted above, Warwickshire was one of the earliest counties to adopt enclosure by Private Act with 33 Acts before 1760 totalling over 16,600ha (ibid: 78-80) or a little under 8% of the modern county (including Solihull). These early acts generally sanctioned existing agreements and developed into the more usual acts whereby commissioners were appointed to make the partition. The majority of acts after 1760 were of this latter type though the earliest to appoint commissioners was that of 1742 for Preston Bagot (ibid: 92).

Even at this relatively late stage over two thirds of the enclosures covered land that included open-field arable. Tate gives the last of these as that for Langley dated to 1831-5 that only covered 20ha (Tate 1949: 75) but in his tables, there appears to be an enclosure in 1867-9 under the general Act of 1845 of Crimscott and Wimpstone open fields near Alderminster (Stour) that covered 473.4ha (ibid: 89). There are only 25 Acts for enclosing waste beginning with that for Sambourne in 1773 and ending with Coundon and Keresley in 1841-8 (ibid: 75) though Warwick Common was unenclosed in 1949, and several small areas such as Yarningdale Common (Central Arden) are still unenclosed.

In 1793 it was reported that approximately 9% of the county was still open field with about another 19% unenclosed waste. By 1874 these figures had fallen to less than 0.5% and 0.2% respectively (Tate 1949: 73, 76).

As noted above, enclosures are not recorded within the HERs, principally due to their ubiquity (Emma Jones, pers comm). One of the outcomes of the current programme of HLC will be the identification of areas of Parliamentary Enclosure though it will not identify the individual events and will not therefore be able to say much about the process.

5.3.8.2.1.2 Agricultural Improvements

Liming and marling continued and the vast majority of known limekilns and lime and marl pits are from this period although this is because they have been identified from first edition Ordnance Survey 6" maps of the 1880s. This work has not been systematic however.

Water meadows continued in use and it is likely that many existing meadow systems would have developed through this period as well as some new ones being established. They probably only began to be abandoned with the loss of field labourers in the post-WWI period.

The development of land drainage, particularly the use of ceramic pipe drains, which increased through the 19th century, has done much to obliterate ridge and furrow and will have affected many other archaeological remains. We currently have no idea of the extent of these improvements within the county though given the dominance of pasture it is likely to be restricted.

During the 19th century, steam power was used to plough with stationary traction engines pulling the plough across the fields on ropes running to a large pulley wheel or second engine at the opposite end of the field. Steam ploughing produces a characteristic type of ridge and furrow that is straight and narrower than medieval examples with wider headlands. One area of probable steam ploughed rig has been plotted during the NMP work as part of this project in Kingsbury, North Warwickshire (MWA12010, Blythe/Tame) and it is likely that as this work continues other areas will be identified.

During WWII many areas not ploughed since the high medieval period were once again under the plough as Britain tried to feed itself. At Burton Dassett ploughmen had to be brought in from Gaydon as no one locally knew how to plough any longer (N. Palmer, pers comm). No work has been done on the extent of this or its impact. Post-WWII, most areas put under the plough during the war appear to have reverted to their previous use.

Increasing mechanisation in the post war period has lead to deep ploughing in many areas and this has been particularly destructive of sub surface deposits in these areas. The extensive areas of ridge and furrow in the county clearly demonstrate those areas that are unlikely to have been affected. These areas continue to be lost and as their extent is reduced their importance increases (see Hall, 2001).

5.3.8.2.1.3 Woodlands

Little work has been done on woodland during the imperial period.

From the middle of the 18th century onwards, the pressures on woodland began to change. The use of coke lead to a reduction in the need for coppiced woodland for fuel (Crossley, 2005) and this may well have shifted the economic balance in favour of clearing woodland, particularly in the north and west of the county where most industry was located and which was closer to other industrial areas outside the county. However, other developments required wood. For example as the textile industry developed there would have been an increased need for bobbins for which coppiced wood was needed, and, perhaps of more significance locally, the increasing depth of coal mines necessitated large quantities of pit props from timber. It was not only the requirements of industry that would have affected the distribution of woodland At the same time as the agrarian landscape was being enclosed and given over to pasture large scale planting of woodland was being undertaken within the parks and estates of country houses, giving the Arden a more wooded appearance than it had probably had for centuries and which persists today (Tyack, 2000: 139). Many woodlands (coverts) were also preserved or planted to provide cover for shooting or fox hunting.

As noted above woodlands are not recorded within the HERs but HLC will add considerable information. However, additional work on woodlands in the whole of the post medieval period is required.

5.3.8.2.1.4 Rural Settlements

The rural settlement pattern appears to have been relatively stable through this period and most of the main settlements developed steadily through the late eighteenth and nineteenth centuries. A few settlements grew up around new foci associated with developments in the transport network such as canal basins or railway stations. A few were also established because of industrial developments. Settlements of this type include Bermuda, a late 19th century colliery village to the south of Nuneaton (MWA1879 n/a) and the model village at Southam Cement Works (MWA10304). The possible settlement identified at Bascote (MWA8231, above, n/a) might be associated with the construction of the Grand Union Canal (opened 1800, below) and hence of this period. New settlements of this period would clearly form a useful focus for study.

Some settlements still shrank or were completely abandoned. A settlement in Oldberrow named as Freemans Green in 1822 had no buildings surviving by 1839. Earlier maps suggest a hamlet clustered at a minor crossroads (OS field sheet 1814). The site of this settlement, straddling the parish boundary, is highly suggestive of squatter settlement upon wasteland beside the boundary brook. The abandonment of this hamlet was associated with the closure of many of the roads in the parish owing to estate policy (MWA1208, not aggregates).

The main urban areas that saw rapid expansion in the late 19th and early 20th centuries now lie outside the county in the areas around Birmingham and Coventry though Rugby and Solihull saw significant expansion. In the post WWII period continuing expansion in these areas lead to a high demand for aggregates and much quarrying took place at this time, particularly in Blythe/Tame and the area of Dunsmore to the south-east of Coventry.

5.3.8.2.2 Country Houses, Gardens and Parks

Refer back to Figure 38.

5.3.8.2.2.1 Country Houses

In the 1740s and 50s a new generation of owners, many of whom had travelled on the continent as part of the 'Grand Tour', began to rebuild and remodel many houses in a Palladian style[61] and Warwickshire played a key role in the mid 18th century gothic revival[62], not least through one of its leading practitioners, Sanderson Miller, who lived at Radway (Wood & Hawkes, 1969). Rebuilding continued in many places throughout the 19th century, sometimes financed by non-agricultural income such as coal mining[63] or land sales[64] (Tyack, 1994: xxi).

The landed gentry of rural Warwickshire began to be affected by incomers during 19th century. Some estates were sold off and bought up by the *nouveau riche* such as the mill owner Sir George Phillips who acquired the Weston estate in 1817 and built a new house there[65]. Others had to acquire new lands on which to build houses[66] though these did not confer the same status on their owners being country villas rather than gentlemens' seats (Tyack 1994: xxiii).

As some estates expanded others lost out; some country houses were reduced in status[67] and others disappeared completely. In 1673 there were 125 resident gentry in Warwickshire, but by 1815 this had reduced to 63 (Tyack 1994: xxiii). Many country houses and their estates declined after the agricultural depression of the 1870s, a process accelerated by tax rises after WWI. Some houses were sold by their original owners[68] and others were demolished[69]. Some new houses were built and others remodelled however, at least until WWII when more tax rises and a shortage of domestic servants led to more sales. Most of these later houses, though, were on much smaller estates than those of the early 19th century[70] (Tyack 1994: xxv).

5.3.8.2.2.2 Gardens and Parks

In the first half of the 18th century a new view of the ideal landscape developed. The formalised landscapes of the baroque gave way to informal parklands that whilst no less artificial created a form of idealised nature that at first glance might seem more natural. The gardens at Farnborough Hall (MWA7158, below Cotswold Fringe) and Honington Hall (MWA2140, Stour) were transformed in this period (Tyack 1994: xxii). The most famous of all English landscape gardeners was Lancelot 'Capability' Brown who espoused these ideas and he had connections with Warwickshire that he built up during the 1740s and 1750s (Tyack, 2000: 132). His first work in Warwickshire was at Warwick Castle Park in 1749 (MWA6956; Lower Avon). He began work at Compton Verney (Feldon) in 1768 and over the next dozen years created a landscape that remained essentially unchanged until the 1970s (Tyack 2000: 134). He also carried out work at Packington Hall (MWA410, Blythe/Tame), Newnham Paddox (MWA6952, High Cross Plateau),

[61] eg Guy's Cliffe (MWA5245, Dunsmore)

[62] eg Arbury Hall (MWA6258, Eastern Arden), Alscot Park (MWA7548, Lower Avon)

[63] eg Merevale Hall (MWA6951, Industrial Arden)

[64] eg Guy's Cliffe House (above)

[65] eg Weston House (MWA7594, Cotswold Fringe)

[66] eg Hampton Manor (MSI301, Central Arden)

[67] eg Old Berry Hall became a farmhouse (MSI486, just off Central Arden)

[68] eg Compton Verney (MWA1188, Dunsmore), Combe Abbey (MWA3739, Dunsmore)

[69] eg Henwood Hall (MSI520, just off Central Arden), Weston-under-Wetherley Hall (MWA10296, Dunsmore), Hams Hall (MWA64, Blythe/Tame)

[70], eg Honiley Hall (MWA2613, Central Arden), Haseley Manor (MWA2623, Central Arden), Upton House (MWA6955, Cotswold Fringe), Clifford Chambers Manor (MWA7329, Lower Avon)

Combe Abbey (Dunsmore) and Charlecote (MWA7112; Lower Avon; Tyack 1994: xxii, see also Lovie 1997).

Substantial crop mark features probably associated with this period of development have been identified as part of the NMP work in Middleton Park in the far north of the county (MWA6296 n/a).

In the earlier 20th century gardens were often remodelled as 'outdoor rooms' with walls and decorative borders though there are relatively few examples in aggregates areas[71] (Tyack 1994: xxvi).

5.3.8.2.3 Religious Sites

See Figure 44.

There was a major increase in the number of new religious sites during this period. The Dissenting Tradition expanded during the 18th century and there was wide scale rebuilding of parish churches in the 19th century together with the establishment of several suburban cemeteries. After about 1850 Roman Catholicism re-emerged from a long period as an 'underground' faith and this also saw a small scale return of monasticism, usually in the form of nunneries.

Of 271 new sites, however, only 46, or 17% were on aggregates. This low figure is because these new sites were generally within settlements and these areas have been excluded from this assessment. Most larger villages and towns had some new sites built within them during this period particularly Leamington Spa (31) Rugby (25) and Kenilworth (8).

The majority of these sites are also still standing and are often protected by listing or being within a conservation area. Of the sites on aggregates all but seven are standing.

5.3.8.2.4 Transport

The development of transport through this period was a significant component of the industrial revolution, allowing the movement of raw materials to manufactories and the movement of their products to markets.

5.3.8.2.4.1 Roads

See Figure 45.

Turnpikes in Warwickshire have been examined in detail (Cossons 1946) but not fully incorporated into the HERs. For example, none of the several turnpikes known to have crossed Solihull have been recorded in the HER. The turnpike network within Warwickshire continued to develop through this period. Overall over 80% of the turnpikes were built under Acts post-dating 1750. The last turnpike was established by an Act of 1852 and ran from Southam to Kineton. The resultant network was quite dense and covered the county fairly evenly.

Packington Park (MWA410, Blythe/Tame) was, until the second half of the 18th century, bisected by an important thoroughfare that formed part of the main London to Holyhead route (MWA8228). The diversion of the road was proposed by 'Capability' Brown in 1751 and had been carried through by 1782. Traffic was diverted via a turnpike to Stonebridge and then along the present A452 to Coleshill. Several more minor roads were also abandoned at this time (eg (MWA1238, 1239, 1240, 1241, 1242)

After the era of the turnpike, not much appears to have happened in the development of the road network until the spread of the motorcar in the early twentieth century. In the late 18th century, John MacAdam invented the method of "macadamizing" roads by adding a layer of crushed gravel to the surface and some aggregate extraction was doubtless for this purpose. Cars however churned up dust clouds and sent rocks flying. In answer to this problem, 'Tar MacAdam' was developed in the first few years of the 20th century and the use of 'Tarmac' rapidly spread. It is not known how this spread or what impact it had though road building is one of the primary uses of diorite from Mancetter. In many instances modern road surfaces have 'fossilised' earlier features such as hollow-ways. Since WWII the road network has expanded massively which has lead to both destruction of sites and, particularly since the 1970s opportunities for excavation.

[71] eg Bourton Hall (MWA3320, Dunsmore), Packwood House (MWA7156, Central Arden), Upton House (above)

5.3.8.2.4.2 Canals

See Figure 46.

The development of the canal allowed the transport of heavy goods, particularly raw materials and coal, over considerable distances at relatively low costs using horse drawn narrow boats and barges[72]. The main canals in Warwickshire were the Grand Union, Stratford on Avon, Birmingham and Fazeley, Coventry, Ashby, and Oxford Canals. Associated with these were numerous cuttings, tunnels, embankments, aqueducts, locks, reservoirs, basins, branches, workshops, stables, lock-keepers cottages and so on. The Birmingham and Fazeley Canal was the earliest canal in the county, opening in 1789 (MWA4399, Blythe/Tame). It was soon followed by the Coventry Canal (MWA4373, mainly Anker) and the Oxford Canal (MWA3730, 4351) both of which opened in 1790, though the latter was straightened and modernised, and reopened in 1834 (MWA4348, forms the boundary between High Cross Plateau and Dunsmore in the north, largely off aggregates in the south). The northern section of the Stratford Canal (MWA4330, Central Arden) was opened in 1796, but the southern section (Arrow/Alne) was not completed until 1816. The Grand Union Canal (MWA4300) was formally established in 1929 but was a union of several much older canals. The two main Warwickshire sections were the Warwick and Birmingham Canal (MWA4314, mainly Central Arden), which was opened in 1799, and the Warwick and Napton Canal, opened in 1800 (largely off aggregates). The Ashby Canal (MWA4390, forms the boundary between High Cross Plateau and Anker) was opened in 1804 (Crowe 1994).

After a period of neglect all the above canals are in use and not generally vulnerable to development, though some realignment may be necessary because of major infrastructure projects such as the M6 toll which required work to the Birmingham and Fazeley Canal. Their disused sections, branches, wharves and so on, and the sites of associated buildings are potentially more vulnerable. The vast majority of these disused sites are along the Coventry Canal (Anker) and the northern part of the Oxford Canal (High Cross Plateau, Dunsmore) though this may be the result of research bias.

5.3.8.2.4.3 Railways

See Figure 47.

The opening of the Liverpool and Manchester Railway in 1830 was a major landmark in railway history. It was the first modern railway constructed by a public company under an act of parliament, engineered to a high standard and powered by locomotives (Morriss, 1999: 18). Most lines were established by the1860s and most improvements after this period were improvements in the track and rolling stock rather than the construction of new lines. The last line to be completed through Warwickshire was the Great Central, which opened in 1899. By the end of the Edwardian period, there were over 100 separate railway companies. Railways began to meet serious competition from road transport in the early twentieth century. By the end of WWI even the large companies were experiencing difficulties and in the interwar period the separate companies were merged into four large companies, all of which served parts of Warwickshire. After WWII, these were nationalised. Following Beeching's report, numerous branch lines were closed during the early 1960s and the system today is largely one created at that time (Morriss 1999: 28-34).

Perhaps the earliest railway line in the county was a horse-drawn tramway between Moreton-in-Marsh (Gloucestershire) and Stratford-upon-Avon (Lower Avon) that opened in 1826[73]. Its development mirrors that of railways across the county. A branch to Shipston-on-Stour (SP2541) was completed in February 1836 and in 1889, the portion from Moreton-in-Marsh to Shipston-on-Stour was converted to a mainline steam railway. The old remnant to Stratford-upon-Avon fell out of use about 1904 and the main line itself had been closed down by the later 1950s. Both have now been dismantled, though substantial traces remain (MWA7545).

There are numerous mineral railways associated with mines and quarries within the county. Mineral railways have been suggested as the earliest sites where railways developed, particularly in mines, and as the sites where archaeological evidence for their early development may be

[72] There were also ornamental canals for example at Ladbrooke Hall (MWA368) or Arbury Park (MWA4401). Neither is on aggregates.

[73] Over 23km long, it mainly ran off aggregates but probably followed the Stour valley at it's northern end

located (Morriss 1999: 18-20, 29). None are known in the county before the late 19th century, however, as later works probably obscure earlier evidence. Only two mineral railways are known on aggregates, both in Cotswold Fringe. At Burton Dassett, a railway was constructed around 1895 to replace a ropeway and connected the quarry to the main rail network at Fenny Compton. It ran until the quarry closed in 1921 (MWA8917). At Edgehill there was a cable incline and railway connecting a quarry there to the same line as Burton Dassett although this was constructed later, between 1919 and 1922 (MWA9182)

There are military depots at Long Marston and Kineton that have their own specialised railway systems, for moving ordnance and ammunition in the case of DM Kineton, which developed since the 1940s, but neither is on aggregates.

5.3.8.2.4.4 Air

There are several sites associated with early air transport from the inter war period within the county. These include civil airfields at Baginton (MWA8027), Leamington Spa (MWA8092; not aggregates), Kineton (MWA9078) and Ansty (MWA9584). There was also an aircraft factory to the south of Coventry that had its own airfield (MWA8095).

5.3.8.2.5 Industry, Material Culture and Economy

The development of industry was intimately associated with the development of transport. Until it became possible to move heavy goods cheaply over large distances, most industries were tied to their raw materials and only able to supply local markets. As transport improved, initially with the turnpikes but followed by canals and railways, it became feasible to move increasing quantities of materials and goods further, which in turn allowed the development of large commercial enterprises that could benefit from increasing economies of scale and reach larger markets in the developing towns. Regional specialisations developed and the development of new manufactories led to a fundamental shift in patterns of employment, though out-working continued.

5.3.8.2.5.1 Sources of Power

See Figure 48.

Watermills

By this time, the number of watermills in the county had declined to 128 from 160 in the post-medieval period. A little over a quarter of the known post medieval watermills had gone out of use though a dozen new ones had been built. These simple figures conceal other changes as many mills continued to be converted to new uses. Fulling mills are known from the medieval period but the range of other functions expanded to include forges, paper mills, and cotton or silk mills (though early examples of all of these are known from the post-medieval period). The needle mills of the Arrow Valley are a case in point as of the eight needle mills identified by Collins, all but two had their origins as corn mills (Collins 1994: 69). The decline in the numbers of water mills and the conversion of many others to new uses was probably at least as much due to the conversion of arable to pasture across much of the county as to the rise of industry.

Of these watermills 65 (just over 50%) are in aggregates areas and several others are very close to them. Not surprisingly, they are most frequent in the main river valleys, being common in Dunsmore, particularly along the Upper Avon and Sowe Valleys, Stour, Arrow/Alne, Blythe/Tame and reasonably common in Anker. They are surprisingly uncommon along the Lower Avon though this is probably because of the low gradient of the watercourses. Industrial Arden, Feldon and Cotswold Fringe do not contain any watermills at all and Eastern Arden has only one. They are also not common across Central Arden or High Cross Plateau.

Windmills

In contrast to watermills the number of windmills in the county rose to 114 from 92 in the post-medieval period. There was much greater change in their distribution with nearly half of the post-medieval windmills going out of use and about 60 new ones being built. There appears to be a northwards drift in the distribution of windmills from the post medieval into the imperial period. The majority of abandoned sites are in Stratford, Warwick and Rugby districts but the districts where new sites exceed abandoned sites are Solihull, North Warwickshire, Nuneaton and Bedworth and Warwick.

It seems likely that this is in part due to the greater range of sites more suitable for windmills than watermills and the lesser investment required for their construction. These factors mean that they

would have had less 'inertia' and been more susceptible to local economic conditions. Unlike watermills the vast majority of windmills continued to be used for grinding corn and in some places the conversion of the watermill to a different use may have prompted the construction of a windmill in the area to take over flour production.

Of these windmills, 46 (just over 40%) are located on aggregates and several others are only just off them. The distribution of windmills is the inverse of that for watermills. They are not common in the main river valleys; none have been identified in Arrow/Alne or Stour and only a single example is recorded in Lower Avon. They are also rare in Blythe/Tame and Anker. They are most common across the higher ground of Central Arden, Dunsmore and High Cross Plateau. It is somewhat surprising that they are completely absent along the ridge of Industrial Arden.

Animal

Two horse mills are known within the county with a third suggested by earthworks at Fenny Compton (Usher nd; MWA667; not aggregates). They were all on farms and were probably used to drive threshing machines. One was exposed during excavations on the outskirts of Baginton and is now built over (MWA2958); the other was on Kingley Farm near Wixford (MWA1422). Neither is on aggregates though the former is only excluded from Dunsmore as it is now within a built up area and the latter is only just outside Arrow/Alne. Horse mills were likely to have been reasonably common on farms from the mid 18th century onwards (Crossley 1994: 125) and there are probably more examples to be identified within the county but there is no reason to think that aggregate areas were preferred locations. They were also regularly used at mines, possibly from the earlier post medieval period (Crossley, 1994: 123-4). None are known in the county but Grant (1979) suggests that horse gins were used for raising coal at Griff Colliery.

Steam

Twenty-nine steam power sites are recorded in the HERs of which ten are in aggregates areas. They all appear to be from the nineteenth century but are generally not well dated. The earliest reliably dated site was a purpose-built steam powered ribbon factory in Nuneaton that opened in 1835 (MWA1883, not aggregates). There were also several purpose-built steam powered corn mills that probably date to the second half of the century (MWA218 not aggregates, MWA1539 just off Arrow/Alne, MWA6919 Dunsmore and possibly MWA3634 not aggregates). Several windmills were converted to steam, presumably to offset the vagaries of the wind In no case is it recorded when this took place although the mid to late 19th century seems most likely[74]. A few watermills were also converted to steam, probably during the same period[75]. Several other sites used steam power including a steam pump at Earlswood Lakes, reservoirs for the Stratford Canal (MWA1864, Central Arden), a steam powered sawmill at Cox's Timber Yard, Stratford-on-Avon (MWA7543 not aggregates), a steam whim (hoist) at a sandstone mine (MWA9019 not aggregates), a steam ropeway at Burton Dassett (MWA8917, Cotswold Fringe) and presumably many other sites not recorded in the HERs. There was also a steam engine at Napton Brick and Tile Works though it is not clear what its function was (MWA3779 partially in Cotswold Fringe).

Coal Gas

Prior to the development of natural gas in the 1940s and 50s almost all gas was manufactured from coal. Though there were earlier examples of the use of coal gas for lighting, the first commercial gas works was built in London in 1812 and wooden pipes were laid to illuminate Westminster Bridge on New Year's Eve in 1813. Gas illumination, particularly incandescent lamps, had a major social impact extending working hours, increasing public safety and fostering education. Most of these benefits, however, were felt by urban dwellers. Almost 30 gasworks have been identified within the HERs as well as a single gasholder. Of these however, only four[76] are on aggregates probably because most gasworks were situated in urban areas close to their consumers to minimise any pipe laying required.

Some sites were converted to use gas as a power source. Arrow Mill (MWA1441) had a gas engine, as did a saw mill nearby (MWA1425) and Alcester waterworks had a gas powered pump

[74] MSI573 n/a, 581 n/a, MWA767 n/a, 854 Cotswold Fringe, 1455 n/a, 1758 Central Arden, 1764 n/a, 1771 Central Arden, 1886 n/a, 3015 n/a, 3093 Dunsmore, 3376 just off Dunsmore

[75] MWA1035 Lower Avon, MWA1222 excluded from Arrow/Alne as within Henley-in-Arden, MWA1491 Dunsmore, MWA4154 Dunsmore and MWA1473, 2154, 5014 not on aggregates

[76] MSI747, MWA1445, 6725, 7605

(MWA1876 all three in the Arrow/Alne area but not on aggregates). At one stage Eathorpe Chapel was converted to a corn mill that ran for a time on gas (MWA2998 Dunsmore) but perhaps the most unusual site was a cinema at Kenilworth that ran on a gas engine (MWA3313 n/a).

Electricity

Electricity generation was first developed in the 1800s using Faraday's dynamo generator though it was not until the late 19th century that it became possible to harness electricity in a useful way, particularly with the invention of the incandescent light bulb in 1879. The early pattern of electricity generation was one of fragmented networks often serving very small areas that developed in a piecemeal and inefficient way. Few sites from any period have been recorded in the HERs and the early development of electricity supply within the county is not well studied though an EH MPP report on the electricity industry is anticipated.

A few watermills were converted to generate electricity, often for particular country houses. Castle Mill, Warwick (MWA2157 n/a) generated electricity for the castle from 1894 to 1954 and Talton Mill (MWA2729 Stour) generated electricity for Ettington Hall until 1942. Mercote Mill (MSI565 n/a), Clifford Mills (MWA1326 Lower Avon), Wootton Wawen Mill (MWA1613) and King's Coughton Mill (MWA5021 both Arrow/Alne) were also used to generate electricity. One small hydroelectric station was purpose built at Alscot Park, which was constructed in 1912 and served Alscot House (MWA8777 Lower Avon). All these sites were in use during the first half of the 20th century and generally went out of use as the National Grid became established in the 1930s and 40s.

The Electricity (Supply) Act of 1926 created the Central Electricity Board, which set up the UK's first synchronised, nationwide AC grid. It began operating in 1933 as a series of regional grids with auxiliary interconnections for emergency use, but by 1938 the grid was operating as a national system and it was nationalised by the Electricity Act 1947.

Thermal power stations are likely to be in aggregates areas as large amounts of water were a requirement. The power station at Hams Hall was initially constructed in the late 1920s (MWA63 Blythe/Tame), probably as part of the establishment of the National Grid. Other components of the grid are more likely to be located within urban areas, close to where they were required. Only two electricity sub-stations, in Nuneaton (MWA5789 n/a) and Leamington Spa (MWA7165), both constructed c 1900, are identified in the HERs.

Several watermills (MWA3, 88, 568, 2154) and a windmill (MWA622) were converted to operate on electricity, generally in the post war period after the National Grid had been established and electricity supply was becoming increasingly reliable.

The archaeology of electricity generation within Warwickshire does not appear to have been studied other than some recording work at Warwick Castle Mill by WCC Museum Field Services Projects Group which revealed relatively little relating to this phase of use (WMA 43, 2000 and 44, 2001). There is also a small hydroelectric generator next to Middleton Pool Dam (Blythe/Tame) which is not recorded in the HER.

5.3.8.2.5.2 Mining and Quarrying

See Figure 49.

This is the first period for which we have reasonably reliable information on mining and quarrying activity across the county. This is principally because of the detail contained in the first edition Ordnance Survey mapping that shows numerous small pits and quarries often indicating their products and whether they were disused. The detail contained in the tithe maps and apportionments also allows some additional sites to be identified and many more inferred as well as adding detail to the information on the first edition mapping. Neither of these resources has been examined systematically for the whole county and much detail could be added to the HER. In particular Warwickshire Geological Conservation Group is proposing the production of an atlas of building stone to enable improved management of historic stone buildings.

What the maps reveal is the extent of small-scale extraction across the county. In the 19th century, there were numerous marl pits, clay pits, gravel and sand pits, and many small limestone quarries often shown with their associated limekilns. The products of all these were likely to have been for local use and this pattern of exploitation probably went back to the eighteenth century at least, if not the medieval period.

The origins of large-scale commercial exploitation of aggregates are not clear though it is probably associated with the rise of large scale road surfacing/ building and the development of the cement

industry and the use of concrete in construction. The majority of historic aggregate extraction sites identified within the HERs are small and conform to the pattern of local exploitation described above. Commercial exploitation of aggregates relies on cheap transportation to get this low value, bulky resource to market. Whilst a certain amount of material would have been moved by river it is likely that commercial exploitation only developed as the communications network developed and was therefore restricted to this period. It is highly likely that extensive later workings have removed all evidence of earlier exploitation. Detailed map regression and documentary research might be able to throw light upon the development of the industry. In terms of resource management this is not a high priority; the identification of the full extent of extraction would be sufficient to identify areas that have been sterilised for archaeology (though this has proved problematic, see 3.1.1.2 above). Careful study might however, be able to identify areas or 'islands' where there has not been any extraction and earlier deposits might survive.

No iron ore extraction sites are known in Warwickshire other than the ironstone workings around Burton Dassett (Cotswold Fringe) that were mainly used to provide building stone and small amounts of crushed rock aggregates (MWA7612, 8917 and probably 7620).

At Hartshill Hayes (Industrial Arden) manganese workings were in operation by 1818 (MWA8212). Manganese was used in the glass industry to clear glass and as a colouring, as well as in pottery manufacture. Field investigation by RCHME in 1997 (Brown 1997) outlined the extent of the workings which were of limited scale but include remains of quarries, spoil heaps, hollow ways and working areas and the site has been identified as potentially of national importance. The area of this site is surrounded by hard rock aggregates quarries but its location in an area of amenity woodland managed by the county council makes future extraction less likely.

The coal measures overlie the diorite deposits of Industrial Arden and dip down to the southwest. Not surprisingly the 74 coal mining sites in the county follow these measures, are all located to the north of Coventry in the area between Industrial Arden and Blythe/Tame and are not on (or below) aggregates.

5.3.8.2.5.3 Metal Industry

See Figure 50.

There are no smelting sites known within the county during this period and it seems that iron production in the county was overshadowed by developments elsewhere (such as Ironbridge) and rapidly became untenable.

There are three iron works or foundries recorded within Warwickshire. They include an 18th century site in Morton Bagot that may have been a water powered forge (MWA3783), and two late 19th or early 20th century iron works, one certainly a foundry (MWA5776, 7162 Nuneaton and Leamington Spa respectively). None of these sites is on aggregates though the later two are only excluded as they are within built up areas. This appears to be a somewhat low number and documentary research might be able to identify additional examples.

The vast majority of sites of this class are recorded as forges and smithies (blacksmith's workshops). As noted above there is some confusion within the HERs between the two; it seems clear that many of the sites described as forges are in fact smithies. This incorrect attribution appears to be particularly problematic in Warwick and Rugby districts. The distribution of these sites is very uneven. North Warwickshire, Nuneaton and Bedworth, Rugby and Warwick districts all have a fairly even smattering of sites though the southern parts of Warwick and Rugby do not have as many as elsewhere. The whole of Stratford district however, has very few sites and there is only one site in Solihull. The blacksmith was a well known figure in the countryside and it seem likely that most settlements of any size as well as many of the larger estates would have had a smithy such as that at Chedham's Yard, Wellesbourne, which still survives with hearths, bellows, and many of the working tools (MWA9865). The distribution therefore suggests a need for systematic research in these areas (at the same time research to identify any sites with early origins would be valuable, see above).

The small group of needle mills in the Arrow Valley is the result of a detailed study of the needle industry there (Collins 1994) and illustrates the way that industry specific studies can both add information and create distortions in the data.

5.3.8.2.5.4 Pottery, Brick, Tile

See Figure 51.

Only four pottery production sites are known within the county during this period. This is probably because the local industry was severely affected by the development of regional and national industries such as those of Worcester and Staffordshire. Careful examination of consumer assemblages may identify any local production.

In contrast, the brick and tile industries appear to have flourished with 130 sites recorded in the HERs. They are particularly dense within Nuneaton and Bedworth. Only 35 (18.5%) of these are in aggregates areas, however, probably because sources of clay and aggregates tend to be mutually exclusive. On aggregates, they are most common in Dunsmore and High Cross Plateau where clays often overlie aggregates.

5.3.8.2.5.5 Glass

Only one glass manufacturing site is suspected in the study area. Large quantities of glass and the remains of masonry walls have been observed on the south face of Blacklow Hill on the edge of Dunsmore. This may indicate the presence of a Post Medieval glassworks (MWA5279, shown on Figure 51).

5.3.8.2.5.6 Textiles

See Figure 52.

There are 15 sites associated with textile production of which only four are on aggregates, but many are urban. These include one site known only from field names (MSI943 Central Arden), two fulling mills (MWA2686 Dunsmore, 3824 Stour) and a paper mill that was converted to a silk mill (MWA4252 Dunsmore). Other sites, particularly clothing manufacture, seem to have been concentrated in towns with sites associated with the ribbon industry being recorded in Nuneaton and Bedworth and other sites in Warwick, and Leamington Spa. The only site to have had any recent recording work is Rock Mill, Leamington Spa, a late 18th century cotton factory later converted to corn grinding (WMA 46, 2003: 131, not aggregates).

5.3.8.2.6 Military Works

See Figure 53.

Very few military sites of the Imperial period have been identified: none in Solihull and only eight in the rest of the study area. The majority of these are rifle butts that are not necessarily specifically military and may well be civil practice ranges. This seems to be a low number though it may be reasonable as most military activity at this time was abroad.

5.3.8.2.6.1 Twentieth Century Works

Twentieth century military monuments were studied in some detail during the 1990s as parts of both the Monument Protection Programme (MPP) and the Defence of Britain Project (DoBP). The focus of both projects was the Second World War but the MPP also covered the period from 1914 through to 1969 thus encompassing both the First World War and the early part of the Cold War. The MPP was primarily a documentary based project with follow up fieldwork and identified such elements as the defensive stop-lines established during 1940 (Dobinson 1998). The DoBP on the other hand focussed on the archaeological remains, identifying individual pillboxes and tank-traps for example, the two approaches being complimentary (Saunders 1998). As far as possible, all sites identified during the DoBP have been incorporated into the HERs though in some cases the information was not sufficient to locate the sites accurately enough for inclusion.

Since this report was prepared an comprehensive guide to the twentieth century defences in Warwickshire has been published (Carvell 2007) but it was too late to include this material here.

WWI

Archaeologically speaking, the First World War largely passed Warwickshire by. Only two sites are recorded in the HER, one a disused windmill where German prisoners of war were kept (MWA1771, Central Arden), the other a drill hall in use from about 1910 and still standing into the 1920s (MWA6867, n/a).

War memorials were erected in most villages and towns particularly after WWI. Very few have been recorded in the HERs however. The Imperial War Museum is compiling a National Inventory of War Memorials and this information needs to be incorporated into the HERs when it becomes available.

WWII

Of 138 sites of the period within the county only 39 sites (28%) are in aggregate areas though a few others are marginal. Many of these sites have been identified from documentary sources and there may well be no physical remains on the site. Field visits may be valuable.

The Avon Valley was seen as a possible line of invasion and so anti-invasion defences were constructed. There were probably a few stop-lines in the county (Dobinson 1998: map on 3), but these have not been accurately mapped. A gun emplacement in Arrow/Alne (MWA7423) and two pillboxes in Lower Avon (MWA8007, 9733) may have been parts of these lines together with several other sites only just off aggregates.

Of the ring of defensive sites around Rugby all except for one gun emplacement (MWA8857) have been swallowed up by post war expansion and are now excluded as within the urban area. There is a scatter of anti-aircraft batteries across county (28) presumably to protect Rugby, Coventry and Birmingham, many of which (13) are on aggregates. several of these are only identified as crop marks and may potentially be confused with prehistoric ring ditches.

RAF airfields were located at Bramcote (MWA8099; High Cross Plateau), Church Lawford (MWA3489 etc., Dunsmore), Gaydon (MWA8026, Feldon), Atherstone-on-Stour (MWA7993 etc., Stour), Warwick, Wellesbourne Mountford (MWA8101, 7989 etc., Lower Avon), Snitterfield, Honiley (MWA8100, 8107; Central Arden), Leamington Spa. Southam and Long Marston (MWA8094, MWA8106; MWA8029, not aggregates). Elmdon Airfield was a civil pre-cursor to Birmingham Airport where Spitfires were assembled before delivery (MSI10100; not aggregates). They were clearly located on aggregates much more frequently than not.

Of the 18 bombing decoys in the county, over half are on aggregates, most being in Dunsmore (MWA9673/4, 9684/6/9, 9690/3/4) with one in High Cross Plateau (MWA9672) and one in Blythe/Tame (MWA9682, 9696 - probably a duplicate).

The only other site on aggregates was a prisoner of war camp at Birdingbury (MWA9591, Dunsmore) though the camp at Ettington Park (Stour) may have been partially on aggregates (MWA9592).

Cold War

The commonest sites of this period are Royal Observer Corps (ROC) underground monitoring sites, which were underground chambers from where it was intended to monitor radioactive fallout in the event of nuclear attack. Of the 15 sites within the study area, nine are on aggregates (MWA7966, 9562, 9563, 9565, 9566, 9568, 9619, MSI1243, 1244) and a couple more are only just off them (MWA9561, 9632). There were also several WWII ROC observation posts that were modified and continued in use into the cold war period, but none of these was on aggregates. Also on aggregates was the site of a Royal Artillery Anti-Aircraft Operations Room, built in the early 1950s and covering the Coventry & Rugby Gun Defended Area (MWA9174). The building is now demolished and only the footprint survives. The only other cold war site that may have been on aggregates was DM Kineton, an extensive munitions depot (MWA8856, Feldon). There was also a nuclear bomb store for V-bombers at RAF Gaydon (MWA8026, Barnwell, P, 2003) but this was not on aggregates.

5.3.8.2.7 Recreation

See Figure 54.

Recreation developed through this period particularly in the later 19th and 20th centuries as workers slowly won more rights and better conditions. Within the HERs 21 sites have been recorded as recreational in nature. Only four of these (MWA4904, 5745/6, 6937, 8193) are in aggregate areas which is a low percentage. This is probably because many developed to serve the needs of working class urban populations in the late 19th and early 20th centuries. These included a music hall in Nuneaton (MWA5794), cinemas in Kenilworth and Warwick (MWA3313, 7515), a library in Fentham, Solihull (MSI276), a football pitch in Nuneaton (MWA5795) and a rugby clubhouse in Rugby (MWA3623). The remaining sites are, not surprisingly, rural in nature and include a menagerie in Combe Abbey grounds (MWA8193), racecourses at Alcester, Moxhull Park, and Atherstone (MWA4709, 4904, 5828), as well as a range of sites related to hunting: a decoy pool (MWA376), several rifle ranges/butts (MWA1138, 4004, 6937, 7257), pheasantries (MWA7829-31) and kennels (MWA5745/6, 7832). Many old aggregates sites have been restored to form leisure facilities such as country parks, fishing or boating lakes and marinas.

5.3.8.2.8 Health and Welfare

Very few health and welfare sites are on aggregates as they were generally situated within urban areas. Of 35 sites of this type only four are on aggregates, they include two isolation hospitals, one at Henwood, Solihull (MSI17 Central Arden) and another for smallpox at Lawford Heath (MWA3490 Dunsmore). There were also two medicinal baths at Willoughby that were established in the 19th century but never took off (MWA3068/9).

5.4 Overviews of Key Extraction Areas

5.4.1 Study Areas

A breakdown of monument density by period and study area is reproduced in Table 6 below. The monument density for each period was calculated in the same way as for each district and similarly subdivided by period (see Section 5.2 above; cf Table 3 and Table 4).

Table 6 - Monument Density (km^2) by Study Area

Period	County	All	CA[77]	BT	EA	IA	AN	HC	DM	FE	CF	ST	LA	AA
Palaeolithic	0.09	0.09	*0.05*	0.10	-	**0.44**	*0.00*	**0.36**	*0.04*	*0.03*	*0.00*	**0.78**	0.10	*0.06*
Mesolithic	0.15	**0.22**	*0.09*	0.15	-	**0.88**	**0.19**	**0.32**	**0.25**	*0.06*	**0.20**	**0.44**	**0.33**	*0.09*
Neolithic	0.37	**0.59**	**0.46**	**0.52**	-	**1.32**	**0.57**	**0.63**	**0.62**	*0.21*	0.37	**0.57**	**1.00**	*0.31*
Bronze Age	0.48	**0.79**	**0.60**	**0.66**	-	**1.55**	**0.68**	**0.72**	**0.87**	*0.27*	**0.63**	**0.70**	**1.42**	0.46
Iron Age	0.41	**0.69**	**0.54**	**0.64**	-	**1.21**	**0.53**	**0.66**	**0.75**	*0.24*	**0.51**	**0.57**	**1.91**	0.43
Romano-British	0.59	0.61	*0.39*	*0.39*	-	**0.88**	**1.06**	*0.41*	0.56	*0.27*	*0.48*	**1.35**	**0.97**	**1.48**
Prehistoric	1.10	**1.40**	*0.77*	*0.95*	-	**2.98**	**1.86**	**1.50**	**1.47**	*0.55*	1.17	**2.09**	**2.35**	**1.88**
Migration	0.11	**0.17**	**0.26**	**0.23**	-	0.11	*0.04*	*0.09*	*0.08*	0.12	0.11	**0.44**	**0.25**	**0.17**
Early medieval	0.11	**0.18**	**0.32**	**0.24**	-	*0.00*	**0.15**	*0.07*	*0.06*	*0.09*	0.11	**0.44**	**0.26**	*0.09*
Medieval	1.64	**1.95**	**2.52**	**2.72**	-	1.66	*1.03*	*1.30*	1.57	*1.04*	*1.08*	**4.01**	1.75	**3.33**
Post-medieval	1.24	**1.43**	**1.91**	**2.66**	-	*0.55*	*0.53*	*0.71*	1.12	*0.58*	*0.85*	**3.05**	1.34	**2.25**
Imperial	1.73	1.74	1.56	**2.66**	-	**4.75**	1.63	*1.49*	**1.91**	*0.76*	*1.28*	**2.44**	*1.30*	**2.91**
Modern	0.38	0.39	0.39	0.39	-	*0.22*	*0.08*	*0.22*	**0.48**	*0.18*	**0.46**	0.35	**0.46**	**0.43**
Historic	3.70	3.98	**4.32**	**5.00**	-	**6.73**	*2.70*	*3.03*	3.70	*2.20*	*2.70*	**7.06**	3.88	**6.90**
Unknown	0.45	*0.13*	*0.24*	0.48	-	**0.55**	0.42	**0.53**	**1.04**	*0.21*	**0.77**	**1.13**	**1.19**	**0.91**
Total	5.26	**6.01**	5.08	**6.20**	4.87	**10.26**	4.94	5.06	**6.17**	*2.99*	*4.64*	**10.24**	**7.49**	**6.81**

High density values are bold (more than 10% above the overall county density)

Low density values are italic (more than 10% below the overall county density)

Across all aggregates areas the average monument density is 6.01 per km^2, which is slightly above the County value of 5.26. In all periods there is not a large difference between aggregates and non-aggregates areas though the latter all have a slightly higher monument density than the former (see Figure 4).

[77] CA = Central Arden, BT = Blythe/Tame, EA = Eastern Arden, IA = Industrial Arden, AN = Anker, HC = High Cross Plateau, DM = Dunsmore, FE = Feldon, CF = Cotswold Fringe, ST = Stour, LA = Lower Avon, AA = Arrow/Alne

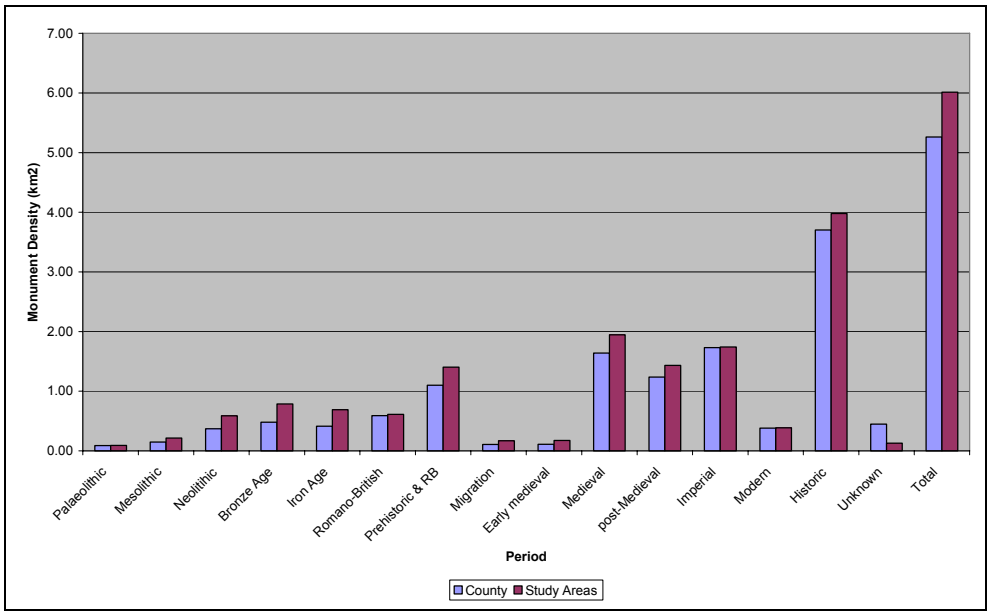


Figure 4 - Monument Density by Period

The differences became more pronounced when individual study areas were examined. A brief summary of monument density arranged by study area follows. For a detailed discussion of these figures by period see the introduction to each of the period based overviews below (eg Sections 5.3.1.1, 5.3.2.1 etc.).

5.4.1.1 Central Arden

This study area lay within Warwick (c 40%) Stratford (c 30%), and Solihull (c 30%) districts. It had a slightly low overall monument density which was slightly below expected from a comparison with the districts it lay within. This was complicated however, by the fact that this study area sat across two separate HERs, Solihull and Warwickshire. This is shown Table 7 below, from which it should be clear that the area of Central Arden in Solihull (CASO) is very different to the area within Warwickshire (CAWA). In the former the monument density in every period is above that for the latter and in most cases the former is higher than the county as a whole and the latter lower.

Table 7 - Central Arden within Solihull and Warwickshire

Period	County	Solihull	All aggr	CASO (30%)	CAWA (70%)	Central Arden
Palaeolithic	0.09	**0.14**	0.09	**0.15**	*0.01*	*0.05*
Mesolithic	0.15	0.15	**0.22**	*0.13*	*0.08*	*0.09*
Neolithic	0.37	**0.49**	**0.59**	**1.00**	*0.22*	**0.46**
Bronze Age	0.48	**0.55**	**0.79**	**1.04**	*0.40*	**0.60**
Iron Age	0.41	**0.55**	**0.69**	**1.04**	*0.32*	**0.54**
Romano-British	0.59	*0.46*	0.61	**0.87**	*0.17*	*0.39*
Prehistoric	1.10	*0.74*	**1.40**	1.19	*0.59*	*0.77*
Migration	0.11	**0.34**	**0.17**	**0.85**	*0.00*	**0.26**
Early medieval	0.11	**0.43**	**0.18**	**0.94**	*0.05*	**0.32**
Medieval	1.64	**3.88**	**1.95**	**5.45**	*1.22*	**2.52**
Post-medieval	1.24	**3.23**	**1.43**	**4.19**	*0.90*	**1.91**
Imperial	1.73	**2.78**	1.74	**2.83**	*1.00*	1.56
Modern	0.38	**0.65**	0.39	**0.72**	*0.24*	0.39
Historic	3.70	**6.92**	3.98	**8.58**	*2.42*	**4.32**
Unknown	0.45	*0.37*	*0.13*	*0.17*	*0.27*	*0.24*
Total	5.26	**7.66**	**6.01**	**9.17**	*3.26*	5.08

High density values are bold (more than 10% above the overall county density)
Low density values are italic (more than 10% below the overall county density)

5.4.1.2 Blythe/Tame

This study area lies within Solihull (c 30%) and North Warwickshire (c 70%) districts. It has an above average monument density overall (6.20 per km^2) which is between the density for the two districts it lies within suggesting that in fact the monument density for this study area broadly reflects that of the surrounding area.

As was the case for Central Arden interpretation was complicated because the study area sat across the two separate HERs of Solihull (BTSO) and Warwickshire (BTWA).

Work along the Tame and Blythe has been subject to little archaeological intervention. Much of the aggregate extraction in the Kingsbury area and along the River Blythe in the Coleshill area was undertaken to meet demands arising from post-WW2 construction. No archaeological research was undertaken.

In Solihull MBC area the prehistoric period is almost certainly under-represented in the HER; one of the few sites investigated is the Iron Age enclosure and its Bronze Age precursor at Meriden quarry on the Meriden Sands (Stevens 2005).

Table 8 - Blythe/Tame within Solihull and Warwickshire

Period	County	Solihull	All aggr	BTSO(30%)	BTWA (70%)	Blythe/Tame
Palaeolithic	0.09	**0.14**	0.09	**0.21**	*0.06*	0.10
Mesolithic	0.15	0.15	**0.22**	**0.34**	*0.08*	0.15
Neolithic	0.37	**0.49**	**0.59**	**1.30**	*0.27*	**0.52**
Bronze Age	0.48	**0.55**	**0.79**	**1.58**	*0.38*	**0.66**
Iron Age	0.41	**0.55**	**0.69**	**1.58**	*0.36*	**0.64**
Romano-British	0.59	*0.46*	0.61	**0.96**	*0.21*	*0.39*
Prehistoric	1.10	*0.74*	**1.40**	**1.99**	*0.63*	*0.95*
Migration	0.11	**0.34**	**0.17**	**0.89**	*0.02*	**0.23**
Early medieval	0.11	**0.43**	**0.18**	**1.03**	*0.00*	**0.24**
Medieval	1.64	**3.88**	**1.95**	**4.67**	**2.13**	**2.72**
Post-medieval	1.24	**3.23**	**1.43**	**5.08**	**1.92**	**2.66**
Imperial	1.73	**2.78**	1.74	**4.26**	**2.17**	**2.66**
Modern	0.38	**0.65**	0.39	**0.82**	*0.25*	0.39
Historic	3.70	**6.92**	3.98	**7.28**	**4.30**	**5.00**
Unknown	0.45	*0.37*	*0.13*	*0.14*	**0.59**	0.48
Total	5.26	**7.66**	**6.01**	**8.52**	5.50	**6.20**

High density values are bold (more than 10% above the overall county density)
Low density values are italic (more than 10% below the overall county density)

5.4.1.3 Industrial Arden

The aggregate-producing geologies in the Mancetter-Bedworth area of North Warwickshire which make up Industrial Arden occur in a narrow band immediately adjacent to the areas of shallow coal within the North Warwickshire coalfield, within which there has been extensive open-cast working, some of it of medieval or even earlier date (Cook 2000), activity that has continued until the present day. Although coal extraction falls outside this study, the industrial activity and urbanisation along this strip has been the most distinctive contribution to its character.

Industrial Arden mainly lies within North Warwickshire (c 60%) and Nuneaton & Bedworth (c 40%) districts. It has the highest monument density for any study area (10.26 per km^2) which is well above the average for each of the districts it lies within and indicates that this study area has a genuinely high proportion of monuments.

All prehistoric periods have densities well above the average for both the County and aggregates areas. The Romano-British period is also above average though this is less pronounced. The overall figures for the prehistoric and Romano-British periods are well over twice the average for both the county and aggregates areas. The figures for the historic periods are far more variable being average or lower for all periods other than the Imperial which is very high (4.75) reflecting the industrial development here during the 19th century. This distorts the average for the historic period which would be below average without the very high Imperial figure.

5.4.1.4 Anker

This study area also lies within North Warwickshire (c 65%) with smaller parts in Nuneaton & Bedworth (c 20%) and Rugby (c 15%) districts. It has a slightly below average monument density (4.94 per km^2) which is broadly in keeping with that of the districts it lies within.

The most significant feature of the monument density in this study area is the high density in the prehistoric and Romano-British periods, which is well above average (1.86) despite having no known Palaeolithic sites. This is particularly pronounced in the Romano-British period where it is approaching twice the County average (1.06 compared to 0.59). These figures are all the more significant given the overall low monument density of this study area. In the historic period the monument density is generally low apart from the early-medieval period which is above average, and the imperial period which is average.

An important Mesolithic site was evaluated at Kisses Barn Farm, Polesworth on the Anker gravel by Warwickshire Museum in 1992 (Palmer, S 1992c).

5.4.1.5 High Cross Plateau

High Cross Plateau lies within Rugby District (c 85%) with a small proportion in Nuneaton & Bedworth (c 15%). It has an overall monument density of slightly below average (5.06 per km^2) which is only very slightly higher than for the surrounding district as a whole and which can largely be accounted for by the area within Nuneaton & Bedworth which has a higher monument density. It therefore appears that monument densities in the study area broadly reflect those of the surrounding districts rather than indicating any significant difference between aggregate and non-aggregate areas.

Despite this overall density there is a heavy bias towards the prehistoric periods. These are all above average but every period from the Romano-British onwards has a below average monument density. This largely reflects the pattern within Rugby District but the exclusion of urban areas has reduced the number of imperial and modern sites.

Work on the glacial plateau gravels around Wolvey and High Cross includes the programme of investigation of the prehistoric landscape of the Wolvey area currently being undertaken by the University of Birmingham under the direction of Paul Garwood (the Wolvey project, which is in turn part of a larger research programme concerned with Late Neolithic and Early Bronze Age funerary monuments in north-western Europe). Work at High Cross quarry close to the County boundary and to a Romano-British town situated on the Fosse Way/Watling Street cross-roads at Copston, has revealed later prehistoric features as well as evidence for earlier activity (Palmer forthcoming a). Further south at the Romano-British settlement of Tripontium, also on Watling Street, some of the excavations by Rugby Archaeological Society (Cameron and Lucas 1969, 1973) were undertaken in advance of gravel extraction.

5.4.1.6 Dunsmore

This area lies mainly within Rugby and Warwick districts (c 50% and 40% respectively) with a small amount in Stratford District (c 10%). It has an above average monument density of 6.17 km^2 which is somewhat higher than might be expected from a comparison with the districts it lies within.

The low density of Palaeolithic monuments within this study area is somewhat surprising as all three of the districts it lies within have higher values and the rest of the period density figures largely appear to reflect the district figures. This is purely a result of the way the sites have been recorded within the HER. The numerous well dated finds from Bubbenhall are actually recorded within 2 or three HER entries whereas the large number of poorly dated finds collected by Waite each have a separate entry. The figures have clearly been distorted and are not representative.

The pre-Anglian river gravels in the Bubbenhall area contain some of the oldest human artefacts recorded in the UK. These deposits are clearly of national importance within the Palaeolithic context, and are of geological significance in that they represent an older fluvial topography (Shotton et al 1993).

Features dating from the early Neolithic onwards have been examined on the Avon terrace gravels at Church Lawford and King's Newnham, and on the terraces of the Avon's tributary the River Leam at Frankton and on the River Itchen (a tributary of the Leam) at Long Itchington during

insertion of gas pipelines (Palmer, S 2000b, 2003a, 2003c, 2006a); the Church Lawford Neolithic enclosure is one of the earliest man-made features known in the region.

The most extensive area of gravels examined to date is that at Ling Hall Quarry, Church Lawford, where some fifteen years of archaeological work has revealed extensive areas of activity, mainly dating to the Iron Age (Palmer, S 2002; work ongoing). Preservation of these deposits has been assisted by the fact that Dunsmore was heathland until the 18th century, and the prehistoric features escaped damage from intensive medieval ridge and furrow cultivation. A short distance east of Ling Hall, investigation has also taken place at the deserted medieval settlement at Cawston occupied in the 13th and 14th centuries (Palmer, S 1999c); this produced better than normal palaeo-environmental evidence including waterlogged and charred plant remains. Amongst other investigations on the Dunsmore Plateau are those around Ryton, including excavation of a late Bronze Age cremation cemetery and enclosure and late Iron Age enclosures in advance of gravel extraction at Ryton Wood (Bateman 1978a). Further investigation was also undertaken in advance of work on the A45/A445 roundabout that revealed part of an Iron Age settlement with an unusual ceremonial aspect (Palmer, forthcoming c[78])

5.4.1.7 Feldon

Feldon lies entirely within Stratford District and has an overall monument density well below the average for the county or aggregate areas (2.99 km^2). This is also well below average for the district as a whole. Every period has a below average monument density as well apart from the post-Romano-British period which is slightly above average. In the context of the generally very low monument density figures this is significant. In part the low monument densities are likely to reflect the low level of development within a predominantly rural area but Stour is similarly rural in character and has a high monument density so this cannot be the full explanation.

5.4.1.8 Cotswold Fringe

This study area also lies entirely within Stratford District and has a monument density only a little below average (4.64 km^2) and slightly above that of the district. However it has a different density pattern when examined period by period. The monument density is significantly higher than that of the surrounding district in the prehistoric and modern periods and lower in the Romano-British period but this may well be because it is not really representative of Stratford District as a whole probably having far more in common with areas of the Cotswolds outside the County.

The Jurassic ironstone quarries are situated close to the Cotswold escarpment and in most cases within the AONB At Burton Dassett, where the quarries are now a prominent feature within the country park, quarrying was undertaken before the advent of systematic archaeological mitigation and excavation, although there are accounts, for example of what was evidently an Anglo-Saxon cemetery discovered during quarrying at the Burton Dassett hills in 1908 (Warwickshire HER 649, 6186). An Iron Age pit group was excavated and a possible villa and Anglo-Saxon settlement are indicated (Booth 1989c). The industrial archaeology of the ironstone industry is of interest in itself (Tonks 1988).

5.4.1.9 Stour

Again, Stour lies completely within Stratford district but has the second highest monument density of any study area (10.24 km^2). This is much higher than the figure for the surrounding district and is therefore highly significant. Monument density is also well above average for every period other than the modern which is slightly below average and every value is higher than that for the surrounding district.

5.4.1.10 Lower Avon

This study area lies mainly within Stratford District (c 80%) but has a small amount in Warwick District (c 20%). It has a monument density that is well above average both for the County as a whole and the districts it lies within (7.49 km^2).

[78] also interim report at

http://www.warwickshire.gov.uk/Web/corporate/pages.nsf/Links/D85A77DB93E2C08F80256FAC005C5A14

The density of Palaeolithic monuments is average and roughly as might be expected from a comparison with the surrounding districts. However every period from the Mesolithic to the early-medieval has a higher density than either district and the County as a whole, which is particularly pronounced from the Bronze Age onwards. From the medieval period onwards values lie between those of the two districts the study area lies within as might be expected.

In the context of the extant river network, there has been significant work along the Avon and its tributaries which has identified prehistoric and multi-period landscapes from the Neolithic to the Romano-British/post-Romano-British period. The Avon valley is identified as a distinctive area of landscape character within the County (WCC 1993b), separating the enclosure landscapes of the Feldon from the more dispersed pattern of the Arden to the north The potential importance of the crop-mark evidence along the Avon, indicating intensive settlement by the later prehistoric period, was noted in the 1960s (Webster and Hobley 1964), since when fieldwork has been undertaken at a number of sites. Much, although by no means all, of this work has been initiated in order to mitigate aggregates extraction.

Extensive work has taken place south (downstream) of Warwick, examining major multi-period crop mark complexes in the Barford/Wasperton/Charlecote area (Cracknell and Hingley 1994, Hughes and Crawford 1995, Loveday 1989, Oswald 1969, Crawford 1982,83, Ford 2004). The Avon valley was an important line of communication from the Neolithic onwards (Palmer S, this volume).

There were Anglo-Saxon cemeteries at Wasperton, Bidford and Stratford. That at Wasperton, with its overlap with the Romano-British period is of national importance. Nucleation of the Avon landscapes probably begins in the later Anglo-Saxon period. Numerous small manors are recorded in DB. The river was of economic significance, with the foundation of late Saxon or medieval towns at Warwick, Stratford and Bidford.

5.4.1.11 Arrow/Alne

Arrow/Alne also lies mainly within Stratford District (c 80%) and again has a small proportion (c 20%) in Warwick District. Once again it has an above average monument density for the county as a whole (6.81) but this is slightly below the value for Warwick District and so the overall density is more in keeping with that of the districts that the study area lies within.

For the prehistoric periods the monument density is roughly as might be expected from a comparison with the districts within which the study area lies, but the Romano-British period is well above that for either district (1.48) and is the highest for any study area. This is almost certainly due to the effect of Alcester on its hinterland despite the urban area being excluded. In fact every period after this (apart from the early medieval and modern periods which are roughly as might be expected) is above the density for either district.

In the valley of the River Arrow, a tributary of the Avon, work has taken place in advance of construction of the A46 Norton Lenchwick bypass (Palmer 2000a), and also in advance of quarrying at Marsh Farm, Salford Priors (Palmer 2000d and *in prep*); these investigations have revealed a long sequence of activity along the valley, particularly during the Iron Age & Romano-British periods. There was a town at Alcester in both the Romano-British and medieval periods which has been the focus of extensive excavations.

6 Research Framework & Agenda

The gravels sites, whether fluvial or glacial, have enormous potential for future research. Nevertheless, despite the relative high visibility of sites in these areas, there are some constraints upon research. There is variable differential preservation of palaeo-environmental evidence, with conditions for preservation of pollen, coleoptera and macrofossils being generally very poor.

At present, it is not possible to identify meaningful distributions within the county as the record has evolved over many years from chance discoveries and a wide range of projects covering differing areas with different methodologies. Future research strategies will need to address this issue.

6.1 Period Based Research Topics

It is not anticipated that many people will want to read this report cover to cover and will instead use it as a tool examining individual sections as and when they become relevant. For this reason topics relevant to more than one period are repeated in each section so that they are not missed.

6.1.1 Palaeolithic and Mesolithic (to c 4000 BC)

(By Stuart Palmer)

See Section 5.3.1.

The Palaeolithic period has attracted considerable interest in recent years, including The English Rivers Palaeolithic Project (Wymer 1996); The Ancient Human Occupation of Britain project; The Shotton Project (Buteux & Lang 2002; Buteux, Keen & Lang 2005; Lang & Keen 2005); the National Ice Age Network; and The Colonisation of Britain by Modern Humans project.

The existing national research frameworks are the Research Frameworks for the Palaeolithic and Mesolithic of Britain and Ireland (Prehistoric Society 1999). However, the pace of research is such that work is afoot to produce a framework for the Palaeolithic that will include the Pleistocene/Holocene transition (Pettitt et al 2006). The regional research agenda (Garwood forthcoming) is also in preparation and thus a caveat is included here that the agenda for the aggregate areas of Warwickshire and Solihull could be extensively modified.

There is no type of Mesolithic site in Warwickshire that would not benefit from further research. No opportunities to excavate/survey/record should be passed up, particularly if there is a possibility that well preserved stratigraphy, waterlogged or charred plant deposits, large assemblages of flint or animal bone, might be found.

6.1.1.1 Lower and Middle Palaeolithic

- Establish when hominins first reached the area and by which routes, and the nature of the environment they inhabited.
- Determine the technical and cognitive capabilities of early hominin populations by examining the lithic record.
- Establish the date and character of the Wolvey and other such assemblages, their geological and environmental contexts, and the research potential of the area.
- Establish whether hominins were present during the Hoxnian Interglacial and the prevalent environmental conditions in the area.
- Determine if Levallois technology exists in the area.
- Analyse existing finds using a Quaternary Science framework by putting them in their geological and environmental context.
- Determine the chronology and geological sequences relating to the pre-Anglian river Bytham and the post-Anglian Avon and refine the route of the River Bytham. Such study would be enhanced by establishing the true age of the Anglian glaciation and the presence or absence and extent of any subsequent pre-Devensian midlands glaciation.

6.1.1.2 Upper and Final Upper Palaeolithic

- Establish the chronology of the first colonisation of the area by modern humans and the chronology and duration of later re-colonisation episodes during the Last Glacial.
- Determine the geographical distribution and adaptations of modern human populations in relation to climate change and particular environmental zones and conditions.
- Determine the spatial organization of settlement, subsistence and other practices, and patterns of everyday life.

6.1.1.3 Mesolithic

- Investigate evidence for environmental change and settlement at the Pleistocene/Holocene (Late Upper Palaeolithic/Mesolithic) boundary, c 9000-7000 BC.
- Determine the geographical distribution and local adaptations of Mesolithic populations in relation to changing environmental conditions, resource availability and diet during the early Holocene.
- Investigate continuity and change during the Mesolithic.
- Investigate the transition from the later Mesolithic to the earlier Neolithic.
- Large-scale organisation of Mesolithic societies: territories, migration ranges, and regional cultural or ethnic groups.
- Establish the settlement patterns, subsistence and other practices, including the nature of occupation sites, residential mobility and perceptions of landscape.
- Investigate lithic technologies, tool function and behaviour.
- Analyse and publish the Leek Wootton assemblage.
- Identify areas of alluvium and colluvium which have the potential for masking sites by means of predictive modelling.
- Identify palaeochannels in river terrace deposits, obtain datable material and determine the nature of the contemporary environment.

6.1.2 Neolithic and Early Bronze Age c 4000 BC – 1600)

(By Stuart Palmer)

See Section 5.3.2.

There is currently no national research agenda for the Neolithic or Early Bronze Age but a regional agenda for the West Midlands is currently in preparation (Garwood, forthcoming). The regional research agenda includes specific research questions that relate to the aggregate areas of Warwickshire and Solihull and are included in the following:

Particular shortfalls in our current understanding of the Neolithic and Early Bronze Age include monuments, settlements, pits, middens, sites with well preserved stratigraphy, waterlogged or charred plant deposits, assemblages of animal bone and pottery. Any development within a Neolithic landscape, particularly on river terraces, could disturb significant archaeological materials and deposits.

Other priorities are to:

- Identify areas of alluvium and colluvium which have the potential for masking sites by means of predictive modelling.
- Identify palaeochannels in river terrace deposits, obtain datable material and determine the nature of the contemporary environment.

6.1.2.1 Early Neolithic

- Characterise the Mesolithic – Neolithic transition with particular regard to the chronology and nature of the adoption of agriculture, the construction of durable funerary and ceremonial architecture and the adoption and use of ceramics.
- Study likely upland locations such as the Cotswold Fringe, Industrial Arden and the High Cross Plateau for evidence of early monuments by field survey, aerial photography, LIDAR etc.
- Locate, identify and sample possible megalithic tombs on the Cotswold Fringe to ascertain their function, date and method of construction.
- Undertake detailed analysis of pottery assemblages with special attention to thin section analysis including those from Warwick, Baginton, Church Lawford and King's Newnham.
- Identify and analyse all suitable environmental deposits.

6.1.2.2 The Middle and Late Neolithic

- Determine the nature and chronology of the emergence of ceremonial centres and the nature of the social structures within which they were constructed.
- Determine the impact of man on the environment and the relationship between settlement and monuments.
- Determine the extent to which agriculture was adopted, its relative economic importance and the economic and cultural significance of pastoralism.
- Synthesise the results of the work previously undertaken on the Avon Valley complexes with a view to identifying areas where further work could usefully be undertaken to clarify the nature of the complexes including excavation, survey, and analysis of archives.
- Survey and sample excavation of certain elements of previously studied monument complexes in order to provide essential dating and contextual data for the elements already examined, with particular emphasis on the Church Lawford oblong enclosure and ring ditches, the King's Newnham barrow cemetery and the Longbridge Cursus.
- Identify and analyse all suitable environmental deposits.

6.1.2.3 Early Bronze Age

- Identify the chronology of the arrival of Beaker 'prestige goods' package and its impact upon the pervading social economic and political structures.
- Examine the proliferation of single grave burials and associated structures, and identify their relative chronology, changes in monumental architecture, funerary practices and spatial patterning.
- Determine the relationship between burial sites and settlement sites and the changes in agriculture, pastoralism and clearance.
- Examine evidence for climatic change and its impact on local environmental conditions and subsistence practices.
- Sample by excavation the extant barrows on the High Cross Plateau and other areas as they most likely provide the best representative data for comparable monuments.
- Identify and analyse all suitable environmental deposits.

6.1.3 Middle Bronze Age to Late Iron Age (c 1600 BC – AD 43)

(By Stuart Palmer)

See Section 5.3.3.

There is currently no national research agenda for the Middle Bronze Age but a regional agenda for the West Midlands is currently in preparation (Garwood, forthcoming). The current national research agenda for the British Iron Age, 'Understanding the British Iron Age: An Agenda for

Action' (Haselgrove et al 2001) forms the basis of the West Midlands regional research agenda currently in preparation (Hurst, D, forthcoming) and includes specific research questions that relate to the aggregate areas of Warwickshire and Solihull and which are included in the following:

Particular shortfalls in our current understanding of the Middle Bronze Age to Late Iron Age include, settlements, field systems, pits, middens, sites with well preserved stratigraphy, waterlogged or charred plant deposits, assemblages of animal bone, metalwork and pottery.

The single most important research priority is the establishment of an accurate chronology of the period using single-entity accelerator mass spectrometry dates obtained where possible from stratified samples.

Other priorities are to:

- Identify areas of alluvium and colluvium which have the potential for masking sites by means of predictive modelling.
- Identify palaeochannels in river terrace deposits, obtain datable material and determine the nature of the contemporary environment.

6.1.3.1 Middle Bronze Age

- Characterise the middle Bronze Age occupation of the area by establishing the nature of settlement across varied geological and topographical zones
- Develop strategies for the detection and prediction of settlement sites
- Establish a reliable chronology of the period using absolute dating techniques

6.1.3.2 Late Bronze Age and Early Iron Age

- Characterise the nature of the Late Bronze Age – Early Iron Age transition by identifying and excavating settlement sites
- Develop strategies for the detection and prediction of open settlements and burial grounds
- Sample by excavation hillforts and their defences in order to obtain a relative chronology of their construction and abandonment, their use and their relationship to their environs
- Establish the nature of the agricultural environment
- Update the county type series for Iron Age and Romano-British pottery.

6.1.3.3 Middle Iron Age and Late Iron Age

- Characterise the nature of the transition from the Early Iron Age
- Determine the cause and consequences of settlement expansion after 300 BC
- Determine the relevance of the appearance of 'Belgic' pottery on some late Iron Age sites and its absence on others with regard to the change in eating habits, food consumption and social relations
- Develop strategies for the detection and prediction of open settlements and burial grounds
- Determine the character of the Hobditch possible oppidum by survey, excavation and analysis.
- Update the county type series for Iron Age and Romano-British pottery.

6.1.4 Romano-British Period (c AD 43 – 410)

(By Stuart Palmer)

See Section 5.3.4.

There is no current national research agenda for the Romano-British period. The West Midlands Regional Frameworks Agenda, currently in preparation, seeks to address intra-regional

differences in the existing database and advocates four over-arching or major themes that are intended to be integrative and able to pull together techniques and analyses from different materials and approaches[79]. Within the major themes are various minor themes designed to articulate them (Esmonde Cleary, 2006). A research agenda for Warwickshire which includes more specific strategies has already been suggested (Booth 1996).

No opportunities to excavate/survey/record Romano-British sites should be passed up, particularly if there is a possibility that complete building plans, well preserved stratigraphy, waterlogged or charred plant deposits, large assemblages of animal bone, pottery, metalwork or other finds might be found Large-scale excavations do produce a wider range of evidence.

Themes specific to the aggregate areas of Warwickshire and Solihull include the following:

- Determine the impact of invasion on the rural populace and determine the role, if any, the military played in the process of Romanization
- Determine the chronological origins and processes of growth and the range of economic functions of the nucleated settlements with particular reference to any military origins
- Establish the relationships between the nucleated settlements and their individual hinterlands
- Excavation and analysis of non-gravel site rural settlement for comporanda with gravel site settlements
- Determine the validity of the possibly widespread relocation and expansion in rural settlement during the 2nd-century
- Identify the 3rd-century economic hiatus/crisis and determine its impact on the rural and urban populations
- Determine the burial or other methods of disposing of the dead in the early Roman period and excavate a cemetery if found
- Identify religious structures on rural settlement sites
- Update the county type series for Iron Age and Romano-British pottery.
- Increase understanding of industrial sites, including the tile industry, and associated distribution patterns. Re-examination of existing collections of material may be of assistance here
- Identify and characterise 5th-century material culture, architecture and environment
- Determine the chronological and uptake limits of the Belgic type ceramics with particular reference to established cultural, tribal and social boundaries
- Osteological analysis of the Stretton-on-Fosse skeletons as well as mtDNA and stable-isotope analysis to determine the late and post-Romano-British ethnicity (as has recently been undertaken for Wasperton – M Carver, pers comm)
- Obtain complete plans of a number of Romano-British settlements of varying status in a variety of topographical locations
- Identify areas of alluvium and colluvium, which have the potential for masking sites, by means of predictive modelling.
- Identify palaeochannels in river terrace deposits, obtain datable material and determine the nature of the contemporary environment.

6.1.4.1 Publication

Significant sites of this period awaiting publication include: Wasperton; Mancetter, Hartshill; Lapworth; Home Farm Baginton, Crewe Farm.

[79] These are: Resource Mobilisation; Assessing the Evidence; Assessing the Gaps; Tradition and Innovation

6.1.5 Post Romano-British and Early Medieval (c AD 410 – 1066)

See Section 5.3.5.

There is no current national research agenda for the post Romano-British and early medieval periods but the West Midlands Regional Research Framework Agenda is currently in preparation, (WMRRF Seminar 4[80]; Hooke, forthcoming).

No opportunities to excavate/survey/record Anglo-Saxon sites should be passed up, particularly if there is a possibility that complete settlement plans, building plans, well preserved stratigraphy, waterlogged or charred plant deposits, large assemblages of animal bone, pottery, metalwork or other finds might be found Large-scale excavations do produce a wider range of evidence.

6.1.5.1 Early Anglo-Saxon Period

The principal theme in this period is the Post Romano-British transition. This has two principal components: the archaeology of the existing British population and the nature of the Anglo-Saxon migration. The archaeology of the British population in the post-Roman period in the region is both important and particularly difficult to get hold of archaeologically. Burials are unaccompanied and for long periods no pottery was used, so sites are invisible.

Work is therefore required to:

- Determine the extent and survival of 5th-century Romano-British settlement and occupation.
- Characterise the Romano-British to Anglo-Saxon transition.
- Identify the nature and extent of Anglo-Saxon migration and the degree of acculturation of the 'native' population.
- Establish the degree of differentiation between British and Anglo-Saxon populations.
- Interrogate existing pagan cemetery archives and assemblages with particular attention to precision radiocarbon dating of skeletal material and DNA/stable isotope analyses to determine ethnic/geographical origins.
- Locate settlement sites and identify patterns.
- Identify and excavate a complete settlement site
- Assess the structure of society at this time.
- Determine the environmental conditions in which settlement occurred by identifying waterlogged deposits from which pollen and macrofossils can be extracted and analysed.

6.1.5.2 Middle Anglo-Saxon Period

- Identify and excavate Middle Anglo-Saxon settlement.
- Reconstruct estate territories and identify their components to develop a settlement model for this period.
- Any model settlement pattern would need to be related back to the earlier period. To what extent is it the same or different? Does this pattern reflect the earlier British settlement pattern? Is it in fact the same thing?
- Identify minsters and reconstruct their parochiae. Examine their relationships to folk groups, hundreds and their meeting places, high status sites (Hatton Rock, Snowford Bridge), multiple estates etc.
- Identify 7th to 9th century burials and cemeteries.
- Targeted evaluation of Hatton Rock and Snowford Bridge sites in order to determine their date and character.

[80] Papers from this seminar are available at:
http://www.iaa.bham.ac.uk/research/fieldwork_research_themes/projects/wmrrfa/sem4.htm

- Targeted evaluation of the Bidford-on-Avon 'productive site' to characterise its nature, extent and quality of survival.
- Any discoveries that might provide information about Anglo-Saxon industry would be highly important.
- Determine the fall-off rate of the sites found by fieldwalking east of Watling Street (within Leicestershire) on the Warwickshire side of the Danelaw border.
- Identify and analyse any environmental evidence that can shed light on the environment of the period.

6.1.5.3 Late Anglo-Saxon period

- Determine the date of origin of nucleated settlements and open field agriculture.
- Areas of dispersed settlement also need to be examined; what were their origins? Is there continuity from earlier periods or did they shift? What were the exploitation patterns they were based upon?
- Later Anglo-Saxon industry: pottery and metal production sites. Any discoveries that might inform us about Anglo-Saxon industry would be highly important.
- Locate and sample excavate Alveston mill.
- Identification and examination of hundredal meeting places.
- Can earlier multiple estates be related to later estates and process of subinfeudation?
- Identify and analyse any evidence that can shed light on the environment of the period.
- Much of the work on the medieval period may ultimately have to examine this period in the search for origins of later patterns.

6.1.5.4 Publication

Significant sites of this period awaiting publication include Bidford and Wasperton Iron Age and Romano-British cemeteries and Blacklow Hill.

6.1.6 Medieval (AD 1066 – 1540)

See Section 5.3.6.

There is no current national research agenda for the medieval period but the West Midlands Regional Research Framework Agenda is currently in preparation, (Hunt J, 2005). In this work he identifies several key themes including: clearing the publication backlog; undertaking synthetic studies and regularly updating them; avoid seeing themes in isolation; increase multidisciplinary working; adoption of landscape based approaches; and the identification of regional research projects for excavation, including large scale excavations to address issues not covered within the framework of PPG16.

This is the first period for which documentary evidence and standing buildings can be expected to make a meaningful general contribution.

No opportunities to excavate/survey/record medieval sites should be passed up, particularly if there is a possibility that complete building plans, well preserved stratigraphy, waterlogged or charred plant deposits, large assemblages of animal bone, pottery, metalwork or other finds might be found Large-scale excavations do produce a wider range of evidence (Palmer, N, 2003).

- Determine the character, date of origin and sequence of development of a variety of minor castles.
- Define the extent of manors and townships in order to provide a framework for examining the development of settlements and field systems.
- Identify manor house sites and date and characterise a range of them.
- Date and characterise a wider range of moated sites.

- Undertake surveys around all the above sites to place them in their landscape context and to identify any additional components that may not have been previously recognised.
- Identify any previously unknown deserted settlements or areas of shrinkage, accurately map these areas and determine the character, date of origin and sequence of development of a variety of these sites.
- Similarly examine areas of dispersed settlement, particularly Feldon.
- Complete the mapping of the pattern of ridge and furrow across the county (and other landscape elements where possible such as meadow, pasture, commons, waste and parks).
- Identify and map areas of medieval enclosure.
- Map the extent of medieval woodland across the county as begun by Wager (1998).
- Identify isolated church and chapel sites, determine the character, date of origin and sequence of development of a variety of these sites.
- Identify any opportunities to obtain significant skeletal assemblages.
- Determine the character, date of origin and sequence of development of a variety of monastic sites, including the full extent of monastic ancillary structures.
- Identify monastic granges where possible and take any opportunities for their investigation.
- Identify the location and extent of industries such as pottery or tile manufacture and how these may have changed over time.
- Locate mill sites and determine the character, date of origin and sequence of development of a range of them. In particular use documentary research and fieldwork to identify any fulling mills and take any opportunity to excavate an example.
- Identify the extent and likely areas of industrial activity through documentary research and re-analyses of consumer assemblages as a pre-cursor to fieldwork.
- Excavate a range of industrial sites to gain more information on techniques of production and developments during the period
- Place industry in its context including transport, markets etc, and assess its impact on surrounding areas, for example woodland management for fuel production.
- Examine market and fair sites where available.
- Study the use of rivers as transport links and fisheries.
- Scientifically investigate materials such as pottery, metals and stone in order to identify areas of origin and trade patterns.
- Update the county type series for medieval pottery (Soden and Ratkai, 1998). Make this available on the internet.
- Develop similar type series for artefact types such as tile fabrics, floor tiles and stone.
- Identify and analyse any environmental evidence that can shed light on the environment of the period.

6.1.6.1 Publication

Significant projects of this period awaiting publication include: Burton Dassett Southend, and Hunningham Moat.

6.1.7 Post-Medieval (c AD 1540 – 1750)

See Section 5.3.7.

The Society for Post-Medieval Archaeology produced a Research framework in 1988 though this is unpublished. This was in part updated in 2005 with the publication of articles that addressed

research issues relating to post medieval agrarian society and landscape (Newman 2005), battlefields (Carman 2005) and defensive works, particularly naval (Coad 2005). These documents also cover the following periods. The West Midlands Regional Research Framework seminar for this period was held in 2003[81] but any publication is some way off.

Detailed work such as that at Compton Verney (Dyer, 2000) is required across the county in order to understand the sequence and dating of developments in the countryside and the role of local factors such as topography or tenure. Such detailed analyses could be incorporated into the HERs to allow a level of mapping of the countryside during this period that would complement and enhance that of the HLC which only attempts to identify the historic elements of the current landscape rather than map its precursors.

- Incorporate more detailed information on country houses into the HERs, particularly the distinction between new country houses and old manor houses with a clear identification of rebuilding on old sites and development of new sites.
- Date and characterise a wider range of moated sites.
- Identify and characterise any new settlements of the period.
- Identify new farms and the redevelopment of existing farms in this period.
- Identify any previously unknown deserted settlements or areas of shrinkage of this period, accurately map these areas and determine the character, date of origin and sequence of development of a variety of sites of this period.
- Determine the development of monastic sites in the post-dissolution period.
- Identify and map the parks and gardens within Solihull district at same level of detail as those of Warwickshire.
- Map changes in the extent and layout of all parks and gardens through the period.
- Locate any unidentified water meadows, plot their layout and development and identify any patterns.
- Map the extent of post-medieval woodland across the county.
- Identify and map areas of pre-parliamentary enclosure.
- Enhance the HER in respect of early industrial data.
- Determine the character, date of origin and sequence of development of a variety of water mill sites.
- Determine the character, date of origin and sequence of development of a variety of windmill sites.
- Identify horse mills of this period.
- Identify, date and characterise mining and quarrying sites of the period within the County.
- Accurately locate and examine the metal production site at Middleton to determine details of its development.
- Identify any other metal production sites in the county.
- Identify more smithies of this date and clearly distinguish between smithies and forges within the HER.
- Copper alloy sites such as bell foundries might have existed in the county and also possibly boring mills and these need to be identified.
- Evaluate the two possible battlefield sites on aggregates to confirm their status and extent.
- Identify opportunities for recovering finds assemblages from datable and relevant contexts.

[81] Several papers are available from:
http://www.iaa.bham.ac.uk/research/fieldwork_research_themes/projects/wmrrfa/sem6.htm

- Identify opportunities for the study of suitable assemblages of faunal and plant remains.
- Identify opportunities for the analysis of human skeletal assemblages.

6.1.8 Imperial to Modern (AD 1750+)

See Section 5.3.8.

The research frameworks described above also cover this period and papers from the West Midlands Regional Research Framework seminar, held in 2003, are available on-line[82] though again any publication is someway off. The dominant theme of this period is industrialisation and the Association for Industrial Archaeology has set out research priorities (Palmer, M, 1991). More up to date essays that take stock of progress in the subject have been published (Cossons, 2000) and a Theoretical Archaeology Group conference session in 2002 covered many issues relating to this period[83].

There is a need to assert that in this period archaeology is not just the poor relation of documentary history but something worthwhile in its own right. It has the potential to address issues of material culture that are unrecorded or inadequately reported in written sources. It is important, too, that research is the basis for sound conservation measures, translated where necessary into policies which are consistent across the County (Parkhouse 2003).

- Continuing process of settlement change, new settlements, desertion and shrinkage are not well documented or studied archaeologically.
- Identify new settlements of the period.
- Identify new farms and the redevelopment of existing farms in this period.
- Identify any previously unknown deserted settlements or areas of shrinkage of this period, accurately map these areas and determine the character, date of origin and sequence of development of a variety of sites of this period.
- Integrate below ground archaeology with studies of standing fabric, particularly where the one informs the other.
- Excavate a range of rural and village buildings.
- Map extent of enclosure acts.
- Identify, if possible, the extent of land improvement and sub surface drainage.
- Identify areas of steam ploughing.
- Identify, if possible, the extent of the expansion of arable during WWII.
- Plot areas of ridge and furrow surviving from deep ploughing in order to assess the rate of loss since last mapping.
- Locate more water meadows, plot their layout and development and identify any patterns.
- Map the extent of imperial woodland across the county.
- Identify and map the parks and gardens within Solihull district at same level of detail as those of Warwickshire.
- Map changes in the extent and layout of all parks and gardens through the period.
- Fully incorporate information on turnpikes into the HERs.
- Survey turnpike routes to identify associated sites and buildings.
- Survey canal routes to identify associated buildings, works and disused sections.
- Railways/mineral railways
- Take any opportunities to examine water and windmill sites.

[82] From: http://www.iaa.bham.ac.uk/research/fieldwork_research_themes/projects/wmrrfa/sem7.htm

[83] See: http://www.art.man.ac.uk/ARTHIST/tag/Indust.htm

- Identify any horse mill sites.
- Identify, date and characterise steam power sites across the County.
- Identify, date and characterise electrical power sites across the County.
- Systematically record the extent of extraction sites.
- Study early commercial aggregates exploitation.
- Characterise and date the final phases in the development of known industrial sites in order to confirm the impression that much local production of pottery and glass appears to have been overshadowed by developments elsewhere
- Determine the character, date and extent of the possible glassworks at Blacklow Hill.
- Military sites of the post- Civil War period are thin on the ground This is likely to be genuine but needs to be systematically verified. The same is true for WWI era sites.
- More accurately locate WWII and later military works identified through MPP and the DoBP.
- Evaluate possible WWII sites known only from crop marks to confirm date and character.
- Ensure the sites detailed in Carvell (2007) are systematically added to the HER.
- Identify opportunities for recovering finds assemblages from datable and relevant contexts.
- Identify opportunities for the study of suitable assemblages of faunal and plant remains.
- Identify opportunities for the analysis of human skeletal assemblages.

6.2 Methodological Tools and Issues

A few methodological issues that arose as a result of the case studies are also discussed in Section 7.2.6.

6.2.1 General

6.2.1.1 Aerial Photography

See Figure 10 and Appendix 10.4 below.

Continuation of aerial photographic surveys across the county and examination and transcription of photographs as they become available.

The NMP work undertaken to date clearly demonstrates its value and it should be continued.

Previous WCC AP transcripts are clearly valuable but future work would be better undertaken to NMP standards.

6.2.1.2 LIDAR

Sample LIDAR data was obtained late in the project from the Environment Agency in the form of ~.jpg files (see Figure 11). These are of limited value as they cannot be manipulated in the same way as the original data. They did however provide a useful indication of the level of detail available.

LIDAR surveys record the elevation of the ground at very high resolutions using the timing of the return from a reflected laser pulse. The images examined here are based upon data with a 1m horizontal resolution and a vertical resolution of less than a few centimetres. The basic data therefore forms a grid of elevation values, a digital elevation model, which can be manipulated to enhance what is shown in a variety of ways. The sample images however, only show one such manipulation where a 'virtual sun' (shining from the north-west!) is used to bring out the topography of the surface (a 'false sunlit' image). This did not allow manipulation of the data and they should be seen in the same light as APs, images rather than elevation data, although their positional accuracy will be greater once geo-referenced within a GIS.

Figure 5 shows one area of LIDAR data overlain by the NMP plotting of ridge and furrow for that area. This shows several things. The blocks of ridge and furrow top right of the image show that NMP work has been able to identify areas of ridge and furrow that still existed in the mid 20th century. LIDAR is clearly not able to identify such areas. It is in its infancy and does not have the time depth of aerial photography and so is not yet capable of identifying lost features or demonstrating change in the landscape in the same way. The block of ridge and furrow in the centre of the image shows that where Ridge and furrow still exists LIDAR is able to add considerable detail to APs. It has a greater positional accuracy than a rectified and geo-referenced photograph and more details of the layout can be perceived. In the bottom left is an area of faint ridge and furrow not picked up on any APs. LIDAR therefore has the ability to detect faint features that are only likely to show up in exceptional circumstances. It is clear from this, that LIDAR has the ability to enhance data obtained from APs and can detect features that do not show up on photographs. LIDAR only records elevation and will not therefore show soil marks or crop marks (however Dr K Challis is working on using reflection intensity data which might be able to detect changes in soil moisture, colour and so on (pers comm)).

Use of actual LIDAR data should allow considerably more information to be obtained. Direct querying of the elevation data should make it possible to calculate the height/depth of earthworks. Vertical scale exaggeration should allow faint features to be seen more easily. It should also be possible to remove modern features such as hedgerows etc making archaeological features clearer and recent work in the Forest of Dean has demonstrated that specially flown surveys combined with suitable data processing can remove woodlands revealing the archaeological features within.

What is needed is a suitable structured survey within the county using actual LIDAR data in a systematic way. The framework provided by NMP might be suitably adapted.

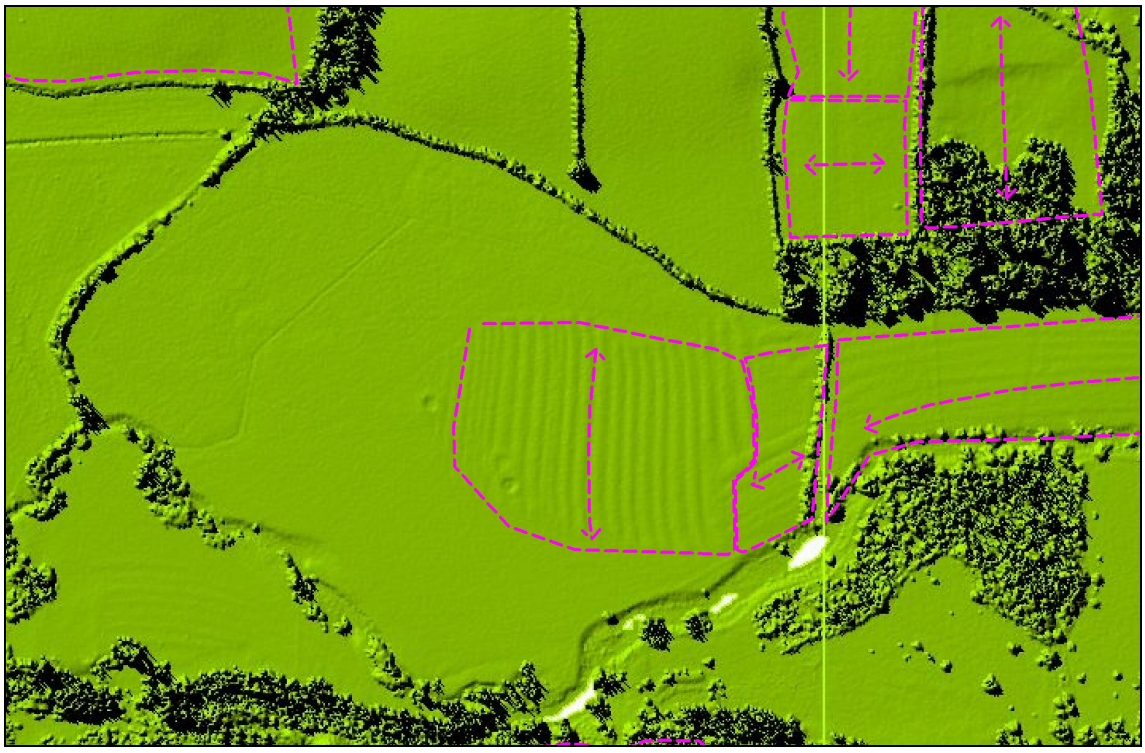


Figure 5 – LIDAR, Detail with NMP ridge & furrow plotting (centred on SP378753)

6.2.2 Period Specific

The implementation of the framework will require certain processes and techniques to be adopted including:

6.2.2.1 Palaeolithic and Mesolithic

(By Stuart Palmer)

See Section 5.3.1.

Suitable training to be given to fieldworkers in order that they can recognise Palaeolithic artefacts in flint and particularly non-flint, including quartzite, raw materials, and Pleistocene deposits.

The systematic and regular monitoring of sand and gravel workings for finds and deposits of significance to Palaeolithic archaeology and the Pleistocene palaeo-environment.

The establishment of a protocol for dealing with Palaeolithic archaeology in the context of aggregates extraction, to include archaeological liaison and input at the geotechnical prospecting stage.

The formulation of 'Predictive Models' for the location of Bytham deposits and artefacts.

The recovery of Palaeolithic artefacts should be a feature of all surface collection programmes.

The development of a fieldwork manual and the preparation of standardised pro-forma recording sheets (c.f. Garwood, forthcoming).

Thorough scrutiny and updating of the HER to include quantification and chronology of lithic assemblages.

Concerted fieldwalking campaigns on all aggregate geologies.

The thorough analysis of existing artefact assemblages.

The routine dating of unaccompanied burials.

Suitable training to be given to fieldworkers in order that they can recognise Mesolithic artefacts and early Holocene deposits.

The establishment of a protocol for dealing with Mesolithic archaeology in the context of development.

The preparation of precise specifications for projects that are likely to encounter Mesolithic sites or artefacts, to include appropriate surface collection and excavation methods.

The establishment of protocols for prospecting for and evaluating Mesolithic sites to include systematic test-pitting and surface collection and the exploration for sub-surface features and deposits.

6.2.2.2 The Neolithic and Early Bronze Age

(By Stuart Palmer)

Thorough scrutiny and updating of the HER to include quantification and chronology of flint assemblages

Aerial survey in less well covered areas

Concerted fieldwalking campaigns on all aggregate geologies

The implementation of an appropriate sampling policy for evaluations in areas which exhibit the potential for settlement evidence to be found In some cases a sample percentage of between 6% and 10% may be required (see Hey and Lacey, 2001).

Evaluation of apparently 'blank' areas

Open area excavation of all sites and 100% strip, map and sample of development sites in the vicinity of known archaeological sites

100% excavation of deposits and three-dimensional recording of all finds groups

The acquisition of suitable material for suites of radiocarbon dating with particular attention to stratified chronologies using single entity dates from ceramic residues, dumps of charred cereal remains, burials and industrial processes

The thorough analysis of existing artefact assemblages

The routine dating of unaccompanied burials

6.2.2.3 The Middle Bronze Age to Late Iron Age

(By Stuart Palmer)

Thorough scrutiny and updating of the HER to include quantification and chronology of flint assemblages with particular attention to the isolation of post-early Bronze Age technology

Aerial survey in less well-covered areas

Concerted fieldwalking campaigns on all aggregate geologies

The implementation of an appropriate sampling policy for evaluations in areas which exhibit the potential for settlement evidence to be found In some cases a sample percentage of between 6% and 10% may be required (see Hey and Lacey, 2001).

Evaluation of apparently 'blank' areas

Open area excavation of settlement sites.

100% strip, map and sample of development sites in the vicinity of known archaeological sites.

Development of a strategy for the intensive sample excavation of settlement features to include 50%-100% for all features except boundary features and enclosure ditches. Pit alignments, posthole alignments, boundary ditches and enclosure ditches will require a flexible strategy that takes account of the sites depositional practices.

Three-dimensional recording of all finds groups in order to assess and analyse spatial distribution and structuration.

The acquisition of suitable material for suites of radiocarbon dating with particular attention to stratified chronologies using single entity dates from ceramic residues, dumps of charred cereal remains, burials and industrial processes.

The thorough analysis of existing artefact assemblages.

The routine dating of unaccompanied burials.

The development of strategies to place excavated sites in their local context.

6.2.2.4 The Romano-British Period

The HER contains considerable data regarding Romano-British finds and deposits although much is unpublished and little has been synthesized. Thorough scrutiny and updating of the HER is required which should include quantification and chronology of pottery and other artefact assemblages.

Aerial survey in less well-covered areas.

Concerted fieldwalking campaigns on all aggregate geologies.

The implementation of 4% sampling policy for evaluations in areas that exhibit the potential for settlement evidence to be found

Open area excavation of settlement sites.

The development of strategies to place excavated sites in their local context.

Stable-isotope analysis of the human remains from Stretton-on-Fosse and other suitable cemeteries.

The development of strategies to determine the character, nature and chronology of structured deposition with particular regard to votive deposits, human remains, pit filling and boundary construction/destruction

6.2.2.5 Post Romano-British and Early Medieval

Continuing programme of aerial survey in less well-covered areas.

The implementation of an appropriate sampling policy for evaluations in areas that exhibit the potential for settlement evidence to be found In some cases, particularly the earlier part of this period, a sample percentage of between 6% and 10% may be required (see Hey and Lacey, 2001).

Open area excavation of settlement sites.

Stable-isotope analysis of the human remains from Stretton-on-Fosse and other cemeteries where possible.

The routine dating of unaccompanied burials. Dating is a good idea when a post-Roman or early medieval date is even suspected (all sites potentially dating to anytime between late 4th century and 11th century), where material is recovered suitable for absolute methods. There have been some dating surprises in Worcestershire (Hal Dalwood pers comm)

The development of strategies to place excavated sites in their local context.

6.2.2.6 Medieval

The HER contains considerable data regarding medieval finds and deposits although much is unpublished. Thorough scrutiny and updating of the HER is required which should include quantification and chronology of pottery and other artefact assemblages.

Continuing aerial survey particularly in less well-covered areas.

Concerted fieldwalking campaigns on all aggregate geologies.

The implementation of 4% sampling policy for evaluations in areas that exhibit the potential for settlement evidence to be found

Open area excavation of settlement sites.

The development of strategies to place excavated sites in their local context.

It should be possible to begin to compile maps of the medieval landscape at various dates, possibly using GIS. The maximum extent of ridge and furrow has been identified in many parishes. These should be incorporated into the HER GIS and work extended to cover other parishes. Woodland could initially be assessed with regard to pre-Conquest charters and DB. licenses to empark might help to identify areas of parkland. The 'Taxatio Ecclesiastica Angliae et Walliae Auctoritate Pope Nicholai IV', of c 1291 could provide initial baseline data on churches, parishes and chapels, which might then be supplemented with additional information.

Definition of town hinterlands

Identification of market and fair sites by field walking

6.2.2.7 Post-Medieval and Imperial to Modern

In these periods historic environment conservation responsibilities rest between, *inter alia*, archaeologists, conservation officers and planners and it is crucial to improve the dialogue between these parties (Parkhouse 2003).

The results of HLC will be of primary importance in this period.

Map regression and fieldwalking to identify and characterise deserted or shrunken settlements of these periods.

6.3 Research Themes

6.3.1 Publications

A number of sites require publication including:

Burton Dassett, Church Hill

Wasperton

Tiddington

Mancetter – Hartshill

Lapworth

Home Farm Baginton

Crewe Farm

Bidford cemetery

Blacklow Hill

Burton Dassett Southend

Hunningham Moat

6.3.2 Re-examination of Existing Archives

There is considerable scope for re-examining and re-evaluating existing archive material and specific projects should be prepared to achieve this. These could include:

Lithics – to improve dating, characterisation, and quantification;

Pottery – to update type series for the later prehistoric, Romano-British and medieval periods;

human remains – to address issues of ethnicity in late IA/RB/early-mid Anglo-Saxon period, transition to burial in graveyards associated with churches, medieval population studies.

6.3.3 HER Improvements

Work to align Solihull HER more closely with Warwickshire HER, and ideally amalgamated the two records should be a priority. This would require formal agreement with Solihull Metropolitan Borough Council.

More general projects concentrating on data validation and cleaning within the HERs would be of value. Work on the HERs would need to be broken down into sections that could be addressed in realistic time frames. These might be chronologically, geographically or thematically based but there would need to be an overarching framework in order to ensure that within a given time scale all records would be examined at the same level of detail and decisions made within the same methodological framework.

The incorporation of up-to date information from the Portable Antiquities Scheme into the HER.

6.3.4 Geomorphological/Environmental Work

Detailed geomorphological work (possibly undertaken in conjunction with developers during their geotechnical prospection activities) to allow the modelling of subsurface deposits in order to:

Predict the location of Bytham deposits and artefacts.

Identify areas of alluvium and colluvium which have the potential for masking sites.

Identify palaeochannels in river terrace deposits, obtain datable material and determine the nature of the contemporary environment (LIDAR may have a role here).

Identify sites of particular value for palaeo-environmental studies

Palaeo-environmental work to add detail for all periods

6.3.5 Historic Landscape Mapping

Consider the development of an over-arching framework within which local or parish based studies can be placed, possibly a rolling program involving outreach and local communities.

Historic information about the landscape that could perhaps be digitised includes:

Early information:

- Earlier Anglo-Saxon ‘folk’ territories
- Anglo-Saxon minsters and their parochiae
- Anglo-Saxon multiple estates, their caputs and functional elements
- Place names and their constituent elements
- Domesday Book data

Landuse:

- Field systems, woodland, meadows, pasture, commons and waste, parks

- Original extent of medieval ridge and furrow
- Other elements of medieval landscape exploitation such as meadows, pasture and woodland
- Extent of enclosure agreements and Acts

Settlements:

- identification of all settlement sites appearing on historic mapping, extent at a range of periods, any planned elements and phases that can be identified, areas of shrinkage. Particularly valuable in Arden.

Tenurial patterns and organisational structures:

- Medieval and later tenurial patterns; including Royal and monastic holdings, manors etc.
- Administrative structures including medieval vills and townships, hundreds
- Tithe maps and apportionments

Transport network

7 Management of the Archaeological Resource

7.1 Introduction

This section will review prospection methodologies by assessing a series of case studies, comparing information available before evaluation, information available following evaluation, and information available after detailed field investigation. This reflects previous studies (such as those described in Hey & Lacey 2001 and Walker & Challis 2004), in order to address the issues surrounding risk in respect of archaeological constraints to minerals extraction. It then goes on to examine development control and mitigation issues arising from this discussion.

7.1.1 Minerals Planning

Aggregate extraction proposals require Environmental Assessment leading to an Environmental Statement. Any permission granted in archaeologically sensitive areas will then be subject to condition or a section 106 agreement; this will normally include carrying out a Programme of Archaeological Work, specified by, or agreed with, a planning archaeologist/county archaeologist on behalf of the minerals planning authority.

Consideration of the implications for archaeology of a development therefore forms a vital part of any planning appraisal. Archaeological evaluation, using a range of prospection methodologies, provides the information required to design effective mitigation strategies and make appropriate planning decisions.

The process of Appraisal, evaluation and mitigation links with the planning process at several points. Principally these are pre-application, pre-determination or as a condition of consent.

7.1.2 Risk

"As we know, there are known knowns. There are things we know we know. We also know there are known unknowns. That is to say, we know there are some things we do not know. But there are also unknown unknowns, the ones we don't know we don't know."

Donald Rumsfeld—Feb. 12, 2002, Department of Defense news briefing

Risk as a concept associated with project management refers to any uncertainties within a project regardless of whether they have a positive or negative effect on the project outcome. For example discovery of a previously unsuspected site during a project can have a positive effect by adding to our understanding but a negative effect in that it can have serious resource implications.

There are two components to risk, the probability of its occurrence and its impact, typified as the cost of mitigating its effect. Probability is usually simply divided into very rare and possible events, though this can vary depending on circumstances. The probability of being struck by lightning might be very rare in general but becomes a distinct possibility on a high moor during a thunderstorm. The possibility of discovering a well-preserved site rich in preserved organic remains might be reasonably high in waterlogged alluvial deposits but very low on limestone. Cost can be even more difficult to quantify. How does one equate the cost of the destruction of an archaeological site in terms of lost knowledge with the financial cost of its excavation? Attempts to equate environmental costs with financial costs have fallen out of favour and in any case even financial costs are rarely seen in absolute terms, as they will be related to the potential profit/loss. This probability/cost approach does however allow multiple risks to be ranked and prioritised (Walker & Challis, 2004: 5-6).

English Heritage has published 'Management of Research Projects in the Historic Environment', a guide to managing archaeological projects known as MoRPHE (EH, 2006). Within this approach, uncertainties are divided into two main types, *risks* and *issues*. *Risk* is defined as:

"An area of uncertainty identified during project planning. Its anticipation allows for appropriate planning for contingency and for monitoring procedures to be put in place" (EH, 2006: 55).

In MoRPHE, *risks* are contrasted with *issues* (sometimes referred to in other project management approaches as *residual risks*). An issue is:

"An unforeseen discovery, comment, query or suggested change to the project arising during project Execution which may require an Updated Project Design" (ibid: 54).

The former refers to uncertainties that have been assessed and can be planned for – 'known unknowns', the other refers to problems that were unforeseen and so cannot be planned for - 'unknown unknowns'.

Ideally, all risks and issues would be eliminated but this is clearly not possible. Effective project management will therefore seek to reduce uncertainties as far as possible and to identify any *risks* in order to minimise the possibility of *issues* arising.

7.1.2.1 Risk Perception

Risk is not an absolute quantity, as different parties will perceive it differently depending on their viewpoint. For example, the stage of the planning process at which the cost of archaeological evaluation falls will affect the developer's perception of that cost and hence the risks associated with that outlay. Before determination, any archaeological work might result in evidence that will prevent permission being granted and consequently the developer would not be able to recoup their expenses. After receiving permission however they might well be prepared for a higher outlay because they know they can get their costs back. However, the archaeological curator is likely to be less happy in this case as there is typically a time pressure, which can affect the archaeological work reducing the quality of the information obtained. Unexpected discoveries at this stage are far harder to manage and preservation in situ of the most important deposits is likely to be harder to attain.

In any development, there are three principal parties involved, the curator, the developer, who may possibly be represented by a specialist archaeological consultancy, and the contracting unit. Each will have different concerns and perceptions as to the nature of the risk. The curator will principally be concerned that unexpected discoveries might mean that archaeological information is lost either through the destruction of sites that should be preserved or their destruction before they could be recorded. The developer will be concerned that unexpected discoveries might mean failure to obtain planning permission, or might lead to additional costs or bad publicity. In the case of the contracting unit they will be concerned to fulfil the project brief without losing money or compromising their professional standards (Walker and Challis 2004: 18-20). It might be assumed that the consultants concerns primarily resonate with those of the developer. Indeed, this is a factor. However, the consultant occupies a critical position, particularly where the balance between methodological and cost issues are problematic (Adam Mindykowski, pers comm).

Depending on the way the project has been designed and contracts drawn up unexpected costs will be borne by differing parties. This will affect their perception of risk.

7.1.2.2 Cost/Benefit

As already mentioned the management of risk carries costs that must be offset against the benefits of reducing risk. It might be possible to reduce archaeological risk to nil by fully excavating an area before development but the cost would probably be prohibitive, the archaeology might be better served by preservation in-situ, or there might not be any archaeology present rendering the exercise futile.

Clearly, information is required to assess the risk but a judgement must still be made to weigh up the costs against the benefits.

7.1.3 Archaeological Assessment

Archaeological field evaluation is generally taken to be the middle stage of a three-stage process, usually preceded by desk-based assessment and (where significant remains exist) followed by mitigation. Desk based assessment looks at the known or potential archaeological resource within an area based on a collation of *existing* information in order to identify the likely character, extent, quality and worth of that resource. On the other hand archaeological field evaluation consists of a limited programme of fieldwork (both non-intrusive and/or intrusive), which determines the presence or absence of archaeological remains within an area, and, if they are present, seeks to define their character, extent, quality and preservation. It seeks out *new* information and uses prospection techniques to do this. Desk based assessment and field evaluation are both part of the process whereby archaeological information is obtained in order to allow decisions to be made

in respect of planning applications. The combination of *desk based assessment* and *field evaluation* will be referred to here as *archaeological assessment*. As already noted they precede mitigation strategies such as excavation or preservation in situ.

7.1.3.1 The role of Archaeological Assessment

Within archaeology there will always be a relatively large amount of uncertainty as the nature of archaeological features and deposits cannot be known until they are appropriately sampled, or interpreted until post excavation analyses have been completed. Archaeological evaluation however, seeks to quantify this uncertainty by defining the character and extent of archaeological remains in order to assess their archaeological worth and provide sufficient information to determine the most effective mitigation strategy and the likely cost of that mitigation[84].

The key role of evaluation in an archaeological context is therefore to identify the archaeological *risk*, which whilst containing uncertainties can be planned for, in order to minimise archaeological *issues*, which cannot. The success of an archaeological evaluation consequently depends on the degree to which it characterises and identifies the extent of any archaeology present on the development site. Effective evaluation will allow the probability of encountering archaeological remains and the cost of mitigation to be accurately assessed.

It should also be noted however, that the need for evaluation itself might be perceived as a risk by the developer. It is not always considered necessary by the archaeological curator, it has a degree or uncertainty, and carries a cost, potentially much higher than the cost of the evaluation itself if the evaluation determines that extraction should not go ahead.

Evaluation can produce four principal types of result summarised in Table 9 below. Each evaluation technique will vary in the degree to which it is more or less likely to come to any one of the four conclusions. In terms of risk management, it is clear that a correct conclusion is to be preferred to an incorrect one. Of the incorrect conclusions, the false negative will have both the highest cost implications and the greatest possibility for the loss of archaeological information.

Table 9 - Summary of Possible Evaluation Results

	Correct conclusion	Incorrect conclusion
Archaeology present	True positive Detects the presence of archaeologically significant activity that is genuinely present	False negative Does not detect archaeologically significant activity that is actually present
Archaeology absent	True negative Does not detect any archaeologically significant activity that is genuinely absent	False positive Detects the apparent presence of archaeologically significant activity that is actually absent

7.1.3.1.1 Prospection Methodologies

Because of differing circumstances, prospection methodologies will vary from development to development. They will typically consist of one or more of the following techniques:

Desk based assessment (documentary research, map regression analysis)

Aerial photography/survey and other remote sensing (eg LIDAR). These are not typically used as prospection techniques but existing surveys may be examined during desk based assessment.

Walkover survey

Earthwork survey

Field walking

[84] See PPG 16, paragraph 21, and with specific reference to aggregates extraction EU Directive 85/337 etc which describes Environmental Assessment leading to an Environmental Statement

Volumetric sampling of test pits for artefacts

Metal detector survey

Geophysical survey

Geochemical survey

Auguring/boreholes/test pitting

Trial trenching

Hedgerow Analysis

7.1.3.1.2 Mitigation Strategies

If it is determined that there are significant archaeological remains on a development site, the impact of that development is generally mitigated using one or more of the following techniques:

Preservation in situ

Excavation (ranging from full open area excavation to strip, map and sample)

Watching brief

7.2 Case Studies

See Table 16.

7.2.1 Selection of Case Study Areas

The aim of the following case studies is to assess the Impact of evaluation and detailed excavation on archaeological knowledge in selected areas.

Within the context of this project only a limited number of case studies could be examined due to time constraints. For this reason it was decided to focus on those projects that had a clear evaluation phase undertaken to modern standards. This allowed the assessment of a range of work undertaken within the planning and assessment process that has been in place since c AD 1990. This ruled out many areas such as Ryton-on-Dunsmore where the extraction was undertaken before 1990 and archaeology only took place in rescue conditions and Ling Hall where prior evaluation was limited, the majority of work being undertaken during the extraction period of the quarry. It is appreciated that this reduces the variation within the case studies and reduces the opportunity to make certain comparisons. It would also have been useful to include the Ryton-on-Dunsmore area (and sites to the northwest), with Bubbenhall to compare results where there was no prior assessment and no post permission work or where work was self-financed by amateur societies or volunteers. An expansion of this work to address these issues would form the basis of an interesting and useful project.

7.2.2 Area 1, Bubbenhall

Bubbenhall is located on Figure 8 and the quarries are shown in more detail in Figure 55.

At Bubbenhall the deposits being worked consist of Baginton sands and gravels overlain in places by Thrussington Till and Wolston clays and silts. The Quaternary geo/archaeology lies beneath the gravel with later archaeology above it.

Permission to extract minerals has been granted in four phases at Bubbenhall that can be divided into three distinct areas (see Figure 55). The first is known as Waverly Wood Farm Quarry and forms the original area of extraction based on a permission of January 1976. Permission to extend this area to the east was granted in October 1996. Permission to extend to the west into an area known as Glebe Farm Quarry was granted in May 1991. Permission to quarry in a new area to the east of Bubbenhall Wood known as Wood Farm Quarry was granted in October 2000.

7.2.2.1.1.1 Waverley Wood Farm Quarry

Permission to extract in this area was granted in 1976/1978 with no archaeological condition. At this point no archaeological sites were known in this area. No archaeological work was undertaken at the time permission was granted or before opening up the quarry. The internationally important Palaeolithic occupation site (MWA7294) was only discovered during

quarrying in the late 1980s and early 1990s (see Section 5.3.1.2, page 31). Work on the quaternary deposits was carried out by an informal, self-financed network based on Birmingham and Coventry (then Lanchester Polytechnic) Universities with later trial trenching in the bottom of the quarry undertaken in conjunction with Warwickshire Museum geologists. No work was undertaken on the archaeology above the gravel except in a small area to the southeast brought within the quarry by an extension condition, for which permission was granted in October 1996, and which was subject to an agreed six stage archaeological programme. Evaluation involved background research, walkover survey and trial trenching. Trial trenching in February/March 1996 (a 2% sample) in this area only identified a few features suggesting a focus of activity to the west within the quarry and presumably now destroyed. Subsequent observation of topsoil stripping appeared to confirm a lack of archaeological activity in the area.

Assessment here appears to have been successful.

7.2.2.1.1.2 Glebe Farm Quarry

No archaeological sites were known in this area before the investigations detailed below. Immediately to the north, however, an area of crop marks and stray finds had been investigated archaeologically (eg MWA4894/1842/5510). It was felt that these might have extended to the south and the company agreed to pay for assessment involving a fieldwalking survey and some background research that was undertaken in 1988. This survey only produced four pottery sherds thought to be from manuring or casual loss. Permission to extract in this area was granted in 1991 with an archaeological condition requiring an agreed Archaeological Programme that involved nine stages of response covering all work including the current extraction. Observation of topsoil stripping in 1993 revealed a Romano-British settlement site (Elders, Jones & Palmer, forthcoming). The site was materially quite poor which may explain the lack of material recovered during field walking. This suggests that field walking is likely to be skewed in favour of higher status Romano-British sites. The settlement was excavated over several seasons as topsoil was stripped during quarrying. At one point an area was lost when a sub-contractor, apparently not informed of the presence of archaeology by the main contractor, removed the subsoil. Observation of subsequent topsoil stripping in other areas to the north found no signs of archaeological activity other than medieval ridge and furrow and a few residual finds in the topsoil.

Assessment here was not successful. Despite this mitigation was a partial success though the loss of part of the settlement without recording was unfortunate.

7.2.2.1.1.3 Wood Farm Quarry

Before the work described below no archaeological sites were known within the extraction area. Prehistoric and Romano-British sites had been identified in the vicinity though, and it was thought that there was some archaeological potential. The highly significant Palaeolithic finds from the nearby Waverly Wood Quarry were well known.

Evaluation was carried out in 1999, before determination of planning consent. This consisted of background research, walkover survey, hedgerow assessment and trial trenching. A 2% sample was excavated during trial trenching which consisted of 84 trenches each 1.8m wide by 30-32m long. Only a few Iron Age features and remnants of medieval ridge and furrow were revealed. Permission was granted in 2000 subject to an agreed Archaeological Programme (six stages of response + Quaternary work to be under the aegis of Prof D Keen of Coventry University). During observation of topsoil stripping in 2004 four areas of Iron Age settlement were identified. During more observation the following year some of these areas were extended and one new area and another possible new area of settlement were added resulting in an area with several roughly equidistant settlement sites within an irregular framework of enclosures. Evaluation only hinted at the possibility of such activity, partly because of unfortunate siting of trenches and partly because the features were generally difficult to see as their fills were very similar to the natural substrate except where charcoal was incorporated into them when close to activity sites. During quarrying the area of Palaeolithic activity first observed in Waverley Wood Quarry was seen to continue into this area and a further hand axe was recovered. No work had been done to determine the possibility for this before extraction commenced though provision was made for this eventuality in the agreed programme. Most recently, there was a proposal for surcharging Waverley Wood landfill site for which an Environmental Statement was prepared that included archaeology/cultural heritage (Warwickshire Museum 2005b) and which was turned down.

Although the assessment was not very effective the agreed archaeological programme appears to have proven effective in the mitigation of risk though this was largely fortuitous. A higher

percentage of trial trenching would probably have given a better definition of the density and extent of archaeological features and allowed mitigation to be better targeted.

7.2.3 Area 2, Marsh Farm (and A435 Norton Lenchwick Bypass)

Marsh Farm Quarry is located on Figure 8 and shown in Figure 3.

7.2.3.1.1 Marsh Farm Quarry

See Figure 56.

River terrace deposits (sands and gravels of the Wasperton Member of the Avon Valley Formation) extended across the whole extraction site but in the western area these were covered by heavy clays leaving a strip only 150-300m wide where the free draining gravels are at the surface.

Before the development of the quarry a large area of crop marks was known in the eastern part of the site towards the River Arrow, concentrated on the narrow strip of free draining gravels. These had been interpreted as a Romano-British field system and trackway and part had been scheduled and already excluded from the development (MWA1499; SAM162).

Initial desk based assessment in 1987 led to the recommendation that the whole area of crop-marks should ideally be excluded from the development, but that if permission to extract were granted then several areas, defined by their extraction phases, would require investigation and recording.

Permission to extract was given in late 1988 following appeal for the whole area of the quarry except for the scheduled area and a proposal for assessment and mitigation formulated which was based on targeted excavation areas. Funding was fixed at this time and only allowances for inflation and rising wages was made (as the initial agreement was pre-PPG16). The initial proposal was modified in 1991 as a pragmatic response to quarrying activity (S. Palmer, pers comm). The area of Extraction Phase 2 (hereafter Area 2) was evaluated and excavated in 1991 followed by the evaluation of Extraction Phase 4 (Area 4) in 1992. Work in Extraction Phase 9 (Area 9) was undertaken in 2000.

Evaluation of Area 2 consisted of trial trenches that covered approximately 2% of the whole area but was concentrated on the crop-marks in the eastern part of the area where a 5% sample was reached. Nothing was revealed in the western part of the area and it was felt at the time that the clay areas were not archaeologically significant (S Palmer, pers comm). The trenches in the east were unable to clarify the nature of the crop-marks though subsequent strip, map and sample mitigation across over 2ha determined that the crop marks were parts of overlapping field systems of uncertain date. It also uncovered part of a Late Iron Age settlement site that continued to the south into the scheduled area.

Evaluation of Area 4 only examined the crop-mark area to the east and consisted of 12 trenches amounting to a 2.5% sample of this area. It identified features of the same type as had been seen in the earlier evaluation confirming some crop marks and identifying other features that did not appear as crop marks. This work appears to have benefited from the evaluation and excavation the year before which allowed it to focus on a specific area at this low percentage and to make an informed interpretation of features seen in the trial trenches, though the assessment was restricted by the fixed budget. Area 4 was not quarried until late 1994 and so excavation of this area was delayed until the summer of that year.

In the interim period work on the A435 had been undertaken, though not fully published (see below). Area 4 was adjacent to excavation Area C5 of that work with Areas C1-3 just to the south and Area D to the north. The A435 work clearly informed the work that followed within Marsh Farm Quarry as the same personnel undertook much of the work. This would not have been possible had separate contracting units undertaken the work because of the normal delay between excavation and report production and publication.

The excavation of Area 4 revealed similar features to those seen in Area 2 but at a lower density, indicating that the focus of settlement was to the south. Prior to this excavation, in July 1994, two examples of Bronze Age metalwork (a dagger and a blade fragment) were discovered in the vicinity of the active quarry by a metal detectorist (MWA7365).

Two watching briefs were undertaken in 1996 during topsoil stripping. One, across the western parts of Areas 2 and 4, did not detect any features and appears to have confirmed the conclusions

of the evaluation. The other observed a cable trench to the south of the scheduled area outside the quarry and also recorded no archaeological finds or features.

During the spring of 2000 a substantial enclosure visible as a crop mark (MWA5081) was excavated within Area 9. Evaluation during the A435 works had been too far to the east to be particularly informative regarding this site. The enclosure was confirmed as an Iron Age enclosure with an elaborate entrance on the eastern side. Occupation within the later first millennium had probably ceased by the Romano-British period but the enclosure was probably still visible, as an annexe to it was constructed at this time and several field boundaries appeared to be aligned on it. The site is the earliest known permanent settlement in the Arrow Valley.

Before this, an enclosure in Area 7 to the south, also visible as a crop mark, was mistakenly removed without archaeological recording (N. Palmer, pers comm).

The final report on the archaeological work at Marsh Farm Quarry is currently in preparation (Palmer, SC forthcoming b). It presents a full analysis and interpretation of the excavations described above and adds considerable detail to the interim reports. It also highlights that the omission of the small rectangular enclosure partially examined in Area C5 (below) from the excavation programme was unfortunate and leaves a rather uncomfortable hole in our understanding of the development of the valley.

7.2.3.1.2 A435 Norton Lenchwick By-Pass

The Norton Lenchwick Bypass was a road scheme assessed archaeologically in the early 1990s. For the majority of its length it runs along river terrace gravels and skirts the edge of Marsh Farm Quarry. Archaeological work on the bypass informed the work within the quarry and vice versa, so it is also discussed here. Road Schemes have their own procedure for Environmental Assessments and Environmental Statements[85] which was followed in this case. Although this procedure is similar in approach to that for aggregate extraction, it is separate.

The A435 Norton Lenchwick By-pass (now A46) runs from Twyford, north of Evesham (Worcestershire) along the Avon Valley to Salford Priors, then up the Arrow Valley towards Alcester. It was initially proposed in the late 1980s as part of the national trunk road programme provided by the Department of Transport. The majority of the archaeological work was undertaken on the northern section between Salford Priors and Alcester. This case study focuses on that section which informed the work undertaken at Marsh Farm Quarry.

The first assessment of the route was an environmental statement undertaken during 1989 (DoT 1989). This was followed by desk-based assessment, with a full walkover survey where access could be obtained, and limited field walking where conditions were suitable, which was undertaken between July and September 1992 (Phase 1; Warwickshire Museum 1992b). This work identified several specific sites as being archaeologically significant and requiring evaluation in Phase 2. Most of these were already known and recorded within the HER. They included: the site of Salford Priors Mill (MWA1510), which was not available for inspection; Marsh Farm Iron Age and Romano-British site (MWA1499), part of which had already been examined in Quarry Area 2 (above); a large undated enclosure, thought to be Romano-British (MWA5081); undated features further to the north near Broom that were off the road line but thought likely to continue into it (MWA4908); two undated enclosures (MWA4910); and several sites in the vicinity of Boteler's Castle. Due to the time of year only five fields were in a suitable condition for field walking. This work located a scatter of Early Neolithic flint (MWA6409) in the field immediately to the south of the Marsh Farm site that was thought to represent a site of uncertain nature and extent that would also require evaluation.

The first works for Phase 2 were geophysical surveys of the sites identified above using gradiometry or resistivity (GSB, 1992). These were generally inconclusive however. The Marsh Farm site produced the best results demonstrating that archaeological features extended well beyond the scheduled area. Survey failed to locate the eastern side of the large enclosure (MWA5081) though some anomalies were recorded that may have been pits. A few possible pit like anomalies were detected on the site near Broom and two anomalies were located on the site of the two enclosures further north again, though it was thought that these may have been modern.

[85] Set out in Department of Transport Design Manual for Roads and Bridges Volume 11

Immediately prior to trial trenching in the area of the undated crop marks near Broom (MWA4908) it was possible to field walk the two fields to be evaluated (Warwickshire Museum 1993b: Section 3). This recovered numerous struck flint flakes, and a number of blades, scrapers, possible cores and a possible arrowhead, the distribution of which showed a slight concentration in the south and it was thought that there was a site in the vicinity. There was also a light scatter of abraded Romano-British pottery thought to derive from manuring, also showing some concentration to the south. Trial trenching (below) was not particularly dense in this area and only located an undated gully and there was no subsequent excavation, so it is not possible to correlate these finds with any subsurface features.

Trial trenching of the sites in this case study was undertaken from May to July 1993 (Warwickshire Museum 1993a). At Manor Farm 29 trenches were excavated along the road corridor, which included the area of the flint scatter identified in Phase 1. This amounted to about 3% of the evaluation area (5.75 ha). At the south end of the area a large enclosure was identified that seemed to contain the flint scatter. Although the feature could not be dated at the time it was thought possibly pre-Romano-British. In the centre of the evaluation area, immediately to the north of the scheduled area, a concentration of features of Romano-British date indicated settlement although the main focus of activity was not seen. Further north again was an area of late Iron Age or Romano-British activity thought to represent the continuation of the site already seen within Marsh Farm Quarry. Features appeared to die out to the north of this, thus defining the extent of this area of archaeology.

Not far to the north the area near the large enclosure (MWA5081) was evaluated. Eleven trenches were excavated across the 2.1 hectare area to give about a 3% sample. A concentration of features included two Romano-British boundary ditches, gullies and several pits thought to indicate a settlement that went out of use in the earlier Romano-British period to be replaced by a field system.

The evaluation of the site near Broom (MWA4908) was at a lower density than elsewhere. Eleven trenches were excavated to give about a 2% sample of the 3.75 hectare evaluation area. As already noted the evaluation failed to identify any subsurface features that might have been related to the flint scatter in the south of this area. In the north of the area however a pit produced 499 sherds of Bronze Age pottery. In the same trench a hollow with two postholes on its edge suggested a Sunken Featured Building and contained Anglo-Saxon pottery consistent with this.

Phase 3 works commenced in July to October 1993 with open area excavation at Boteler's Castle to the north of the case study (Warwickshire Museum, 1994a). Between August and November 1993 open area excavations were extended to four other areas (Warwickshire Museum, 1994b). From the south these were Marsh Farm (MWA 1499, Area C[86]), the large enclosure immediately north (MWA5081, Area D), the site near Broom (MWA4098, Area E), and the site near the two crop mark enclosures (MWA4010, Area F).

Excavations in Area C4 were quite limited, consisting of three trenches across the small part of the large enclosure ditch within the road corridor that appeared to surround the flint scatter identified in Phase 1 field walking. It was demonstrated that the enclosure was not Neolithic but it could not be closely dated and its function remained uncertain. It was concluded that no further work was justified in the context of the project.

Excavations within the main area of activity at Marsh Farm (Areas C1-3) covered about 2400m2 immediately to the east of the scheduled area and the area previously examined within the quarry. They revealed a north-south trackway along the east side of the excavations and enclosures thought to represent a small 1st or second century AD farmstead. An L shaped configuration of dressed stone, pads and a posthole were thought to indicate a 2nd or 3rd century aisled building. A system of enclosures across this area apparently superseded these and environmental samples indicated open agricultural land in the 3rd century. In the mid 3rd century a two-room building with a hearth and a cesspit was constructed and this appears to have remained in use into the 4th century.

A little further to the north the eastern side of a small enclosure which evaluation had failed to locate was examined (Area C5). This was identified together with a large pit and a small posthole but no dating evidence was retrieved and the results were inconclusive. The enclosure was felt to

[86] Which can be further broken down into three sub areas; the crop mark enclosure in the south (C4); the settlement in the central area (C1-3); and the small enclosure in the north (C5).

be late Iron Age because of the alignment of other features but its function could not be determined.

Further north again an area of some 2700m2 to the northeast of the large enclosure (MWA5081) was excavated (Area D). Conditions were far from ideal and the site was almost permanently waterlogged. In the south a late Iron Age structure was identified. In the central area most features had been removed by ploughing apart from a few large field system ditches. In the north numerous interweaving gullies were not excavated in detail but appeared to align with other features of this date.

Excavations near Broom (MWA4908, Area E)) covered about 1600m2. Numerous unstratified flints from the early Bronze Age or possibly the Neolithic were recovered. Several Neolithic pits contained flint and Grooved Ware pottery, and one pit including two polished stone axes. A clay lined pit filled with Bronze Age pottery and potboilers was excavated. The pit lay adjacent to a Late Bronze Age ring ditch that enclosed the remains of a funeral pyre and the remains of two or even three bronze cauldrons were recovered. The deposit was thought to be unique and nationally significant. Three large sunken featured buildings were identified and firmly dated to the early Anglo-Saxon period from the associated assemblage of pottery, loom weights, animal bone, iron and slag. Several undated postholes were thought to be from this period and may have been for the supports of a long house.

The last site excavated (Area F) was a small area (200m^2) near to the two crop mark enclosures (MWA4910). This revealed an Iron Age ditch and one of two pits that contained pottery vessels associated with cremation, though no bone fragments were recovered (MWA7455).

Following these excavations construction of the road began in January 1994. At this time a watching brief on the soil stripping was carried out along the full length of the corridor (WMA 37, 1994: 93-5. Relatively little new was revealed, which appears to support the overall strategy however, conditions for the watching brief were noted as very difficult (Palmer, S., 2000a: 34-5). In Area C2 the possible aisled building was found to have had a bathhouse inserted which had not been detected during excavation as it was just to the south of the trench. This building had generally been heavily truncated and it was only the deeper features, the sunken rooms of the baths themselves, which survived. To the northeast of the bathhouse and outside the original excavation area the remains of an oven were observed. At the Broom site (Area E) some more Anglo-Saxon pits were revealed.

The final stage of these works was full publication. The Boteler's Castle area was published first (Jones et al 1997) followed by the remaining sites (not discussed here; Palmer, S.C., 2000a). These reports presented a full analysis and interpretation of the excavations described above and added considerable detail to the interim reports. The second report generally confirmed the assessments of the interim reports though considerable detail was added to the dating allowing a much more detailed history of the development of the landscape, particularly in Area C, to be presented. This report concluded that the work had served to fill many gaps in the knowledge of the lower Arrow Valley but also to highlight the existence of many others that would need to be filled by future work.

7.2.4 Discussion

The case studies above cover a limited number of projects that have adopted a limited range of techniques. Due to time constraints it has not been possible to undertake detailed spatial analysis of their results. The discussion and conclusions below are therefore qualitative rather than quantitative and should not be seen as having any statistical significance.

7.2.4.1.1 Prospection Techniques

Lower Palaeolithic sites have only been revealed during the actual process of quarrying. Normal prospection techniques will not be able to detect the presence or absence of these deposits due to their depth; however, it would be valuable to identify them in advance if at all possible. Three-dimensional modelling of subsurface deposits using data obtained from geotechnical works (such as boreholes) might allow a better idea of their potential to be established prior to extraction. Ideally this should take place with archaeological involvement at the quarry companies' prospection stage to avoid repeating work (and costs) unnecessarily. At present developers appear to be reluctant to do this for reasons of commercial sensitivity; however, cost savings could be considerable. This work could also assess more recent deposits (with auguring or test pits) and allow the probability of sites below alluvium, and their depth, to be assessed. It has been

noted in respect of the Trent valley but is probably applicable elsewhere, that "aggregates sites with their various alluvial and riverine deposits were better approached as deeply stratified archaeological sites" (Walker & Challis, 2004, 7)

The only formal desk-based assessment fully undertaken to modern standards[87] was for the A435 scheme, which also included a walkover survey and limited field walking. At Marsh Farm Quarry a brief archaeological assessment was made in the late 1980s but this preceded both PPG16 and MAP2 (EH 1991) and was not as extensive as such a document might now be. No formal desk-based assessments were undertaken at Bubbenhall as most of the permissions there also pre-dated PPG16/MAP2. The brief assessment and desk-based assessment undertaken for Marsh Farm Quarry/A435 did not identify any previously unknown sites[88] but did highlight the possibility that the known sites might be more extensive than had been recorded at that time. It consequently recommended evaluation by trial trenching of these areas. Every area that was subsequently evaluated did locate some features and the areas between that were observed later during a watching brief of topsoil stripping apparently did not contain any features suggesting that the DBA was highly successful. Things are not as simple as this however. At Manor Farm (Areas C1-3) it is possible to say that there was a clear development of understanding from known (or suspected) sites highlighted in the desk based assessment that were then defined by evaluation and understood after excavation. On the site near the large enclosure (Area D) trial trenching identified a focus of Iron Age activity but this was not directly related to the enclosure, though it may have been indirectly associated. Further north at the site near Broom (Area E) Bronze Age features might be related to the nearby crop marks but since these have not been directly examined this is uncertain. It is certain however that these crop marks had no relation to the Anglo-Saxon SFB identified during evaluation, which was effectively a chance discovery. The same can be said for the features identified at Area F further to the north again, which seemed to have no relationship to the nearby crop marks that prompted trial trenching in this area. It is also not safe to assume that as no features were seen during the watching brief on the areas between the evaluated areas that no features existed in these areas, as it can difficult to identify features in these circumstances. In fact it was noted that conditions here were particularly difficult (Palmer, S., 2000a: 34-5). At best it seems that the desk-based assessment was only very moderately successful at identifying potential archaeology and obviously was not capable of determining its extent, state of preservation or significance. This conclusion seems to be supported by the work of Hey and Lacey (2001: 21-23), however as they point out it is a relatively cheap technique and can be cost effective when combined with other approaches (ibid: 52-3).

None of the above case studies commissioned aerial photography/survey or other remote sensing specifically for their evaluation. This is not generally a practical proposition. Given weather and cropping variables air reconnaissance is long term process and it is not possible within the timescale of an environmental assessment even for a road scheme. Existing information from these sources however, would have been examined in the desk-based assessment discussed above.

Walkover surveys were undertaken at Bubbenhall, Wood Farm, and as part of the Phase 1 works on the A435 but both failed to locate any new sites.

Systematic field walking was undertaken on one area at Bubbenhall and two areas on the A435, one in Phase 1 and one in Phase 2 immediately prior to trial trenching. At Bubbenhall field walking only recovered 2 flints and 2 abraded pot sherds which were not thought to be significant. A subsequent watching brief on topsoil stripping recorded a small, low status, Romano-British settlement. This may have been missed because of its material poverty (the nearest find to the site was actually a medieval sherd) but the relatively widely spaced transects (20m) probably did not help. At the southern end of the Marsh Farm area of the A435 work (Area C4), field walking using transects 10m apart located a scatter of Neolithic pottery during Phase 1. Subsequent evaluation and excavation failed to identify any features that might be associated with this scatter but it is possible that the distribution of material in the plough soil was all that remained of the site and that no other technique could have located it. Field walking during Phase 2 on the site near Broom, again using 10m transects, identified another flint scatter with a slight concentration to the south, though this was not well dated. Subsequent trial trenching again failed to identify any

[87] Work doesn't have to be called a desk-based assessment to cover the same ground Prior to the 1990s background research for evaluations/assessments would have covered much of the same issues.

[88] The A435 DBA did identify one new site but this was as a result of field walking (below).

features that might be associated with the scatter, which may not therefore have existed anyway, although in this case the scatter might have been associated with prehistoric features to the north from which they had been displaced in a southerly direction as the result of downhill drift. Alternatively the site may only have been represented by the material within the topsoil. Systematic field walking was limited on the A435 as a result of the timing of the works, which meant that opportunities were limited by the state of the crop.

This demonstrates a clear shortcoming of this technique; its dependence on the appropriate ground conditions. Volumetric sampling of test pits for artefacts can get around this but is more expensive and time consuming and has not generally been successful on prehistoric sites in Warwickshire because of the low density of finds. This technique was not used in any of the case studies.

Formal metal detector surveys were only undertaken in Areas C and D on the A435 (S Palmer, pers comm) and Bronze Age finds were recovered from the area of Marsh Farm Quarry by an amateur metal detectorist (the exact location is not known). Though the find was correctly reported through appropriate channels, its recovery in these circumstances meant that potential contextual information was lost.

Geophysical survey was undertaken as part of the A435 Phase 2 works but was not particularly successful. It was focussed on those sites identified as part of the desk-based assessment discussed above and confirmed the presence of probable archaeological features at the site near Broom and adjacent to Marsh Farm Quarry, though clearly gave no information about the nature of sub-surface features. Elsewhere the results were ambiguous and at the suspected site of Salford Priors Mill possible structures were identified, one of which was later proved by limited excavation to be a largely natural feature. The surveyors did however point out in their report that sands and gravels were not conducive to magnetic surveys (GSB, 1992: para 3.2)

Trial trenching proved variable in its success rate. At Bubbenhall a 2% evaluation found no significant features, which seemed to be confirmed by a watching brief during topsoil stripping. On another site less than 500m away, however, a 2% evaluation only identified a few features not thought to be highly significant. Yet during the subsequent watching brief during topsoil stripping several areas of Iron Age settlement were revealed. The fact that these were missed at evaluation was considered to be due to the unfortunate siting of the trenches, combined with the difficulty of detecting features away from settlement areas and the associated deposition of distinctive material, particularly charcoal from fires. It thus seems that a 2% sample is too low to give reliable results particularly where features are indistinct, a conclusion also reached by Hey and Lacey (2001, 59).

At Marsh Farm Quarry, evaluation in Area 2 sampled 2% of the area but this was heavily biased towards the area of crop marks in the east where it reached 5%. This served to confirm the presence of extensive features that related to the crop marks but was inconclusive as to their nature or significance and appeared to confirm the absence of features in the western area. Subsequent excavation revealed that these features formed parts of overlapping field systems and also revealed an area of Iron Age settlement that had not been previously identified from crop marks. Evaluation in advance of Area 4 followed on from this work and consequently only the area of crop marks in the east was examined by trial trenches (2.5% sample of the area). The features seen here were thought to be similar to those seen in the earlier evaluation, although at a lower density, and this was confirmed by excavation. This multiphase approach to trial trenching seemed to improve results as the evaluation area was better focussed and previous work allowed better interpretations to be made of features only seen in limited exposures.

Along the course of the A435, trial trenching was focused on areas previously identified as having potential and generally examined a 3% sample (except for the site near Broom which was 2%). This generally appeared to be sufficient to indicate the presence of archaeology though not always to typify it particularly well. At the Broom site the evaluation identified some significant features and the following excavation was closely focussed on them. Here the excavation appeared to confirm the results of the evaluation and several highly significant features were examined. However, the restricted nature of the excavation makes it difficult to extend this conclusion to the rest of the evaluation area and other features may have been missed. This is supported by the identification of other pits during the watching brief phase. In the area of Marsh Farm Quarry extensive excavations also suggest that the trial trenches revealed a representative sample of the archaeology that was present, though here as well additional features were revealed during the

watching brief phase, that lay outside the excavation area and which had not been identified during evaluation.

Earthwork survey (as no sites survived as upstanding earthworks) and geochemical survey were not used on any of the case study sites.

7.2.5 Conclusions

Early intervention is always beneficial, and would be particularly useful at the prospection stage to allow better archaeological interpretation of geotechnical results.

More work is needed to identify lower Palaeolithic sites, ideally based on information obtained from geotechnical data.

The desk based assessments examined in the case studies served to identify known sites but may have distorted the focus of subsequent work.

Field walking is an important technique as it can identify sites that now only exist in the topsoil. It was not generally very successful in these case studies though this was due to both the time of year at which work took place and the nature of sites within the development areas. For fieldwalking to be a generally applicable technique the period of time between assessment and development needs to be considerable longer than is generally the case.

Geophysical survey did not prove to be particularly useful on the aggregates areas of the A435. In addition to many genuine results both false positive and false negative results were seen, making the overall interpretation uncertain. It would therefore seem advisable to undertake bench testing before field survey to determine the likely reliability of the results.

Trial trenching at a 2% sample rate is too low to give a reliable indication of the presence of significant archaeology. At a 3% sample rate trial trenching appeared to be better at identifying the presence of significant remains but some key features of sites were missed and they were not always well characterised. The nature of the case studies means that it is difficult to be sure about the success of this level of sampling. Whilst a 5% sample can be too low to give much information about the nature of any deposits it does appear to detect their presence reasonably reliably. At all levels of sampling it appears that multiple phases of trial trenching, where results from one stage inform the next, appear to improved results.

Though it is likely to remain a significant strand in the strategy for the mitigation of extraction, relying on the observation of topsoil stripping during the normal working of a quarry carries risks. Archaeological features can be much harder to identify, particularly in the context of a working quarry, and when it is identified there can be a time pressure which may reduce the quality of the information obtained. Known sites can also be lost due to misunderstandings. For example, at Bubbenhall significant parts of the small Romano-British settlement were lost before any recording despite the provision in the specification for fencing of areas of identified archaeology, whilst an excavation proposal was prepared. At Marsh Farm Quarry a potentially significant crop mark was removed without any intervention at all. Where this approach is adopted, it is essential that provision is made to ensure that adequate time for excavation is available. It would be better to improve the evaluation so mitigation is less reliant on the watching brief.

Even open area excavations can miss significant elements of a site. The advantage of the observation of topsoil removal on quarry sites is that the entire area to be destroyed can be observed, and often important satellite features can be found which would be missed in defined excavation areas. Also, the extent and alignments of features are often lost in defined excavation areas but can be traced across the whole of the extraction area. Ling Hall is a perfect example of this. Here the quarry operator has undertaken to strip topsoil to archaeological levels, with more detailed work being undertaken on the individual areas of archaeological interest identified.

7.2.6 Methodological Issues

The case studies examined above suggested several additional methodological implications, not discussed in Section 6.2 above, including:

Expansion of the above case studies to allow a greater range of sites and methodologies to be examined within a quantitative framework.

Involvement at the prospection stage to allow archaeologically informed three dimensional modelling of sub-surface deposits in order to attempt to predict location of lower Palaeolithic sites and areas where alluvium and colluvium might overlay other sites. This would require outreach and relationship building with the quarry operators.

Systematic field walking needs to be undertaken with a suitable sample size and methodology. More work is required to determine what this would be including a review of past projects and the walking of trial areas followed by testing (possibly on the back of development lead projects).

It is highly likely that systematic metal detecting at the same time, or at least using the same grid, as any field walking survey would be highly beneficial and this hypothesis should be tested in the field.

Work to determine the limitations of geophysics over Warwickshire's aggregates is required. This would involve a review of a wider range of previous surveys and trial surveys followed by testing.

Where strip, map and sample has been determined to be the appropriate strategy the agreement should specify that the initial stripping level should be determined by the archaeology. Stripping should be by 360-degree excavator with a toothless bucket and haul roads should not use stripped areas except where essential and they have been specifically identified as free from archaeology.

It is also worth noting here that submitted reports need page numbers to facilitate referencing in the HER and that they should clearly identify known sites using HER numbers as well as common names. Briefs should reflect these requirements.

7.3 Development Control and Archaeological Mitigation for Aggregates Extraction

This section will describe the decision-making procedure in respect of strategic planning, individual developments and allocations, and the mitigation that may be required of aggregates operators. Since the principles of PPG16 are followed, it is also applicable, in the main, to other forms of development in aggregate areas, particularly infrastructure projects which may be of comparable scale to extraction operations.

7.3.1 Policy Context

(See also Section 1.5 above)

Government objectives for minerals planning include securing sound working practices so that environmental impacts are minimised (Planning & Compulsory Purchase Act 2004 sect 39; MPP 1 & c). This is reflected in WCC's Vision for the Minerals Development Framework (WCC 2007, sect 6.8):

"To secure and manage the long term sustainable supply of both primary and secondary minerals serving local, regional and national needs whilst conserving and enhancing the environment and protecting long-term community and economic needs"

Within the emerging Minerals development Framework, Policy Principle 1 (Criteria for assessing minerals development) includes likely impacts upon the historic environment and associated mitigation measures amongst the criteria for considering all minerals development and site allocations, whilst Policy Principle 21 (Environmental Impacts) states:

"All proposals for Minerals development in the County will be assessed against national guidance and legislation, and all local issues will be identified through Environmental Impact Assessment and through the consultation process"

English Heritage are presently (February 2007) consulting on a draft Policy Position Statement which underscores the historic significance of quarry sites and landscapes and the impacts which quarrying has had, and continues to have, upon the historic landscape, and provides some advice on appropriate mitigation measures (EH 2006).

The Historic Environment Records for Warwickshire and Solihull clearly have a role to play in underpinning the decision-making process. One of the primary aims of this project has been to enhance base-line data in the two Records.

7.3.2 Strategic Advice

The Archaeological Advice and Information team within in the archaeology section of Museum Field Services plays a key role in providing advice to the Minerals Planning team over the articulation of policy. The County Archaeologist and Planning Archaeologist provide strategic input to the evolution of the Minerals Development Framework, to ensure that the framework will contain robust policies to articulate the objectives contained within government guidance and in accordance with WCC and Solihull MBC objectives in respect of the historic environment, signalling the importance that both authorities place on their historic environment, and explaining the processes of evaluation and mitigation which will be expected in respect of proposals for aggregates extraction. Evaluation and mitigation strategies must be sufficiently comprehensive to ensure that they are fit for purpose, as well as fulfilling the test of reasonableness in the planning context (DOE Circular 11/95). English Heritage has been facilitating dialogue between archaeologists, minerals planners and the aggregates industry to develop greater mutual understanding in this area, and to balance the cost of compliance to the aggregates industry with effective protection of significant historic environment assets (EH 2007, paras 6.9, 8.1). Archaeological programmes will need to be undertaken within the context of national, regional and local research frameworks, of which the present document is a primary component.

7.3.3 Site Specific Advice

The County Archaeologist and Planning Archaeologist will also provide advice in respect of specific proposals. The Planning Archaeologist may also give advice on the scoping of Environmental Impact Assessment. In general terms, the following may be expected:

7.3.3.1 Archaeological Assessment

On receipt of proposals for aggregate extraction, the Planning Archaeologist will issue a brief or briefs for a programme of work that will seek to characterise the resource in sufficient detail to permit a properly informed planning decision to be made. Whilst evaluation will inevitably increase developer costs pre-consent, the reduction in uncertainty and risk is likely to reduce post-consent costs. The characterisation of the archaeological resource is likely to consist of a staged approach, involving desk-based appraisal, non-intrusive survey (eg fieldwalking, geophysical survey) and intrusive evaluation (trial trenching). This will be an iterative process, with each phase of work informing the next through a series of reports. This may often be arranged via the minerals developer's archaeological consultant, or the operator may deal directly with an archaeological contractor. The results of this work should be fed into the Environmental Impact Assessment/ Environmental Statement prepared in support of the minerals application.

In general, the techniques of evaluation for aggregates extraction are those generally applicable to those used elsewhere. Nevertheless, certain key features need to be emphasised.

Firstly, it has been shown (Hey & Lacey 2001; and above) that the sampling frequencies used will have a significant effect on the reliability of the results. This is applicable to survey work (eg the spacing of fieldwalking transects or the sampling frequency for magnetic susceptibility) but is particularly relevant to trial-trenching. Hey and Lacey analysed the assessment methodologies employed on twelve large archaeological projects where a variety of evaluation techniques had been applied to sites that had subsequently been investigated and recorded in detail. They concluded that although most of the non-intrusive methods employed had their merits:

"Machine trenching was the only effective means of predicting the character of the sites in [the] study and, even though it was more expensive than other methods, the improved quality of information and greater certainty from which to devise a mitigation strategy, made it cost effective." (Hay & Lacey, 2001)

Equally significant was the conclusion that sampling of 2% or 2.5% is unlikely to give results in which confidence could be satisfactorily placed:

"Eleven of the projects within this study had been evaluated by machine trenching, at samples of between 0.8% and 5.6%, the average being 2.4%. The simulations suggested that the proportion of the sites seen in evaluation was too small to predict with confidence the full range of archaeological material actually present upon them, and this conclusion is borne out by the unexpected discoveries made on the sites when they were stripped to examine remains of other periods. The percentage of a site that needs to be seen to assess adequately the extent

and survival of archaeological remains depends on the character of the site. Where linear boundaries, substantial features and clustered remains survive, and Roman sites are obvious examples, a lower sample could be adequate, though even here 3% - 5% would be required to expect a moderately good assessment. However, more scattered and ephemeral remains, and Bronze Age and early medieval settlement sites are good examples of these, could be missed entirely by sampling at this level.

"This study indicates that the single most important factor in the success of evaluating archaeological sites is the date of the remains that survive upon them […]. The methods we commonly use are successfully locating Roman, medieval and, to a lesser extent, Iron Age remains, reinforcing a known bias in the archaeological record, but those of Neolithic, Bronze Age and early medieval (Anglo-Saxon) date, landscape features and those on topographies where settlement was previously thought to be absent are only being revealed as a result of extensive stripping in large infrastructure and construction projects. This suggests that we are consistently missing sites of this character. The benefits of large-scale stripping were apparent within the projects that formed part of this study, and this work suggests that serious consideration should be given in the right circumstances to stripping, planning and sampling sites (strip, map and sample), with further follow-up work concentrating on critically selected areas." (ibid.)

The conclusion to be drawn, supported by the case studies in Section 7.2 above, is that trial trench sampling of 3-5% may be adequate for certain periods, but that higher sampling frequencies (6-10%) may be necessary in order to detect others. It is also necessary to build contingency into evaluation specifications that allow for additional trenching to answer specific questions that emerge during standard trenching.

Secondly, deeply buried sites, such as those buried beneath alluvium, present particular problems. Although reliable information about the extent of deep alluviation is absent, this may be less of a problem in Warwickshire and Solihull than elsewhere, since the river valleys are at or close to their upper reaches and valley catchments are generally low gradient, so that there may well be less deep alluviation than further downstream. Evaluation may require wide trenching, with trenches several metres across, in order to examine deeply buried archaeology. Site prospection needs to incorporate results of borehole drilling, test pits and specialist data such as electro-magnetic survey, which may be used to detect gravel 'islands' and/or palaeochannels within the sequence. Evaluation also requires input from a wide range of specialists including palaeo-environmentalists, geoarchaeologists and quaternary geologists.

Thirdly, it should be noted that the impact of aggregates extraction may often be at the scale of archaeological landscapes (such as whole sections of river valley) rather than just upon individual sites. There may therefore be major off-site impacts upon the setting of historic environment assets and upon historic landscape character, which will also need to be taken into account during evaluation.

7.3.3.2 Mitigation

Evaluation will lead in most cases to subsequent mitigation. Where evaluation has failed to reveal any archaeology this may result in no, or minimal, further action, although such circumstances are likely to be rare. Where evaluation has revealed deposits potentially of national significance then preservation in situ may be the only appropriate response, and in some instances may lead to refusal, whether or not those deposits are formally designated or not (PPG16, PPG15). Such circumstances are, however, relatively rare, although it may be necessary to sterilise some areas from extraction. In most instances some form of fieldwork will be required as mitigation, in order to investigate and record archaeological deposits in advance of their removal by extraction, and to analyse and disseminate the results. This is likely to involve the full excavation of identified areas of archaeological deposits, and/or excavation of areas identified during topsoil monitoring (often referred to as 'strip, map and sample'). The programme will also include recording palaeo-environmental evidence including alluvial sequences and palaeochannels, which may be of intrinsic interest in their own right. Human activity and environmental change will leave their signatures in such deposits even away from occupation sites, and sampling and investigation of such deposits may therefore be required even when they are not directly associated with archaeological features. Fieldwork programmes will be the subject of a planning condition or a Section 106 agreement, and will be initiated by a brief from the Planning Archaeologist, specified

in detail in a Written Scheme of Investigation (WSI) and monitored on behalf of WCC/SMBC by the County Archaeologist/ Planning Archaeologist.

Where the archaeological monitoring of topsoil stripping is a component of an archaeological mitigation strategy, the topsoil stripping operation should be planned in co-operation with the minerals operator so as to ensure that stripping takes place to an archaeologically appropriate depth, in order to accommodate variations in the depth of archaeological horizons. Topsoil stripping will also need to be conducted in a manner which will permit the areas stripped to be properly investigated, which will require that plant and vehicles will need to be excluded from freshly stripped areas until archaeological deposits have been fully recorded. This point needs to be considered particularly where topsoil is to be used in subsequent re-instatement, since MAFF/DEFRA guidance concerning the stripping and storage of topsoil (MAFF 2000; DEFRA 2004; see also MPG7) underlines the necessity of avoiding vehicle movements over unstripped areas. Use of heavy plant is likely to compact soil and thus make subsequent re-instatement more difficult and expensive. Stripping in a manner that satisfies the requirements of both topsoil reinstatement and archaeological mitigation by record may be difficult and costly to achieve.

As with evaluation, it may well be necessary to arrange specialist input to the fieldwork, including a geoarchaeologist for specialist recording of palaeochannels and alluvial sequences; such recording may be in addition to traditional context-based archaeological description (EH, 2004).

The fieldwork will lead via a post-excavation assessment, in which the significance of the results is assessed, to a programme of analysis and dissemination of the results, along with deposition of the finds and archive with an appropriate body; in Warwickshire this will normally be the Warwickshire Museum. In addition to the formal report, other forms of dissemination may also be appropriate, including the preparation of summary reports, popular publications and web pages. Public engagement and outreach should also be built into the programme; this may be best arranged via local societies and/or quarry liaison groups (see Evans, forthcoming).

The historic environment should also be taken into account in devising post-extraction restoration programmes, in order to ensure that the distinctiveness and legibility of historic landscape character is not compromised; there may even be opportunities for enhancement of landscapes which had been badly managed prior to extraction (MPG 7 para 7). It should also be borne in mind that the physical remains of extractive industries may themselves be of important historic, ecological or geological value and warrant protection.

8 Archive Description

The project archive will be deposited at:

Museum Field Services,

The Butts,

Warwick,

CV34 4SS

Tel: Warwick (01926) 412734

Relevant Project GIS layers and themes have been incorporated into the Warwickshire HER.

Copies of the report will be deposited with the following:

Warwickshire Museum Field Service's HER

Warwickshire Minerals Planning Department

English Heritage

Archaeological Date Service

An online copy of the report will be made available as a PDF through the WCC website at:

http://www.warwickshire.gov.uk/Web/corporate/pages.nsf/Links/F9B702ADF1A7738B802571950047EE1D

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