10 Appendices

10.1 Digital British Geological Survey Data

Table 10 - Digital map data obtained from the BGS

DiGMapGB: Digital Geology Map of Great Britain. Details of table structure are available from the BGS.				
Mapping	Data type	Data set		Coverage
DiGMapGB50 1:50,000 nominal scale 12 tiles.	Polygon	Artificial Ground		Full
		Mass Movement		Partial
		Superficial (or 'Drift') Deposits		Full
		Bedrock (or 'Solid') Geology		Full
	Line	Rock Units		Partial
		Fossil Horizons		Partial
		Faults		Full
		Landforms		Partial
Sand_gravel 1:25,000 nominal scale	Polygon	107s1:	Disturbed geology	Partial*
			Geology	
			Deposit category	
			Resource block	
		115	Disturbed geology	Partial*
			Geology	
			Deposit category	
			Resource block	
		125	Disturbed geology	Partial*
			Geology	
			Deposit category	
			Resource block	
		142	Disturbed geology	Partial*
			Geology	
			Deposit category	
			Resource block	
Mineral_resources 1:100,000 nominal scale	Polygon	Sandstone		Full**
		Limestone		Full**
		Igneous		Full**
		Conglomerate		Full**
		Coal		Full**
		Clay		Full**
		Sand & gravel		Full**
	* Areas corresponding to individual Assessment Reports ** Full coverage but areas mapped in greater detail where covered by above			

10.2 Exploited Geology Tables

Table 11 – All Actively Exploited Geologies

Active Quarry	***10.2.1.1.1.1 Description***	**BGS Tag**
Brinklow	Wolston Clay; Clay & Silt Thrussington Till; Diamicton	WOC-CLSI THT-DMTN
Bubbenhall	Wolston Clay; Clay & Silt Baginton Sand & Gravel; Sand & Gravel Thrussington Till; Diamicton	WOC-CLSI BGSG-SAGR THT-DMTN
Coles Hill	River Terrace Deposits, 1; Sand & Gravel River Terrace Deposits, 2; Sand & Gravel	RTD1-SAGR RTD2-SAGR
Dunston	Glaciolacustrine Deposits (Undiff); Clay & Silt	GLLD-CLSI
Edge Hill	Marlstn Rock Formation; Ferruginous Lmstn & Irnstn	MRB-FLIR
Griff 4	Pennine Lower Coal Measures Formation; Mudstone, Siltstone & Sandstone Midlands Minor Intrusive Suite; Lamprophyre Grp. Outwoods Shale Formation; Mudstone	 PLCM-MDSS MMI-LAMP OWSH-MDST
Griff 5[89]	Outwoods Shale Formation; Mudstone Midlands Minor Intrusive Suite; Lamprophyre Grp.	OWSH-MDST MMI-LAMP
High Cross	Dunsmore Gravel; Sand & Gravel Wolston Sand & Gravel; Sand & Gravel	DMG-SAGR WOSG-SAGR
Jees & Boon	Bromsgrove Sandstone Formation; Pebbly Sndstn. Parkhill Member; Sandstone Tuttle Hill Member; Sandstone & Mudstone Midlands Minor Intrusive Suite; Lamprophyre Grp. Jees, Home Farm & Wood Hall Members (Undiff.); Sandstone & Conglomerate Purley Shale Formation; Mudstone Mercia Mudstone Group; Mudstone Mercia Mudstone Group; Mudstone & Siltstone Caldecote Volcanic Formation; Tuff Boon's Member; Sandstone	BMS-PEST PAH-SDST THQ-STMD MMI-LAMP JHFW-SCON PSH-MDST MMG-MDST MMG-MDSI CAV-TUFF BOO-SDST
Ling Hall	Wolston Clay; Clay & Silt Dunsmore Gravel; Sand & Gravel Wolston Sand & Gravel; Sand & Gravel	WOC-CLSI DMG-SAGR WOSG-SAGR
Lodge Farm	Wolston Clay; Clay & Silt River Terrace Deposits, 4; Sand & Gravel	WOC-CLSI RTD4-SAGR
Mancetter	Midlands Minor Intrusive Suite; Lamprophyre Grp. Purley Shale Formation; Mudstone Abbey Shale Formation; Mudstone Mancetter Shale Formation; Mudstone & Sandstone Outwoods Shale Formation; Mudstone	MMI-LAMP PSH-MDST ASH-MDST MCSH-MDSD OWSH-MDST
Marsh Farm	Wasperton Member; Sand & Gravel	WAT-SAGR
Middleton Hall	River Terrace Deposits, 2; Sand & Gravel	RTD2-SAGR
Midland	Bromsgrove Sandston Formation; Pebbly Sndstn Parkhill Member; Sandstone Tuttle Hill Member; Sandstone & Mudstone Midlands Minor Intrusive Suite; Lamprophyre Grp. Jees Member, Home Farm Member & Wood Hall Member (Undiff.); Sandstone & Conglomerate Purley Shale Formation; Mudstone	BMS-PEST PAH-SDST THQ-STMD MMI-LAMP JHFW-SCON PSH-MDST

Table 12 – Actively Exploited Bedrock Geologies

Description	**BGS Tag**
Abbey Shale Formation; Mudstone[90]	ASH-MDST

[89] Though classified as active by WCC Minerals Planning extraction has not yet commenced at Griff V

[90] Mudstones and Siltstones are not a commercial aggregate product (J. Davies, pers comm) and therefore deleted from the final table.

Bromsgrove Sandston Formation; Pebbly Sandstone	BMS-PEST
Boon's Member; Sandstone	BOO-SDST
Caldecote Volcanic Formation; Tuff	CAV-TUFF
Jees, Home Farm And Wood Hall Members (Undiff.); Sndstn & Conglm	JHFW-SCON
Mancetter Shale Formation; Mudstone & Sandstone	MCSH-MDSD
Mercia Mudstone Group; Mudstone & Siltstone	MMG-MDSI
Mercia Mudstone Group; Mudstone	MMG-MDST
Midlands Minor Intrusive Suite; Lamprophyre Group	MMI-LAMP
Marlstone Rock Formation; Ferruginous Limestone & Ironstone	MRB-FLIR
Outwoods Shale Formation; Mudstone	OWSH-MDST
Parkhill Member; Sandstone	PAH-SDST
Pennine Lower Coal Measures Formation; Mudstone, Sltstn & Sndstn	PLCM-MDSS
Purley Shale Formation; Mudstone	PSH-MDST
Tuttle Hill Member; Sandstone & Mudstone	THQ-STMD

Table 13 – Actively Exploited Superficial Geologies

Description	**BGS Tag**
Baginton Sand & Gravel; Sand & Gravel	BGSG-SAGR
Dunsmore Gravel; Sand & Gravel	DMG-SAGR
Glaciolacustrine Deposits (Undifferentiated); Clay & Silt	GLLD-CLSI
River Terrace Deposits, 1; Sand & Gravel	RTD1-SAGR
River Terrace Deposits, 2; Sand & Gravel	RTD2-SAGR
River Terrace Deposits, 4; Sand & Gravel	RTD4-SAGR
Thrussington Till; Diamicton	THT-DMTN
Wasperton Member; Sand & Gravel	WAT-SAGR
Wolston Clay; Clay & Silt	WOC-CLSI
Wolston Sand & Gravel; Sand & Gravel	WOSG-SAGR

Table 14 – Geology of Allocated Sites

Allocated Area	**Description**	**BGS TAG**
Abbot's Salford	Ailston Member (Warwickshire Avon); Sand & Gravel	AILT-SAGR
Alveston Hill	Ailston Member (Warwickshire Avon); Sand & Gravel Wasperton Member; Sand & Gravel	AILT-SAGR WAT-SAGR
Alveston Pastures	Wasperton Member; Sand & Gravel Ailston Member (Warwickshire Avon); Sand & Gravel New Inn Member; Sand & Gravel	WAT-SAGR AILT-SAGR NIT SAGR
Atherston Airfield	New Inn Member & Ailston Member (Undiff.); S & G	NIAT-SAGR
Bidford-On-Avon	Bretford Member; Sand & Gravel Ailston Member (Warwickshire Avon); Sand & Gravel Wasperton Member; Sand & Gravel	BRET-SAGR AILT-SAGR WAT-SAGR
Bodymoor Heath	River Terrace Deposits, 1; Sand & Gravel River Terrace Deposits, 2; Sand & Gravel	RTD1-SAGR RTD2-SAGR
Brinklow Extension	Wolston Clay; Clay & Silt Thrussington Till; Diamicton	WOC-CLSI THT-DMTN
Bubbenhall Extension	Baginton Sand & Gravel; Sand & Gravel Thrussington Till; Diamicton	BGSG-SAGR THT-DMTN
Cosford	Oadby Member; Diamicton Wolston Clay; Clay & Silt Wolston Sand & Gravel; Sand & Gravel	ODT-DMTN WOC-CLSI WOSG-SAGR
Dunchurch	Wolston Clay; Clay & Silt Dunsmore Gravel; Sand & Gravel	WOC-CLSI DMG-SAGR
Greys Mallory	River Terrace Deposits, 4; Sand & Gravel	RTD4-SAGR
Hampton Lucy	Wasperton Member; Sand & Gravel Bretford Member; Sand & Gravel	WAT-SAGR BRET-SAGR
Hunscote	Wasperton Member; Sand & Gravel New Inn Member; Sand & Gravel	WAT-SAGR NIT-SAGR
Kites Hardwick	River Terrace Deposits, 1; Sand & Gravel	RTD1-SAGR
Lea Marston	Glaciolacustrine Deposits (Undiff.); Clay & Silt	GLLD-CLSI

Allocated Area	Description	BGS TAG
	Glaciofluvial Deposits (Undiff.); Sand & Gravel River Terrace Deposits, 2; Sand & Gravel	GFDUD-SAGR RTD2-SAGR
Ling Hall Extension	Wolston Clay; Clay & Silt Dunsmore Gravel; Sand & Gravel Wolston Sand & Gravel; Sand & Gravel	WOC-CLSI DMG-SAGR WOSG-SAGR
Middleton Hall Extension	River Terrace Deposits, 1; Sand & Gravel River Terrace Deposits, 2; Sand & Gravel	RTD1-SAGR RTD2-SAGR
Polesworth	River Terrace Deposits, 1; Sand & Gravel	RTD1-SAGR
Shelford	Dunsmore Gravel; Sand & Gravel Wolston Sand & Gravel; Sand & Gravel Oadby Member; Diamicton Wolston Clay; Clay & Silt	DMG-SAGR WOSG-SAGR ODT-DMTN WOC-CLSI
south-west Warwick	River Terrace Deposits, 2; Sand & Gravel	RTD2-SAGR
Stretton Baskerville	Dunsmore Gravel; Sand & Gravel Wolston Sand & Gravel; Sand & Gravel Oadby Member; Diamicton	DMG-SAGR WOSG-SAGR ODT-DMTN
Thelsford Brook	River Terrace Deposits, 1; Sand & Gravel River Terrace Deposits, 2; Sand & Gravel River Terrace Deposits, 3; Sand & Gravel	RTD1-SAGR RTD2-SAGR RTD3-SAGR
Wolfhampcote	River Terrace Deposits, 2; Sand & Gravel	RTD2-SAGR
Wolvey Heath	Dunsmore Gravel; Sand & Gravel Wolston Sand & Gravel; Sand & Gravel Oadby Member; Diamicton	DMG-SAGR WOSG-SAGR ODT-DMTN

Table 15 - Allocated Geology

Description	BGS Tag
Ailston Member (Warwickshire Avon); Sand & Gravel	AILT-SAGR
Baginton Sand & Gravel; Sand & Gravel	BGSG-SAGR
Bretford Member; Sand & Gravel	BRET-SAGR
Dunsmore Gravel; Sand & Gravel	DMG-SAGR
Glaciofluvial Deposits (Undifferentiated); Sand & Gravel	GFDUD-SAGR
Glaciolacustrine Deposits (Undifferentiated); Clay & Silt	GLLD-CLSI
New Inn Member And Ailstone Member (Undiff.); Sand & Gravel	NIAT-SAGR
New Inn Member; Sand & Gravel	NIT SAGR
Oadby Member; Diamicton	ODT-DMTN
River Terrace Deposits, 1; Sand And Gravel	RTD1-SAGR
River Terrace Deposits, 2; Sand And Gravel	RTD2-SAGR
River Terrace Deposits, 3; Sand And Gravel	RTD3-SAGR
River Terrace Deposits, 4; Sand And Gravel	RTD4-SAGR
Thrussington Till; Diamicton	THT-DMTN
Wasperton Member; Sand And Gravel	WAT-SAGR
Wolston Clay; Clay & Silt	WOC-CLSI
Wolston Sand & Gravel; Sand & Gravel	WOSG-SAGR

nb The allocated geology is a super set of the exploited sand and gravel geologies. Therefore, only the allocated areas list was used to form the basis of the SQL query.

10.3 Case Study Summary

Table 16 –Case Study Summary Table

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Case Study 1 – Bubbenhall								
Waverley Wood Farm Quarry Extension								
Pre-determination	None	None	None	None	1996: 2% sample – nothing significant, outlying LIA/ERB features from possible site in quarry to W (already mostly destroyed)			
Post-determination						1996, 1998: observation of topsoil stripping – nothing significant	None	
Glebe Farm Quarry								
Pre-determination	None. Site to north so considered to have potential	None	1988: systematic, 20m transects – 4 sherds, manuring or casual loss	None	None			
Post-determination					1993 (at same time as excavation): to define E extent of settlement	1993: observation of topsoil stripping revealed IA/RB settlement not previously suspected 1994-7: observation of topsoil stripping, several phases each revealing more of settlement	1993: excavation within area stripped – probable low status 2nd/3rd C settlement 1994-7: excavation following each WB phase, more detail added	RB field ditches

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Glebe Farm Quarry (continued)								
Post-determination						1998-2006: observation of topsoil stripping, revealed little of significance in remaining area		
Wood Farm Quarry								
Pre-determination	None. Sites in vicinity so considered to have potential	None	None	None	1999: 2% sample – a few IA/RB features, traces of R&F not thought significant			1999: walkover survey – negative, species counts – dated hedgerows
Post-determination						2001, 2003: observation of topsoil stripping – negative 2004: observation of topsoil stripping – settlement 2005: observation of topsoil stripping – additional areas of settlement 2006:	2004: excavation – identified 4 areas of IA settlement/ activity 2005: excavation – additional areas of activity 2006:	2006: 2 Palaeo handaxes + quartzite tools
Case Study 2 – Marsh Farm Quarry/A435 Norton Lenchwick bypass								
Marsh Farm Quarry								
Whole development area, pre-determination	Extensive area of crop marks known along E side of site. Part of complex scheduled.	1987: Two main sites noted, shown to extend beyond scheduled area	1986: no details – little material recovered	None	None			

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Case Study 2 – Marsh Farm Quarry (continued)								
Area 2, post-determination					1991: 2% sample (5% of area of crop marks) – unable to clarify nature of crop marks, nothing in W part of site		1991: open area excavation 2.15ha – criopmarks parts of overlapping field systems, dates uncertain. Pt of late IA settlement revealed, not previously known	
Area 4, post-determination					1992: 2.5% sample (eastern area only) – identified features similar to Area 2, confirmed some crop marks identified additional features	1996: observation of topsoil stripping (western parts of Areas 2/4) – nothing significant	1994: open area excavation – lower density of occupation than Area 2, otherwise similar	1994: stray find (metal detector) – MBA metalwork location uncertain, thought to be W part of Area 4
Area 9, post-determination						None	2000: strip, map and sample – BA pit, high status IA enclosed settlement w. RB annexe	

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Case Study 2 – A435 Norton Lenchwick Bypass								
South of Marsh Farm (Area C4)								
Pre-determination	None	1989: DoT Environmental statement - nothing						
Post-determination		1992: identified as significant area as result of field walking	1992 (as part of DBA): systematic, 10m transects – Neo flint scatter, poss site			1994: negative	1993: sectioned enclosure – only abraded RB pottery, not Neo so not related to scatter, function uncertain	
Marsh Farm (Areas C1-3, MWA1499)								
Pre-determination	Site known from APs and part Scheduled	1989: DoT Environmental statement - nothing						
Post-determination		1992: identified as significant			1993: 3% sample, generally inconclusive, RB settlement in centre of area confirmed dating and extent but not nature			

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Post-determination (cont)						1994: RB bath house and oven	1993: small 1st/2nd C farmstead, 2nd/3rd C aisled building, 3rd/4th century building, surrounded by open agricultural land in the 3rd C	
Marsh Farm (Area C5)								
Pre-determination	Enclosure known from APs	1989: DoT Environmental statement - nothing						
Post-determination		1992: identified as significant		1992: did not locate E side of enclosure	1993: 3% sample, conc of features repr late IA/eRB settlement	1994: negative	1993: E side of enclosure located, - late IA otherwise inconclusive	
(Area D)								
Pre-determination	Known from APs	1989: DoT Environmental statement - nothing						

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Post-determination		1992: identified as significant		1992: nothing significant		1994: negative	1993: numerous features, many late IA, but generally inconclusive	
Broom (Area E)								
Pre-determination	None	1989: DoT Environmental statement - nothing						
Post-determination		1992: identified as significant		1992: several pits sugg. activity cont. E	1993: unusual BA pit and poss AS SFB, both highly significant			

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Post-determination (cont)			1993: scatter of worked flint, poss site, scatter of abraded RB pottery – manuring?			1994: additional late Neo-BA and AS pits	1993: several Neo features – possibly origin of fieldwalking assemblage, BA pit and ring ditch w cremation deposit containing remains of bronze cauldrons – ritual site, highly significant, group of 3 AS SFBs and other features prob subsidiary buildings, pits may be supports of long house.	
(Area F)								
Pre-determination	None	1989: DoT Environmental statement - nothing						

Site	Information existing prior to assessment	Assessment Phase				Mitigation		Additional notes
		DBA	Field walking	Geo-physics	Trial trenching	Watching brief	Excavation	
Post-determination		1992: identified as significant		1992: inconclusive	1993: 3% sample, RB and IA ditches but significance uncertain	1994: negative	1993: early BA features - inconclusive	

10.4 National Mapping Programme Report 1

ASSESSING THE ARCHAEOLOGY OF WARWICKSHIRE'S AGGREGATES LANDSCAPES

INTERIM REPORT FOR AERIAL SURVEY COMPONENT

Report Author: Laurence Chadd

The following report was written by Laurence Chadd. It has been reformatted and edited to conform to the main report by Magnus Alexander.

Summary

To inform Warwickshire County Council's Minerals and Waste Development Framework, Warwickshire Museum Field Services proposed a project to "Assess the Archaeology of Warwickshire's Aggregates Landscape" (Heritage Environment Enabling Programme (HEEP) project 4681). Part of this project was to map archaeology in those areas likely to be subject to mineral extraction using aerial photographic sources. The mapping was done to NMP standards by a mapping officer located in the NMR at Swindon. A total area of 68km^2 was mapped in three areas. Two of these blocks were located in Warwickshire with one block in Solihull Metropolitan Borough. The choice of these particular areas was based on the history of gravel extraction and the likelihood of future work based on the presence of exploitable gravel deposits.

The project mapped in the region of 680 sites covering archaeological remains from the Neolithic to the mid-20th century. Medieval ridge and furrow constituted 65% - 75% of these sites. 173 new records have been created in the Warwickshire and Solihull HERs and a further 45 modified; the majority of these were ridge and furrow. Two new monument types were added to the Warwickshire HER; the first recognition of the remains of charcoal manufacture seen as dark maculae in recently ploughed fields and what appears to be a floated water meadow near Hams Hall. The latter discovery seems to confirm the supposition that there should be examples of early grass production using water management in Warwickshire.

Acknowledgements

The project was initiated and carried out in collaboration with Warwickshire County Council Museum Field Service (WCCMFS). I would like to thank Emma Jones, Magnus Alexander and the WCCMFS team for their advice and assistance throughout the survey.

English Heritage staff members Fiona Small, Edward Carpenter, Helen Winton contributed to this project by providing training, knowledge, maps and encouragement.

The project team would also like to thank the National Monuments Record Enquiry and Research Service team for their assistance and patience in providing the APs essential for this survey.

English Heritage would like to thank the Cambridge University Unit for Landscape Modelling (ULM) for the kind loan of photographs from their Air Photo Library.

Introduction

Warwickshire County Council (WCC) is required by central government to produce a Minerals and Waste Development Framework by 2007 to replace the existing Minerals Local Plan (WCC 1995). To inform this process Warwickshire Museum Field Services undertook a project to "Assess the Archaeology of Warwickshire's Aggregates Landscape" (HEEP project 4681). The project was funded by the ALSF, which is distributed by English Heritage (EH) on behalf of the Department of the Environment Food and Rural Affairs. The APs held by EH and Cambridge University were available as project resources. The project design (Warwickshire County Council 2006) proposed that the archaeological evidence apparent in these collections should be mapped and would form part of the EH National Mapping Programme (EH NMP Manual 2006). This work was carried out at the National Monuments Record Centre in Swindon to provide easy access to the photographic collections. EH personnel provided training for the Mapping Officer appointed to undertake the

analysis of the APy. The Warwickshire and Solihull Historic Environment Records (HERs) and their associated GIS mapping systems were used to record the archaeology found on the APs.

Three survey blocks that were likely to be affected by mineral extraction blocks were chosen as pilots areas for this work. The blocks were sited to reflect the varied geology within Warwickshire, which includes large areas of superficial sand and gravel deposited by fluvial and glacial processes, and areas of hard rocks worked for crushed aggregates. Three survey blocks, with a total area of 68km^2, were mapped and recorded (see Figure 1).

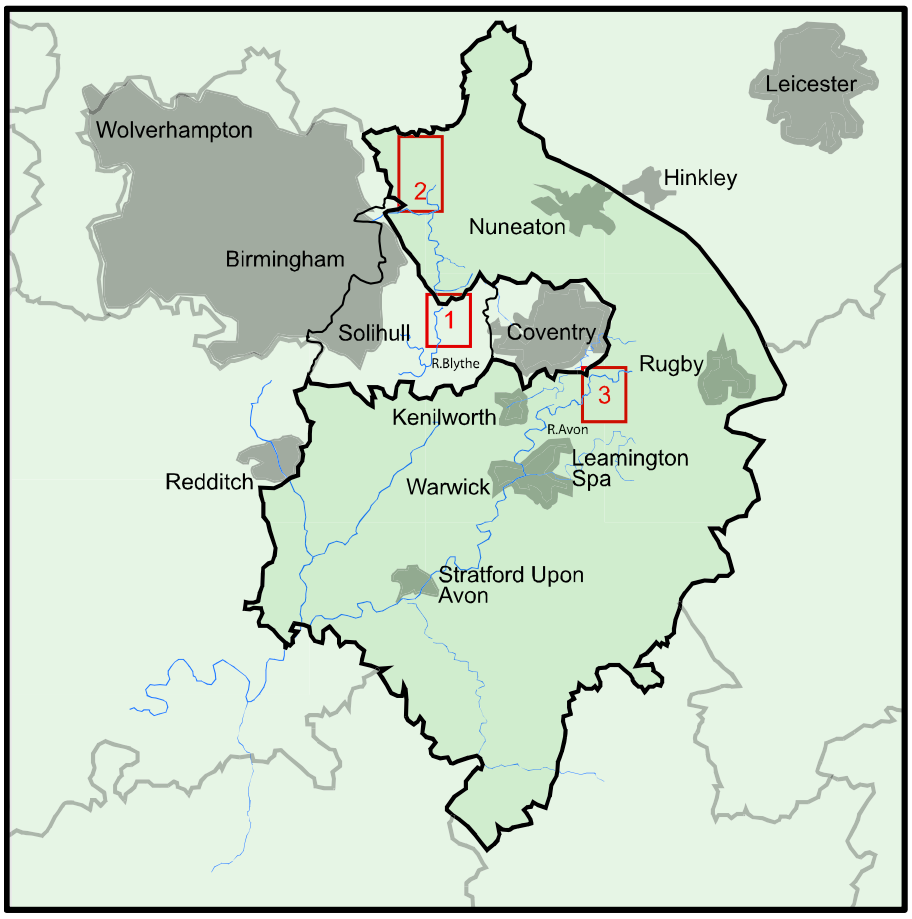

Figure 1: Location of Survey Blocks

Survey Block 1

Location

Survey Block 1 is located in the valley of the River Blythe in the District of Solihull. It is bounded roughly by the A45 to the north and bisected by the A452. The villages of Barston, Berkswell, Meriden, Great Packington and the outskirts of Hampton-in-Arden are located within the survey block. The rectangular 20km^2 block is defined by grid references SP2178 (421000 27800) and SP2583 (425000 283000)

Geology

The River Blythe flows through the western edge of this Survey block and has deposited a narrow band of alluvium. Glaciofluvial drift, deposited by glacial outwash streams, is present to the east of the river extending towards Meriden (Baginton Gravel). The sands and gravels in this area have been extracted over long periods, possibly as early as the middle ages. The evidence for early extraction comes from the numerous small ponds that are evident on both early and current mapping. The remaining part of the area has clay soils derived from the underlying mudstones and sandstones.

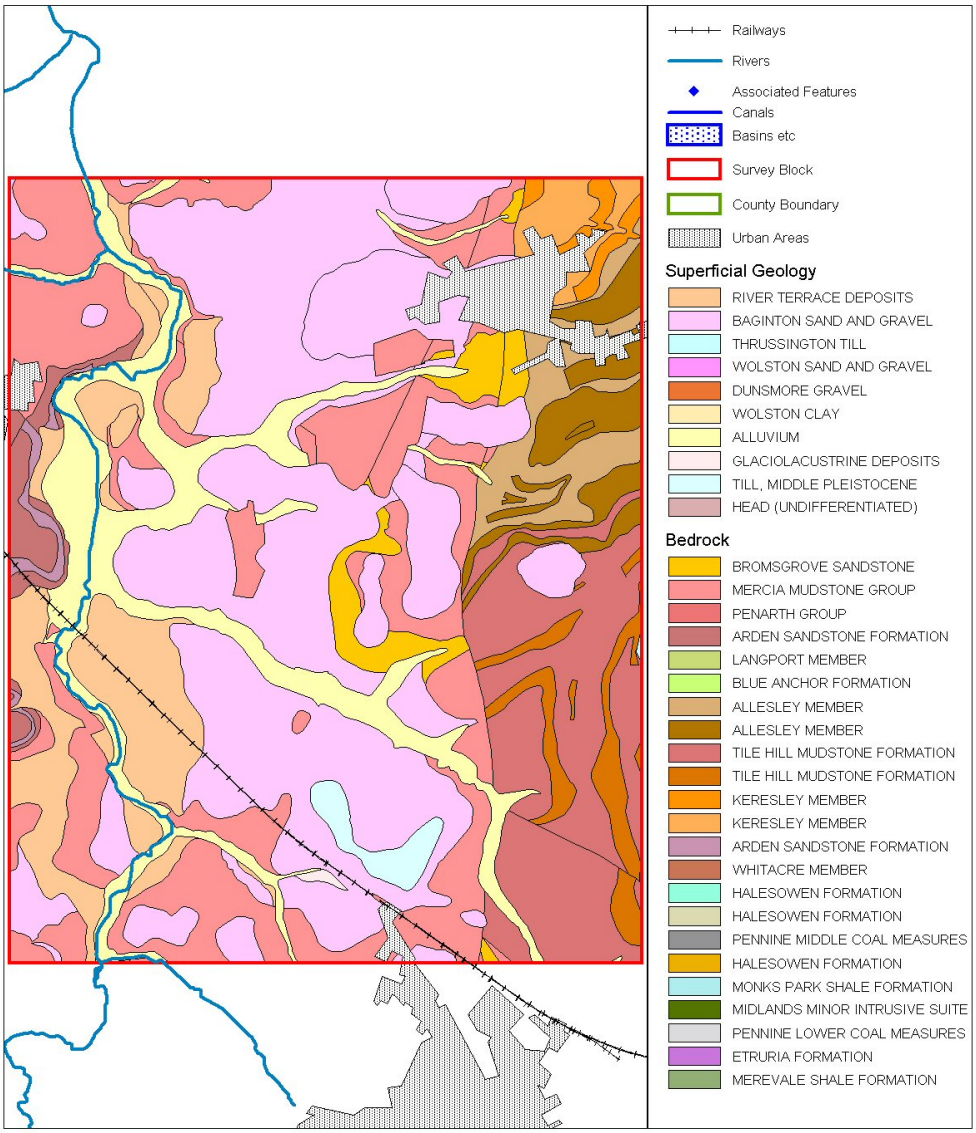

Figure 2: Geology of Survey Block1 (© BGS, reproduced under license)

Landscape Character

This survey block consists mainly of 'Arden Parklands' described as "an enclosed, gently rolling landscape defined by woodland edges, parklands and belts of trees" (WCC, 1993a, map) with 'Arden River Valleys' running north south through its centre which has been described as "narrow meandering river corridors with riverside trees and grazing meadows" (ibid.).

In the south of Survey Block 1 there is a series of farms spaced about 1km apart. This dispersed settlement pattern, which is different to the nucleated villages seen in the other survey blocks, is probably derived from piecemeal colonization of the woodland environment between the 12th and 15th centuries by peasant farmers. This process was possible because the Forest of Arden was never a Royal Forest with strict Laws against assarting to protect deer and was encouraged by landholders who saw an opportunity to increase their revenue (Roberts, B K, 1968). Meriden, now a large village, was a very small settlement until the eighteenth century, only then developing to service the increasing road traffic between Birmingham and London (Salzman 1947) and so conforms to the general settlement pattern of the area.

Two areas of parkland are present in Survey Block 1, at Berkswell Hall and Packington Hall. The park at Berkswell is well defined and there are sections of Park Pale recorded on the OS mapping but this is not apparent on any APs viewed. Only the southern edge of the deer park at Packington Hall Park was within the area mapped.

Hampton Lane Ditches, Enclosures And Pit Alignments

The area on either side of the Hampton Lane (B4102) contains the majority of ditched features within the survey block. The three circular ditches in the south-west part of Figure 3 are most likely to be Bronze Age as are the adjacent linear ditches on both sides of the road (HER N0 MSI 918). However, the pit alignment to the north of Hampton Lane (HER N0 MSI 1229) is likely to be late Bronze Age to late Iron Age (S Palmer (WCC), pers comm) Ditches, which are not apparent on any APs, and a pentagonal enclosure, which is visible, at the rear of Laburnum Cottage have been dated by excavation to the late prehistoric period (HER N0 MSI 913). The parallel ditches immediately behind the cottage were initially thought to be part of a Roman fort, but excavation revealed them to be 18th century boundaries (HER N0 MSI 1275 & 4015).

The presence of the prehistoric features in this area and nowhere else in the Survey block posed some questions. Are they located here because the free draining glaciofluvial sands and gravels provide a choice location which was colonized to the exclusion of other areas, or is there evidence for other similar sites in the surrounding soils? Although it is sensible to suggest prehistoric people preferred to live and farm easily worked soils their settlements are not confined to areas of sands and gravels but the evidence for their presence on clay soils is often not visible on APy. Typically, sandy soils like the Baginton Sands near Hampton Lane are composed of large particles than do not retain moisture. In periods of reduced rainfall plants in these soils quickly begin to show modified growth patterns leading to the appearance of obvious crop marks reflecting archaeological features. In clay soils the fine particles limit the water available for plants to take up and low precipitation causes a general diminishing of crop growth rather than a rapid change. Crop marks do develop in clay soils but slowly, if at all. (Wilson D R 2000) In recent years, as medieval ridge and furrow is levelled by modern ploughing crop marks related to earlier occupation have been revealed. An example of this process can be seen near Stanway in Gloucestershire (SP066631902) where a late prehistoric or Romano British settlement (AMIE HOB ID 871902) can be seen on APs (NMR SP0631/3) In Survey Block 3 to the north of the A455 near Bubbenhall linear features are apparent in fields that have been recently ploughed and have evidence of ridge and furrow ploughing. The date of the aerial photography showing the crop marks is not earlier enough to show the fields in question before they were ploughed using machines.

As with the other survey blocks the occurrence of prehistoric features coincided closely with modern mineral extraction. In this case quarrying in the early part of this century has destroyed the archaeology to the north of Hampton Lane but not before an open area excavation of the multi-period settlement (Stevens 2002)

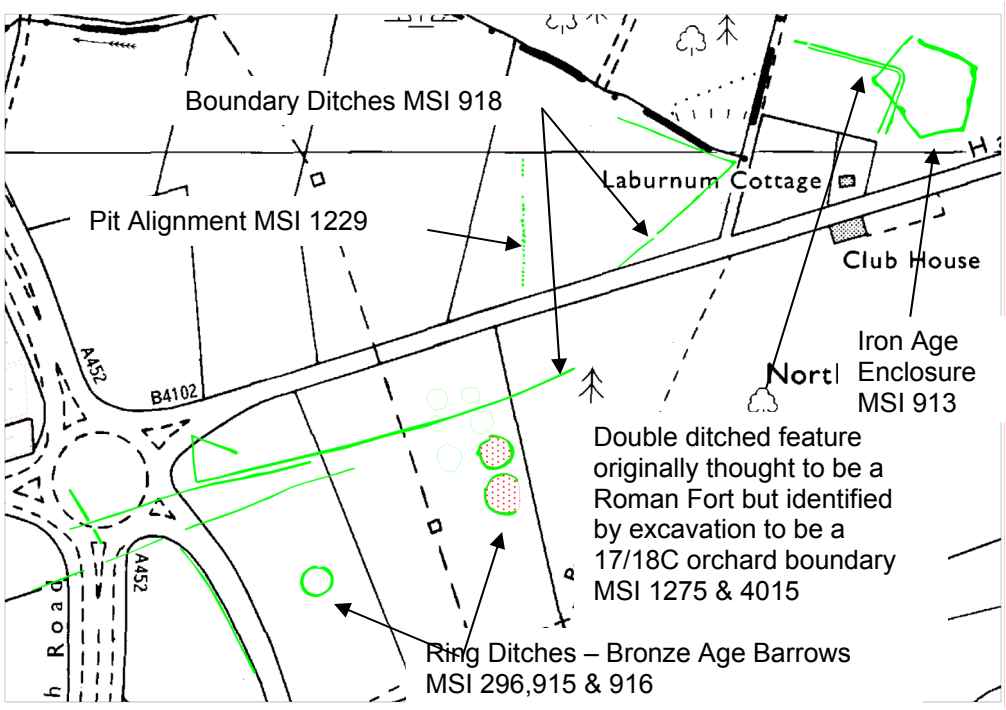

Figure 3: Multi-period crop marks - Hampton Lane between Hampton in Arden and Meriden (SP226818)

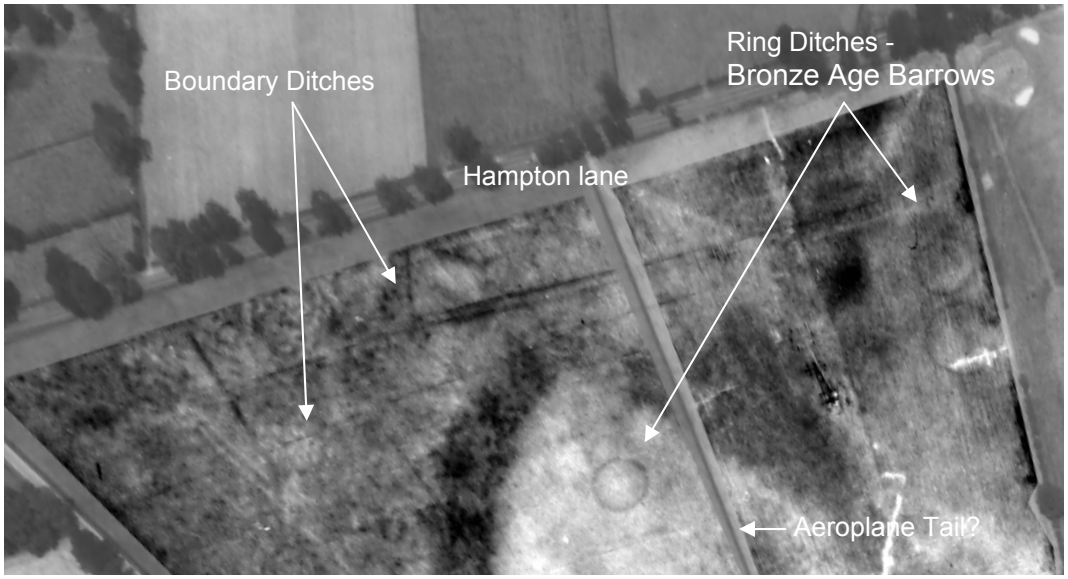

Figure 4: Hampton Lane Ring Ditches (ABG 42 © CUULM (NMR Ref SP2281/1)) (SP226818)

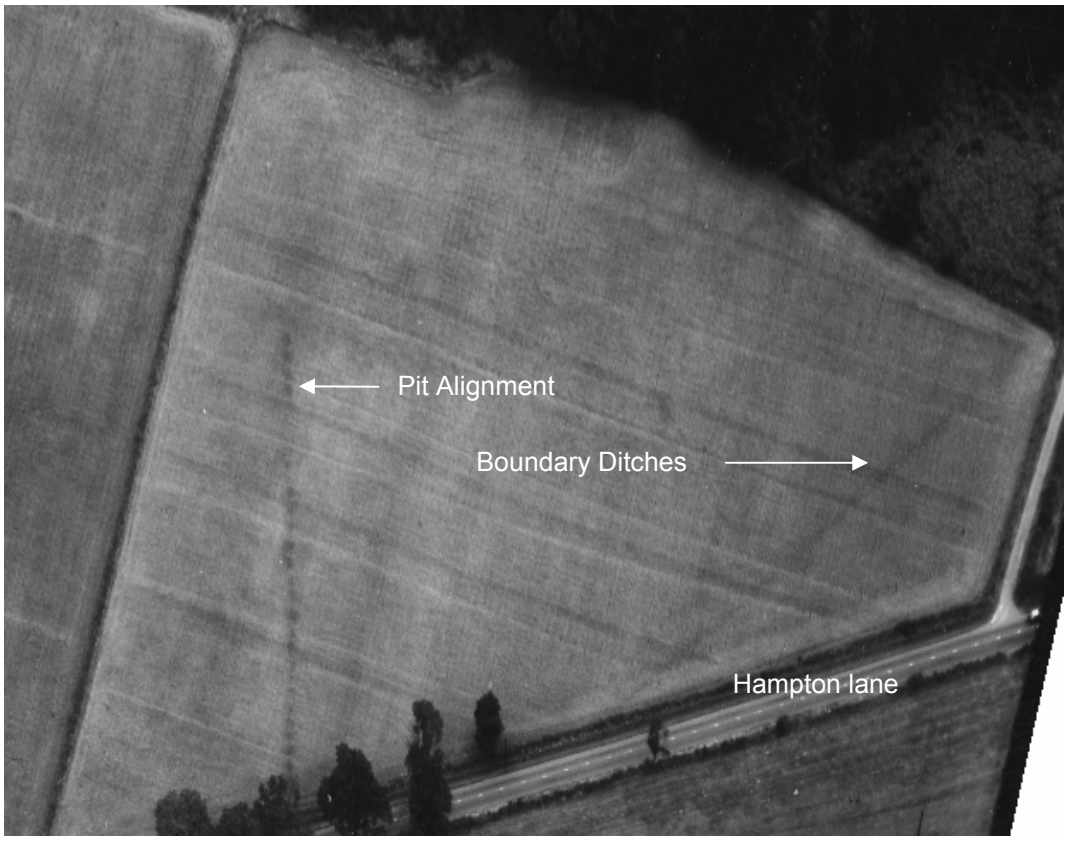

Figure 5:Hampton lane Pit Alignment (XL75 © CUULM) (SP228819)

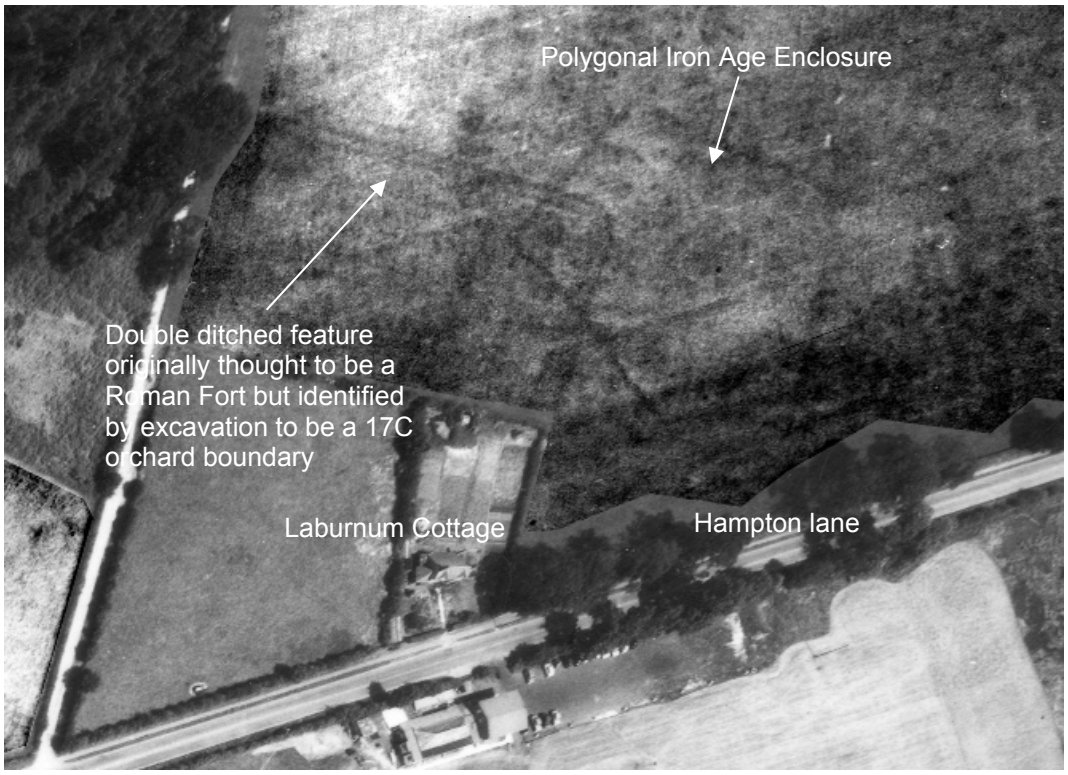

Figure 6: Hampton Lane Enclosure and Double Ditched Orchard Boundary (ABG 44© CUULM (NMR Ref SP2281/2)) (SP228820)

Medieval Ploughing

Ridge and furrow dominated the mapping and recording process (See Table 1, Appendix 1 which is not surprising for Warwickshire but there little evidence of the organised field systems that are apparent in the rest of the county. Land ownership patterns and the way land was farmed in the Forest of Arden differed from the rest of the country. The forest was not a royal hunting preserve and lacked the strict laws designed to protect deer. This allowed piecemeal clearing of the woodland from the 12th century onwards (Roberts B K 1968) and early enclosure of fields by agreement (Skipp V H T 1970).

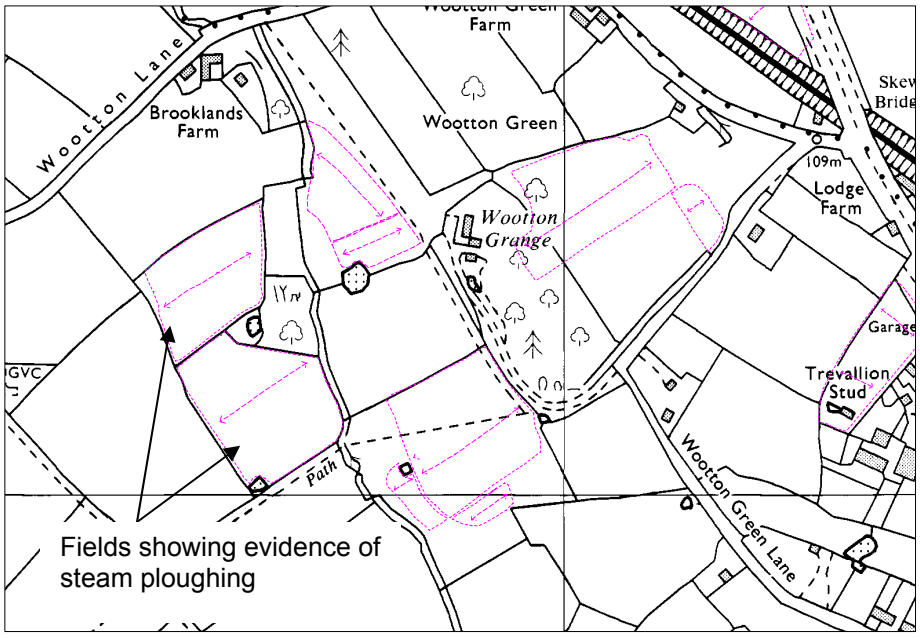

Figure 7: Fields with ridge and furrow clustered around Wootton Grange farm.

The APs of the 1940's and 50's show fields with ridge and furrow clustered around the each of the numerous farms. Generally these fields were devoted to pasture, many of them can be seen with grazing animals. Beyond the pasture near to the farms the outlying fields show no evidence of medieval ploughing. It is difficult to asses whether they have ever been subjected to medieval strip cultivation or have been ploughed so efficiently that all traces have been erased. The overall impression of the area is one of mixed farming that is responding, as it always has, to the economic pressures of the time. The pattern of mixed farming observed on 1940 photographs did not survive long, the ridge and furrow disappearing as field sizes increase to accommodate large machines and extensive arable crops replaced pasture.

There are a few fields that may have been subject to steam powered mechanised ploughing. An example of this is the two fields on the western edge of the group surrounding Wootton Grange Farm (MSI1308). These fields have very straight ridges with triangular profiles. Steam ploughing also requires a wide headland to allow the traction engine and its steam winch to be manoeuvred. This strip of land is either left un-ploughed or is ploughed at right angles to the other ridges in the field. Examples of both techniques can be seen in the area.

Charcoal Production

The survey revealed the plough levelled remains of what are thought to be charcoal burning platforms. This form of remains was first identified from APs during the course of the Forest of Dean NMP mapping project (Small, Stoertz and Bishop, 2006). The dark usually circular soil marks appear in recently ploughed land and are assumed to be the result of high levels of charcoal resulting from carbonising wood. They appear to be spaced at regular intervals, which may reflect the cropping rotation practiced when following a coppicing system. In the majority of cases where these dark patches occur it is in areas that have sinuous boundaries, similar to those enclosing much of the woodland in the area. In an area dominated by fields with straight hedges these boundaries are notable and probably indicate areas of cleared woodland Place name evidence, such as Horn Wood Farm (see Figure 9), is also significant, supporting the contention that the dark circular patches existed in a woodland setting. There is cluster of such sites in the eastern part of the survey block and there may be other sites further to the east of them, possibly indicating extensive areas of managed woodland in the past. Dating the features seen cannot be done by aerial survey, ground based investigation is required. However, some indication of the distribution and density of the practice could be gained by reviewing APs of a wider area. Combining this with scientific dating of the deposits and documentary evidence could provide an insight into the economic impact of the industry over time.

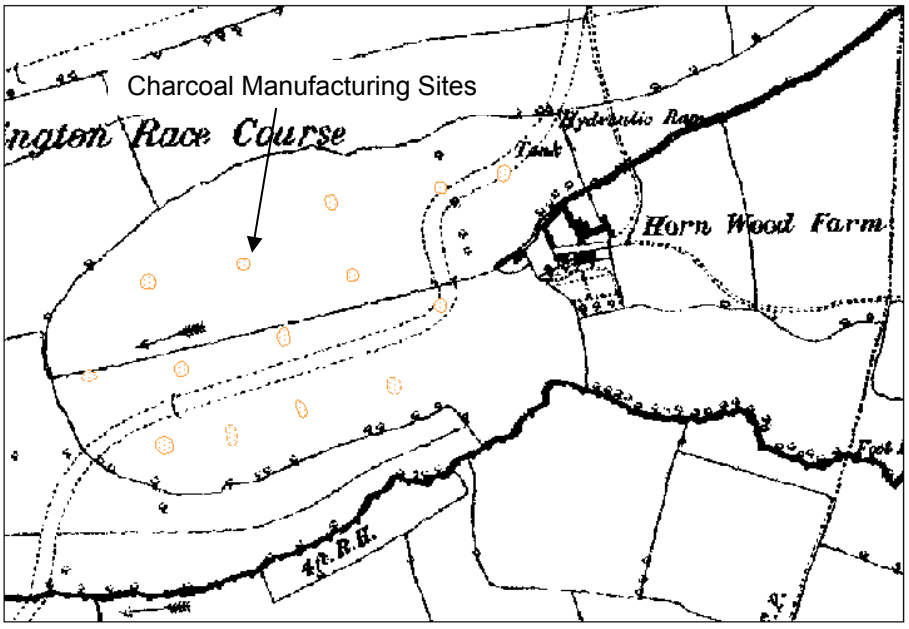

Figure 8: First edition OS map showing Charcoal Manufacturing sites near Horn Wood Farm (SP231814)

Figure 9: Extract from CPE UK 2546 3375 © English Heritage (NMR) RAF Photography (SP231814)

Survey Block 2

Location

Survey Block 2 is located in the valley of the River Tame. The A4091 roughly defines the western edge of the survey block and the Birmingham to Burton on Trent railway its eastern edge. The M42, and the Birmingham and Fazeley Canal run north – south across the survey block. The industrial settlement of Kingsbury, located in the north- west corner the Survey Block is the largest settlement. The villages of Marsden and Lea Marsden are much smaller and more rural in character. The southern part of the Block is dominated by the power stations at Hams Hall and subsequent industrial activity. The 28km^2 survey block is defined by grid references SP1892 (418000 292000) and SP2299 (422000 299000)

Geology

The geology (See below) in the valley of the River Tame is similar to that in Survey Block 1 with alluvial deposits along the river and adjacent areas of glaciofluvial drift and river terraces, which have been exploited for sands and gravels. The eastern and western sides of the area have mainly loamy soils derived from the reddish drift over carboniferous sandstone and mudstone

Landscape Character

The landscape of this block is somewhat more open than that of Survey Block 1. It consists mainly of 'River Valley Wetlands' described as "a highly modified rather degraded river valley landscape strongly influenced by sand and gravel extraction and other industrial activities" (WCC 1993, map). To the west of this are areas of 'Arden Parkland', described above, and to the east are areas of 'Wooded Estatelands' described as being "characterised by a large scale rolling topography and prominent hilltop woodlands" (ibid.).

Middleton Hall, in the north-west corner of this survey block is surrounded by a park that developed from a medieval deer park (Salzman 1947). There are also remains of a formal garden beside the hall.

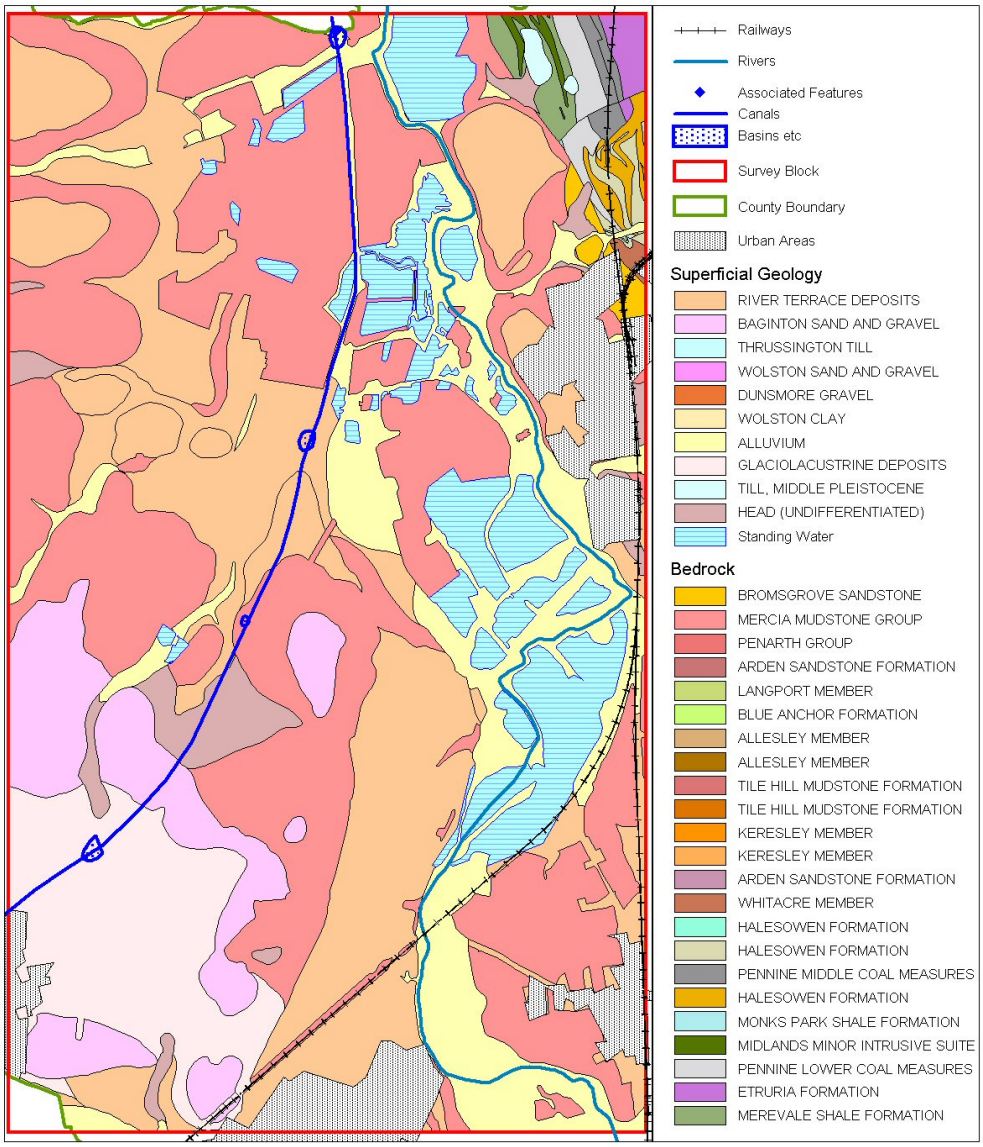

Figure 10: Geology of Survey Block 2 (© BGS, reproduced under license)

Prehistoric Features

There are four sites in this block that can be considered, through morphology or excavation, to be prehistoric and several others that could have originated from the same time period. They are all located on the western side of the survey area mainly in the river terrace deposits. A group of ditches (HER No MWA 6236, 6237 and 12006) is concentrated around Kingsbury Swivel Bridge (SP 201973) on either side of the Birmingham - Fazeley canal. At Middleton Hall a complex of ditches and enclosures (HER No MWA 315) which appear to date from the late Iron Age, although the HER describes them as “undated”, underlie later park features. Near to Coton House Kennels a ring ditch that probably represents a large Bronze Age Barrow (HER No MWA 4725) and a 250m long Neolithic multiple ditched feature and pit alignment (HER No MWA 12035). (See Figures 11 and 12 below) has been lost to mineral extraction apparently without any archaeological investigation. The remaining six crop mark ditches mapped that could be prehistoric are isolated without evidence to suggest their function or date.

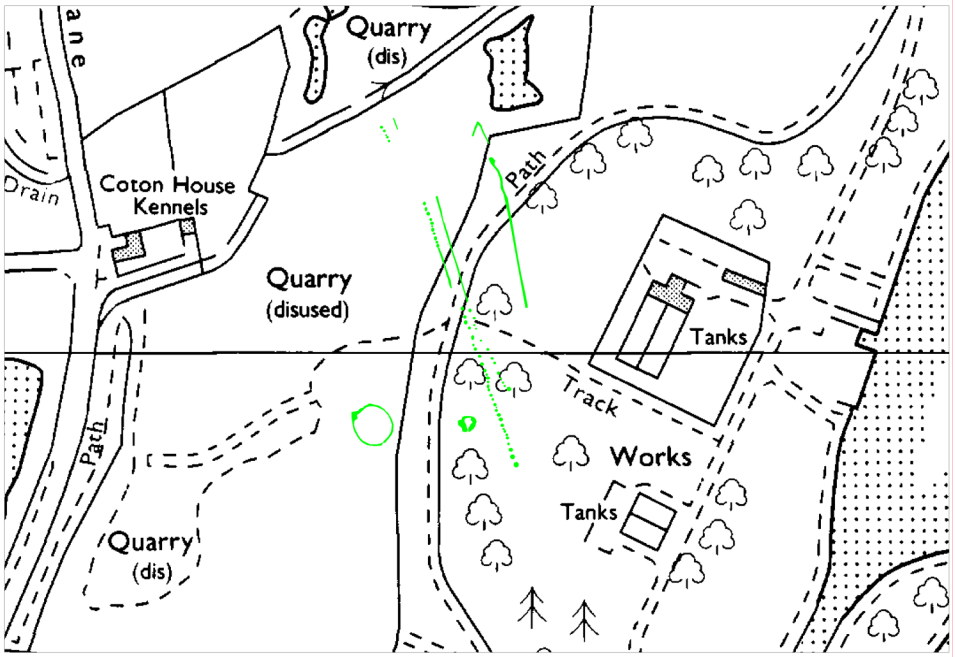

Figure 11: Ring Ditches and Pit alignments between Lea Marsden and Marsden (SP205940)

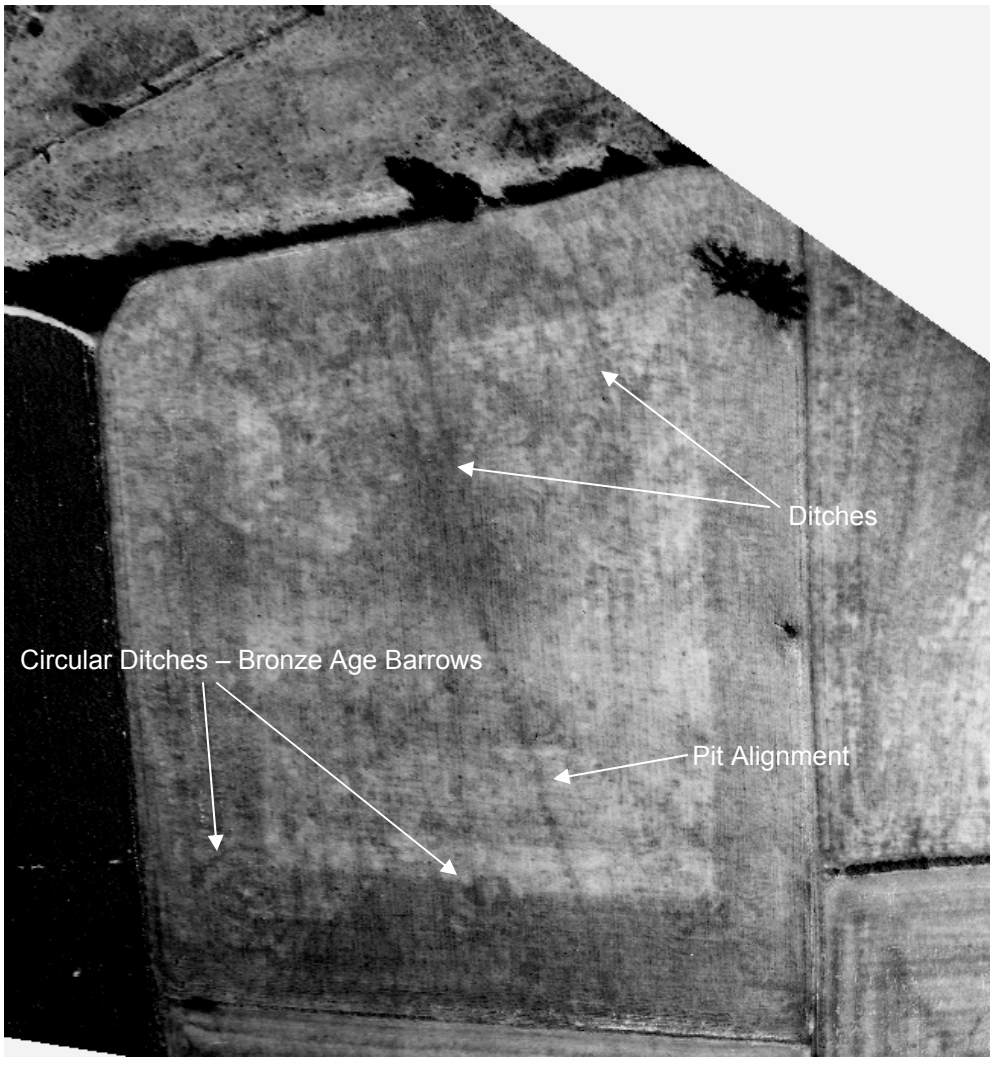

Figure 12: Two circular ditches, a pit alignment that merges with a ditch and two further ditches on the same alignment: APB 73 © CUULM: (SP205940)

Medieval Cultivation

Well over half of the entries created in the HER record the presence of ridge and furrow ploughing. This medieval feature is not evenly distributed, between Curdworth and Middleton to the west of the River Tame it occurs in restricted areas close to farms. In contrast it is much more extensive to the east of the river near Nether Whitacre and Drakenage Farm, the site of a KNOWN shrunken medieval settlement.

On the eastern side of the railway most of the fields do not show any evidence of ridge and furrow, but well-defined plough ridges can be observed as earthworks in the narrow strip of land between the railway boundary fence and the tracks (See Figure 12). From this it can be inferred that although modern ploughing has obliterated the evidence, many of the fields between Middle Lane and the B4098 may also have been ploughed in ridges at some time.

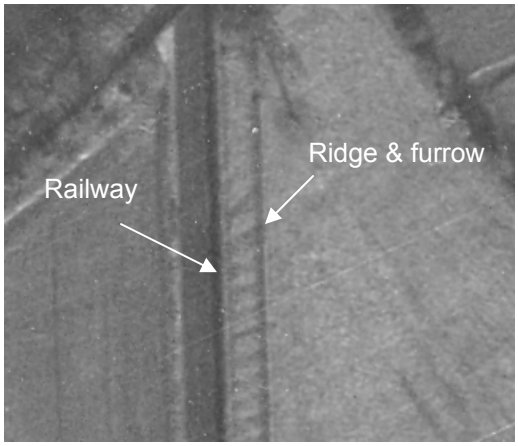

Figure 13: Ridge And Furrow Ridges Preserved beside the Railway: RAF 541 213 3088 © English Heritage (NMR) RAF Photography) (SP219933)

Middleton Hall Park and Garden Features

The area around Middleton Hall (SP192981), which has medieval origins, *(VCH*), is particularly rich in archaeological features. To the north there is a complex of crop-marks, the earliest of which appear to be late prehistoric or Romano-British boundaries and enclosures.

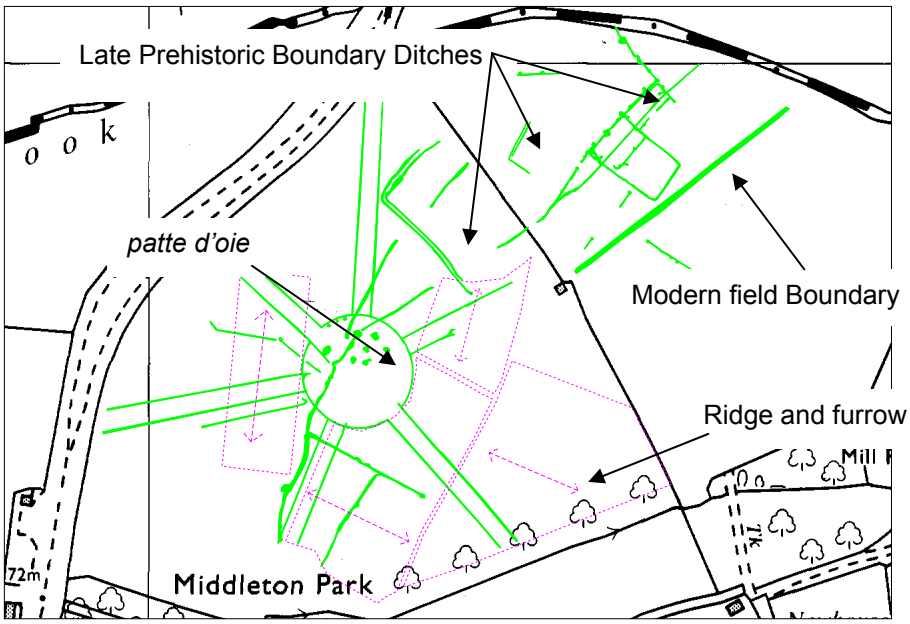

Figure 14: Deer Park to the North of Middleton Hall: A striking park feature overlies late prehistoric boundaries and enclosures (SP192987)

Overlying these is a very clearly defined circular ditch with linear ditches radiating from it (See Figure 13). This is reminiscent of park landscaping originating in the reign of Charles II, which featured rides and vistas that were developed from French woodland *Allée's* by the Mollet family (Ladun S 1991). These *Patte d'oie,* named from their likeness to a goosefoot (Lasdun 1991), can be seen in illustrations of other country houses such as Badminton Hall (Knyff and Kip, 1708). There is documentary evidence for a deer park at Middleton in 1258 and later a "new deer park" (Salzman 1947) but whether either relates to the features mapped and described above is uncertain. There is a case for suggesting that the central circular feature is a Victorian Tree Circle, which would account for the clarity of the crop-marks, and the small dark circular soil marks present seem to correspond with the trees shown on the first edition OS map. There are also traces of medieval ridge and furrow present on the site but because the features have been plough levelled the relationship between the parkland features and ridge and furrow is uncertain.

To the south west of the Middleton Hall there are other complex crop-marks, which are difficult to unravel. The most obvious feature is what appear to be a formal garden 192 m long and 96m wide with a rounded western end. The central portion of this area has an elongated feature, possibly a flowerbed defined by a masonry wall or substantial paths. A long crop-mark extends from the garden westward towards the road with a series of crop-marks joining it at approximate right angles. There are also two groups of small macular crop-marks that may be tree-throw holes representing grubbed out copses similar to those still present nearby. A small pond situated to the south west this area and a larger pool named as Larch Pit in the field to the south appear to be the result of small-scale mineral extraction, possibly for marl. The date these pits were used for extraction of marl is uncertain but could range from early medieval to the 18th century. These features provide a picture of a changing landscape with evidence for use as farmland, parkland and mineral extraction.

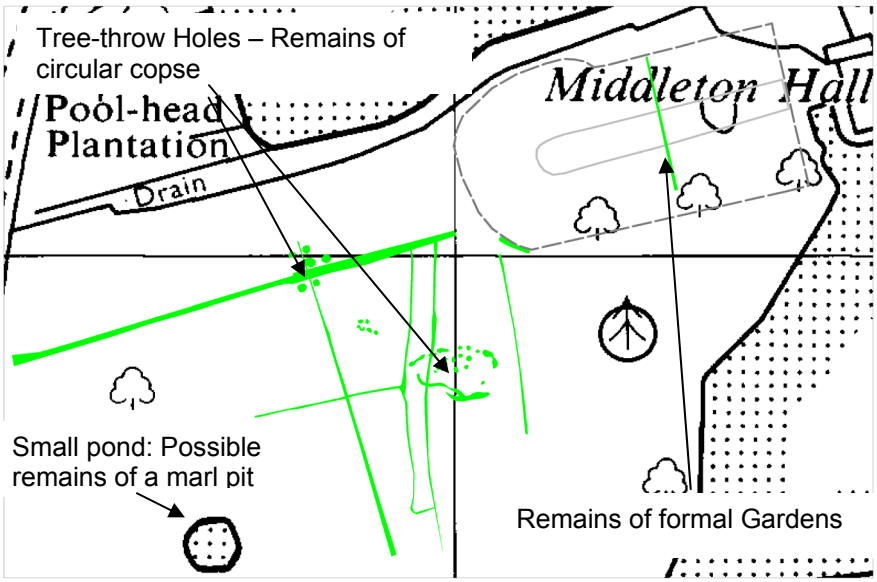

Figure 15: Gardens and Parkland to the South west of Middleton Hall (SP190980)

Charcoal Manufacturing

The area know as the Wilderness (MWA 12039, SP181940) and an area to the east of Dunton Hall (MWA12038, SP193935), both show the dark circular macular soil discolouration associated with the location of charcoal burning platforms similar to those in Survey Block 1

Water Management Features

To the east of the power stations at Hams Hall in a loop of the river Tame there was an intricate pattern of interconnected ditches that appeared to be connected to the river by several sluices (SP211917). These sluices, including the one at the point where the network debouches into the river, were not visible on APs but are shown on early OS mapping (See Fig 16). The system appears to have been connected to fish ponds located to the west. The whole landscape appears to be a floated water meadow, dating from the late 17th or 18th century. A controlled flow of water covered the grass to protect it from frost that encouraged a flush of early grass to fatten livestock,

usually lambs, giving a competitive advantage. The system appears to continue to the north of the area drawn but shows too faintly on the available photography to be accurately plotted.

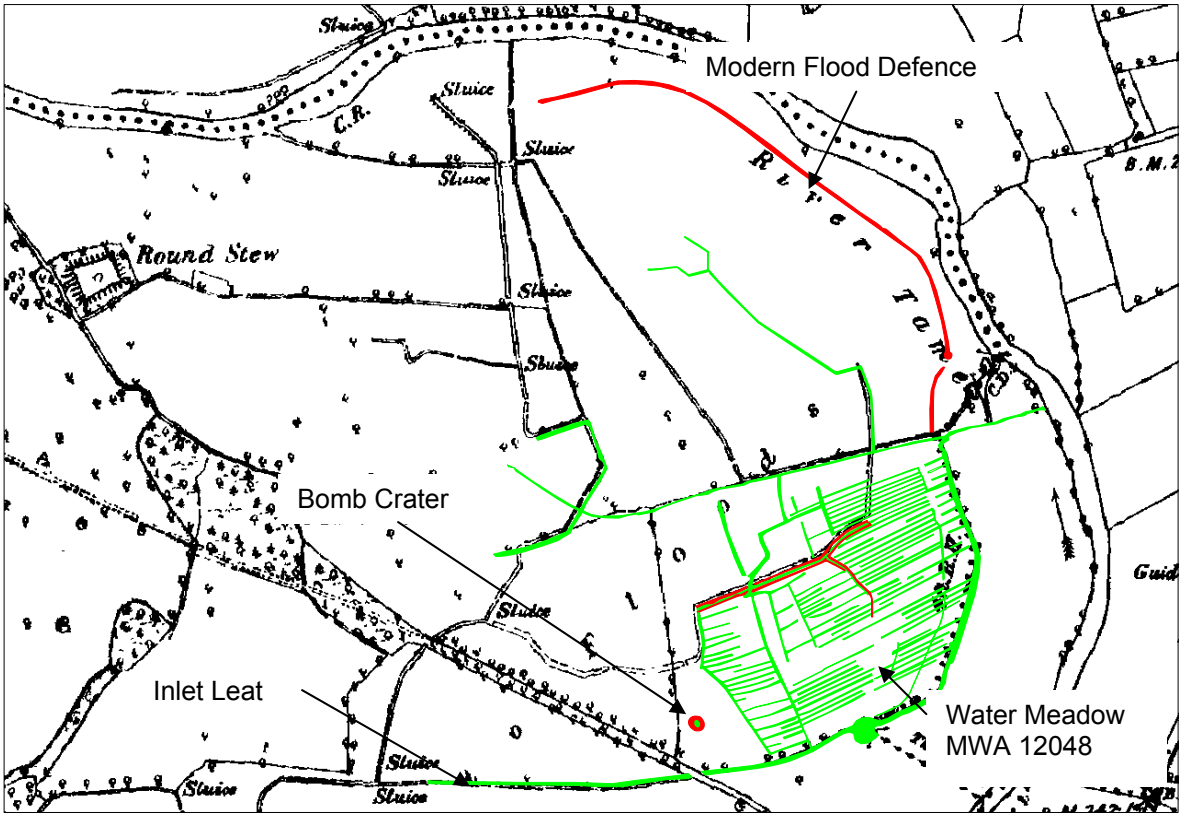

Figure 16: Probable Water Meadows beside the river Tame at Hams Hall (SP213920)

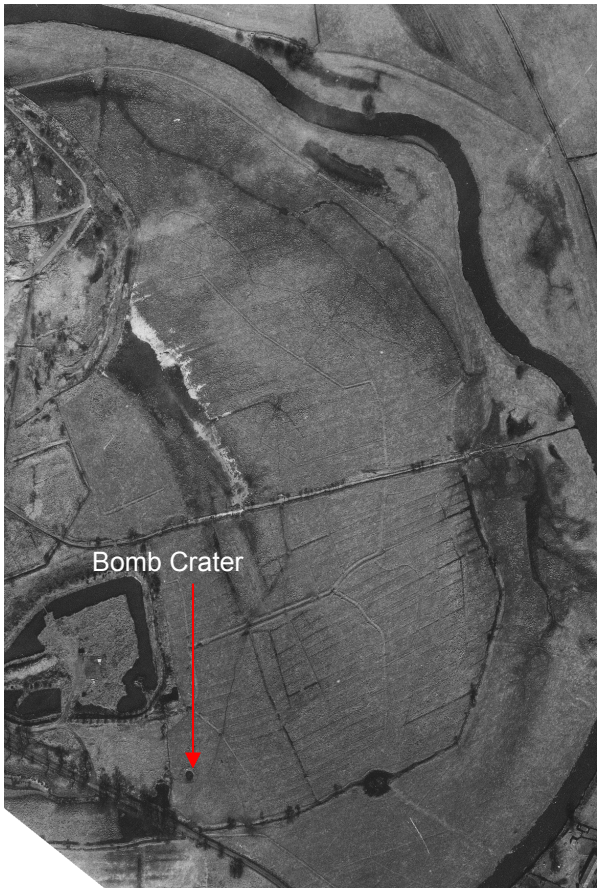

Figure 17: Rectified Image of Probable Water Meadows beside the River Tame at Hams Hall MAL 63577 Frame 109707 Meridian Airmaps Limited

World War Two Features

There are several examples of bomb craters in the proximity of Hams Hall Power Station, including the two shown in Figure 16 above. Most of the craters occurred to the south of this survey area and were not mapped or recorded. The two illustrated were filled in quite soon after the war and then are not visible once the area was utilised for gravel extraction.

Survey Block 3

Location

Survey Block 3 is located to the south-east of Coventry and includes the villages of Ryton-on-Dunsmore and Bubbenhall. Parts of Coventry Airport are present in the north-west corner of the survey block and the River Avon flows across its northern section. The 20km^2 survey block is defined by grid references SP3671 (436000 271000) and SP4076 (440000 276000)

Geology

Glaciofluvial drift and river terraces are present in much of the western edge of the survey area adjacent to the river Avon. Reddish drift and till, including ancient lake deposits, is present in a band stretching from Bubbenhall northeast towards Ryton on Dunsmore. These areas are subject to seasonal water logging and have evidence of almost universal cultivation using ridge and furrow ploughing

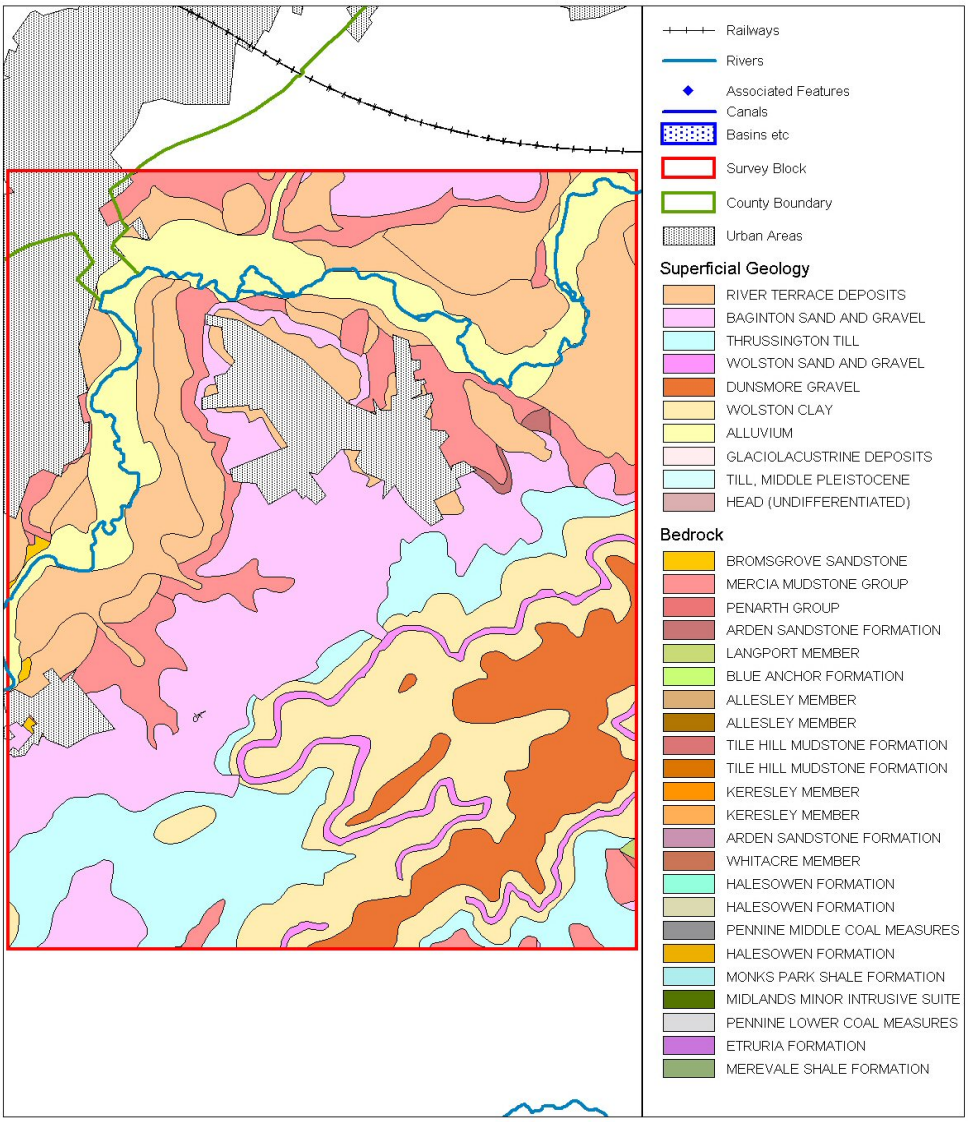

Figure 18: Geology of Survey Block 3 (© BGS, reproduced under license)

Landscape Character

This survey block is a topographically diverse area including the river valleys of the Upper Avon in the north and a higher plateau area in the south. 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)

This survey block has a greater density of archaeological activity than either of the other two bocks even if the World War II monuments are discounted. For example, there are approximately 350 discrete areas of ridge and furrow compared with 150 for the same sized Survey Block 1. The numbers of records created to document the presence of this medieval ploughing is comparable with the other two survey blocks however, but each record covers a larger area.

Prehistoric Features between Bubbenhall and Ryton-On-Dunsmore

On the APs of the land on either side of the A445 between Bubbenhall and Ryton-on-Dunsmore a complex of enclosures, pit alignments and ditches is visible. There have been several excavations in this area, which investigated some of these features, revealing the presence of Bronze Age cemeteries and an Iron Age settlement. When the distribution of these features was compared to the geological map there appeared to be a correlation between the crop marks and the river terrace gravels. Mineral extraction and subsequent landscaping has removed most of the archaeology to the east of the road.

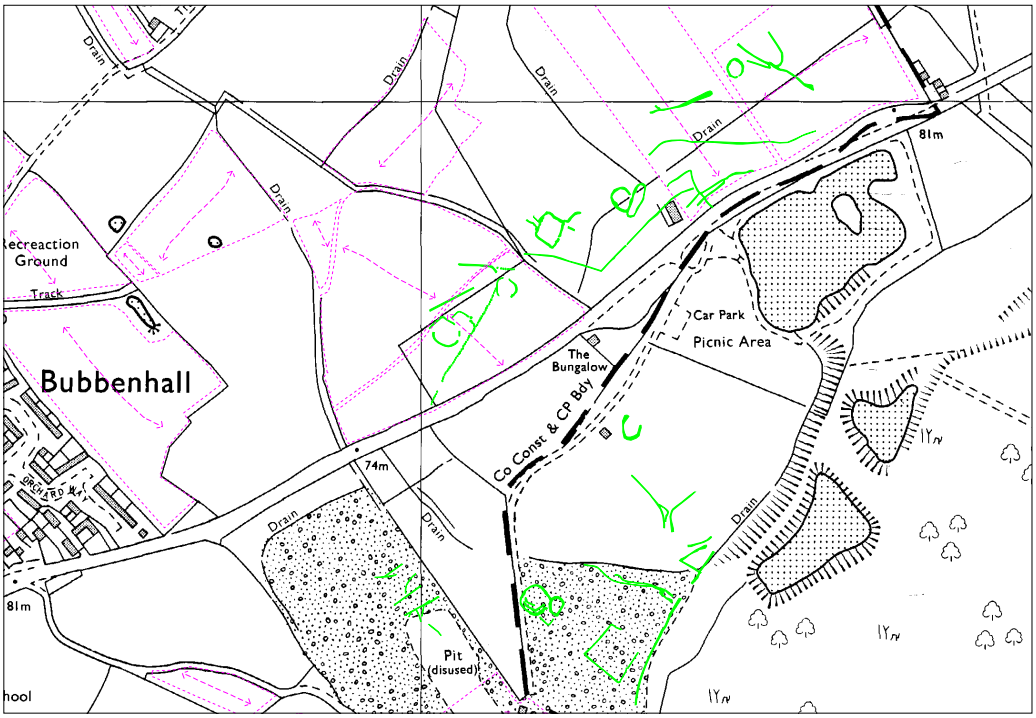

Figure 19: Multi-period Crop marks between Bubbenhall and Ryton on Dunsmore

Medieval Cultivation

Ridge and furrow ploughing can be seen throughout the survey block. In the south, between Bubbenhall and Ryton Woods, there was almost complete coverage. The field boundaries on the 1940s photography, on the whole, respect the layout of the medieval ploughing and do not have the regularity of the Parliamentary Enclosure Acts. A few fields adjacent to woods have curving boundaries probably associated with assarting. These factors point to early enclosure. Ryton Heath Farm is located on a slight ridge that is a little above 100m OD in an area that is free of ridge and furrow and, as the farm name suggests, this must have been heath land for a considerable time.

Medieval Settlement in Ryton on Dunsmore

At the rear of the houses fronting the High Street in Ryton on Dunsmore there were a series of earthworks that are described in the HER as a shrunken medieval Village. There has been at least one episode of mineral extraction in the area, which may have modified the earthworks mapped. The southernmost group of banks could possibly be interpreted as fish ponds although no obvious source of water can be seen and they could equally be eroded building platforms. The Northern rectangular banked enclosure can more certainly be described as a croft. All these features have been built over.

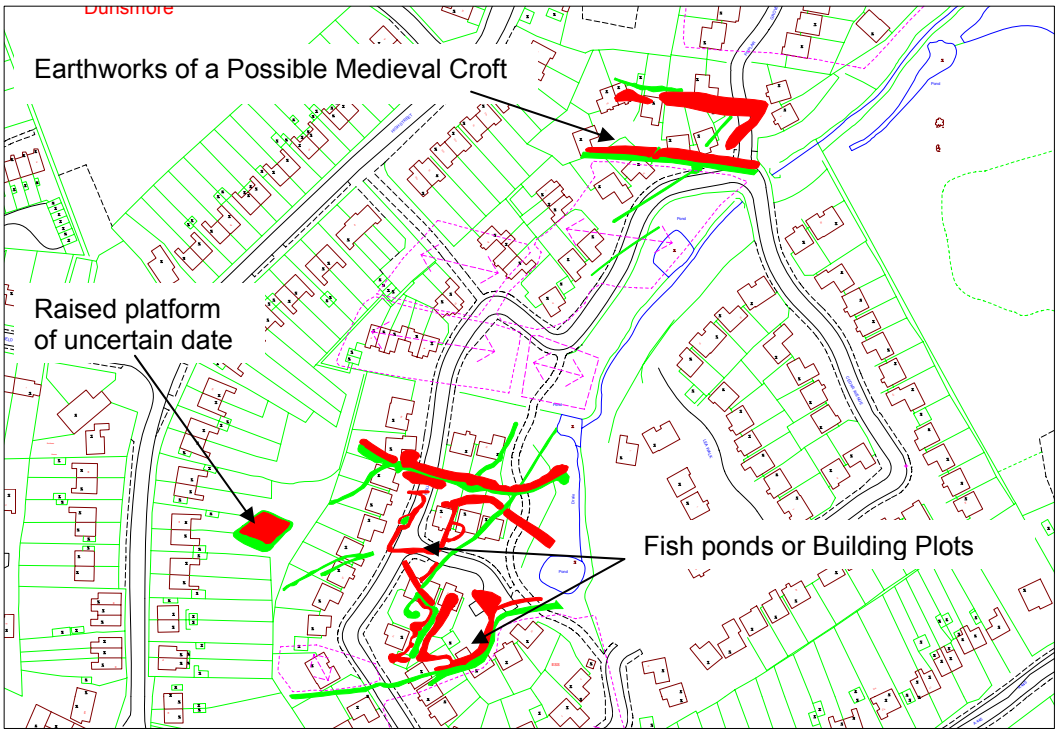

Figure 20: Earthworks to the East of the High Street, Ryton on Dunsmore Probably Part of the Medieval Settlement.

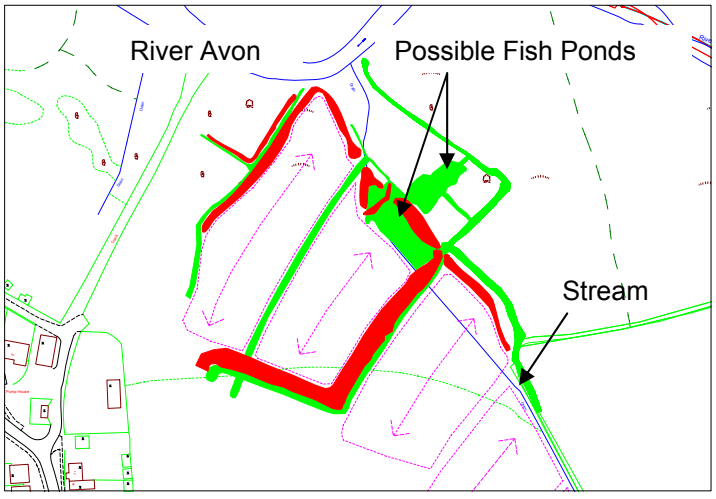

Figure 21: Earth Bank Enclosure with Possible Fish Ponds on Northern Edge

To the north of Ryton on Dunsmore there is a banked enclosure with what appear to be two fish ponds at the northern end fed by a small stream and draining into the River Avon. The interior of the enclosure has two areas of ridge and furrow ploughing separated by a ditch, which may be later than both the enclosure and the ploughing. Although this feature does not appear on later photography the area has not been developed and the enclosure may still exist.

Water Management

Along both sides of the river Avon between the river bridge at Willenhall and Bubbenhall there are areas of ditches. These are possibly only drainage to allow grazing in the meadows next to the river but they are extensive and the effort involved in producing them seem disproportionate to the gain in access to the land Another possibility is that they are water meadows, although it is difficult in most cases to identify inlet and outlet points or control mechanisms.

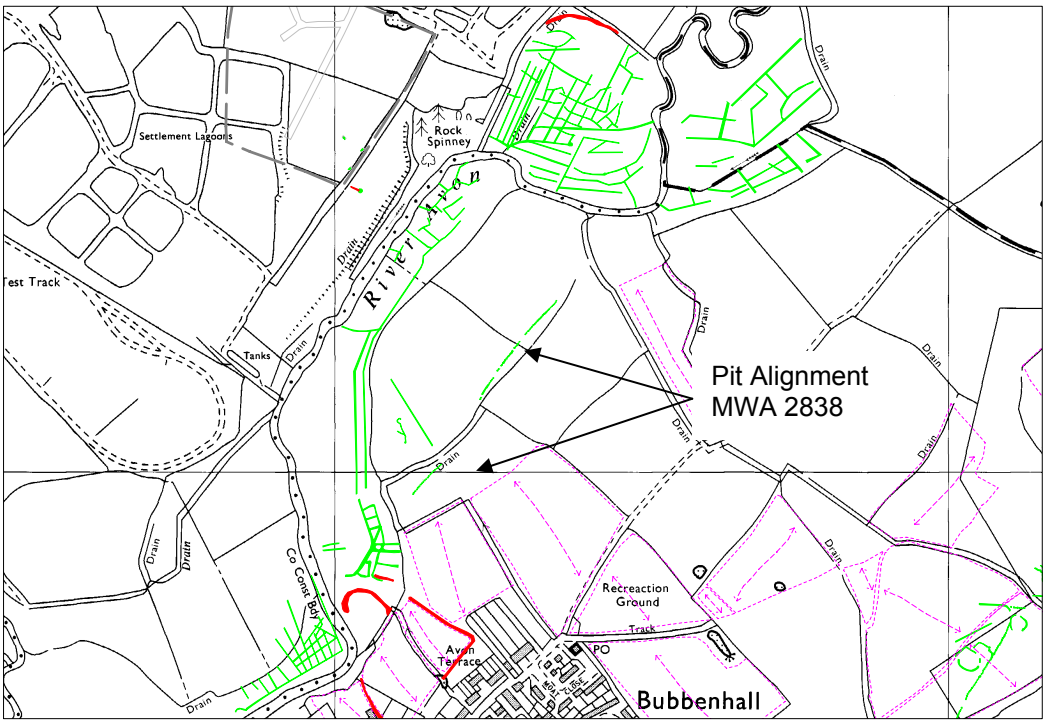

Figure 22: Water Management beside the River Avon near Bubbenhall

World War Two

Baginton Airfield is now Coventry International Airport but in the early years of the Second World War it was a RAF Sector Station for the Midlands. It was not ideally suited to the purpose, being without proper accommodation for men or machines (Smith,2004). The APs of this period (see Figure 23) show aircraft, possibly Hawker Hurricanes, dispersed across the northern end of the field with temporary canvas hangars, which illustrates of the hurried occupation of the airfield. An attempt to disguise the field by painting trees and hedges on the ground is also visible.

The life of the airfield as a Sector Station was limited; it was subsequently enlarged for use by the heavy bombers of 60 Group. Unusually, it was not provided with a concrete runway, which would have precluded fully laden takeoffs. (Smith 2004). Photographs taken in 1946 (see Figure 24) show a number of four engine bombers, Handley Page Halifax and Avro Lancaster, dispersed about the site. Given the date, March 1946, and their generally untidy and close spacing they appear to be either awaiting repair or are surplus to requirement and about to be scrapped. One other oddity is a tailless aircraft just outside the factory, apparently part of the Armstrong-Whitworth experimental development programme (Figure 25).

There were two aircraft factories, both owned by Armstrong Whitworth. The original factory at Whitley is located outside the survey block, to the north-west. The later factory was located on the eastern edge of the airfield and was provided with external air-raid shelters and temporary accommodation huts for either workers or the military personnel that manned the defences that are evident on the APs.

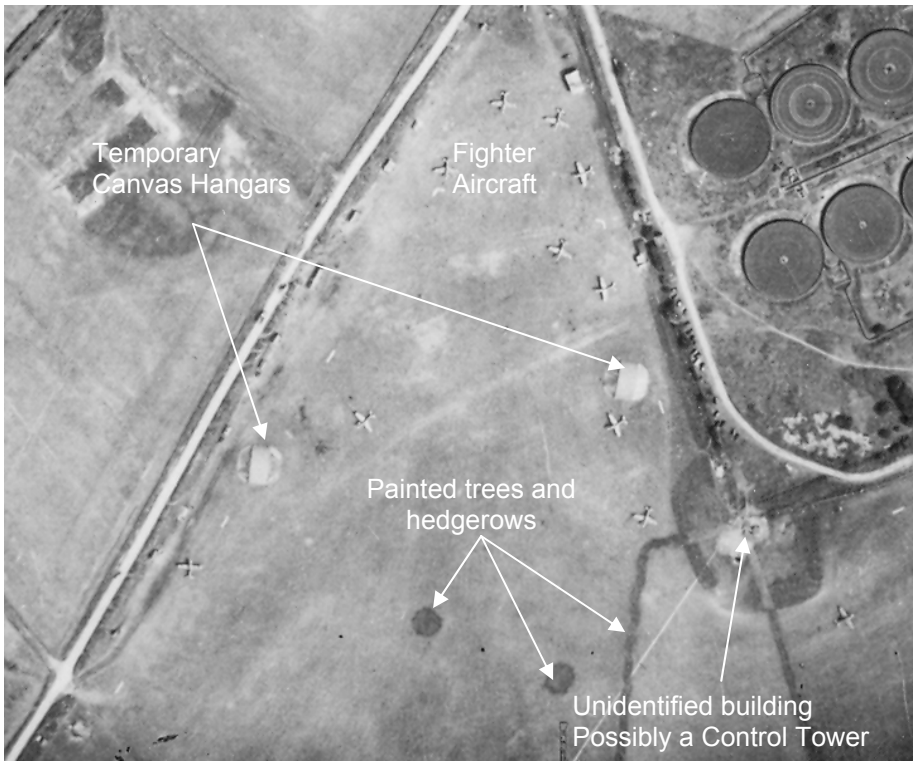

Figure 23: Baginton Airfield in 1941 Extract from S130 H3 140 68 21 May 1941 © English Heritage (NMR) RAF Photography (SP357747)

Figure 24: Baginton Airfield 1946 Extract from RAF 106G UK 1698 6226 27 August 1946 © English Heritage (NMR) RAF Photography (SP359738)

Figure 25: Experimental Tailless Aircraft or Glider on Baginton Airfield Extract from RAF 3G TUD UK 80 5163 25 March 1946 © English Heritage (NMR) RAF Photograph

The air defences in the area included several barrage balloons (MWA12076, MWA12100) a number of light anti-aircraft positions near to the aircraft factories (MWA12074, 12075) a heavy anti-aircraft battery (MWA9642) at Ryton on Dunsmore and a nearby searchlight battery (MWA120970, all with ancillary equipment and accommodation blocks. Despite these precautions there were several groups of bomb craters in the survey area (see Figure 27).

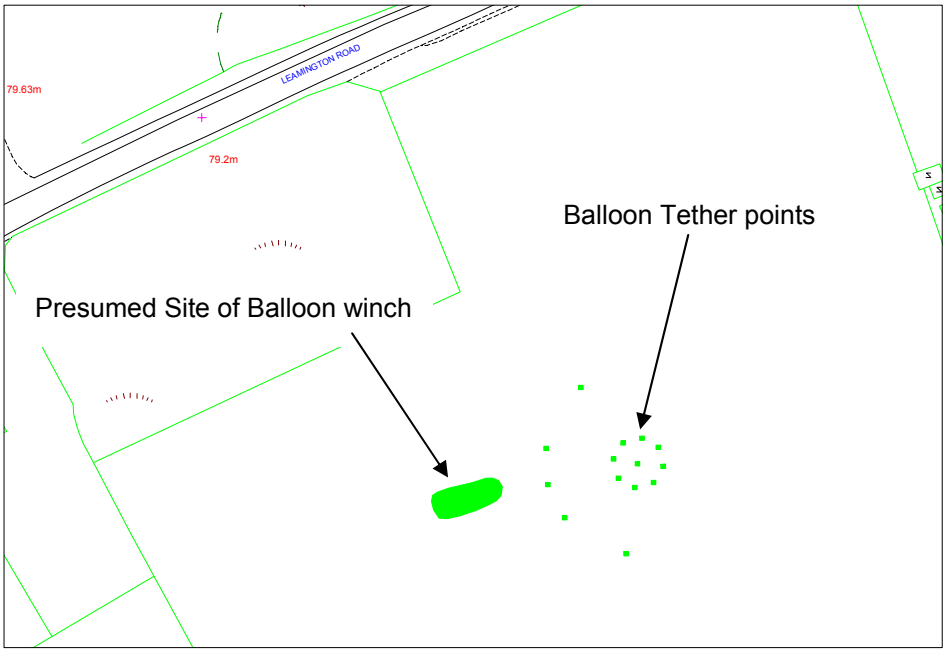

Figure 26: Remains of Barrage Balloon Tether Ryton on Dunsmore (MWA12100) (SP389740)

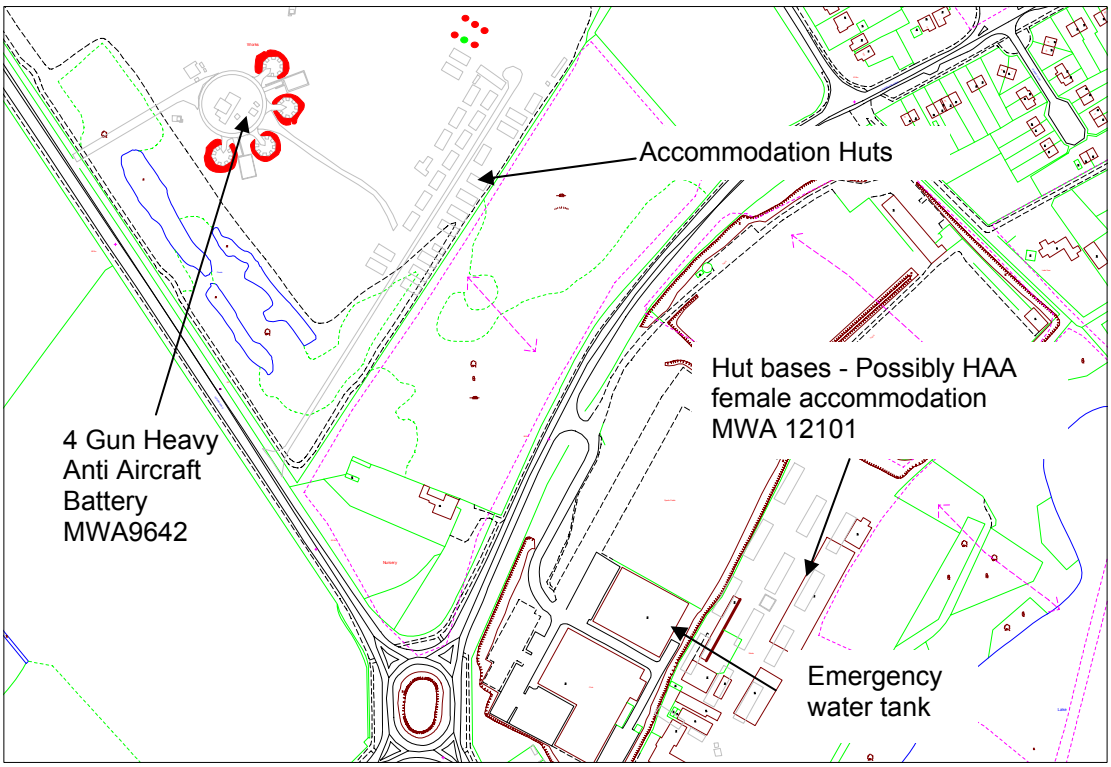

Figure 27: Ryton on Dunsmore Heavy Anti Aircraft Battery (SP383786)

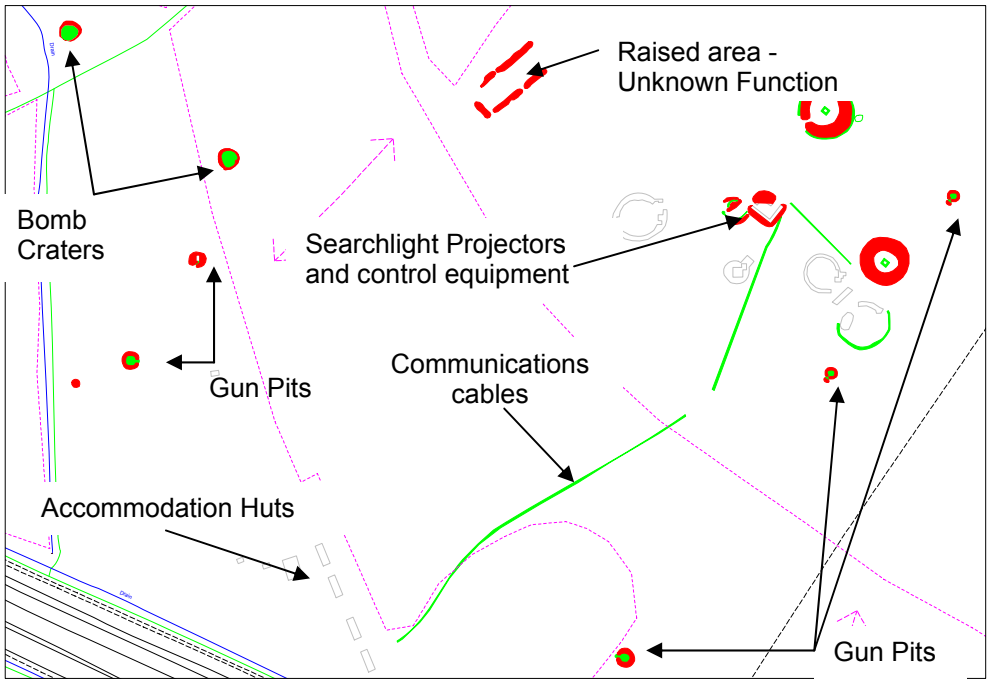

Figure 28: Searchlight Battery Ryton on Dunsmore (SP389744) (MWA12099)

Conclusions

This component of the project has achieved its aim to increase the knowledge of the archaeology in Warwickshire's aggregate producing areas. 173 new records have been created in the Warwickshire and Solihull HERs and a further 45 modified; of these 129 were ridge and furrow. Some 679 sites have been mapped and now appear on the HER GIS where they are available to Council staff and the public.

As has been noted in many other archaeological studies the presence of sands and gravels has a marked impact on the number of sites detected from the air (Webster G & Hobley B 1965, Wilson

DR 2000). The results of this study follow this trend with many of the prehistoric sites mapped appearing in the areas where sand and gravel deposits are present. As the area covered by ridge and furrow ploughing is reduced more sites such as the charcoal burning platforms near Meriden and the prehistoric features near Bubbenhall will possibly appear as they have in other parts of the country. In all survey areas gravel extraction has removed some archaeological features.

The presence of Medieval ridge and furrow in Warwickshire was to be expected and accounted for over 70% of the new records created in the HER for the three survey blocks. The density and distribution of medieval ploughing varied in each area. It was densest in block three to the west of Bubbenhall where it was almost universal except in the heath land above 100m OD. The surviving ridge and furrow in Survey Block 1 was clustered around small farm settlements, a distribution that perhaps reflects a short period of mixed farming in existence at the time of World War 2. The majority of Survey Block 2 exhibited fewer areas of ridge and furrow except in areas that have been protected from modern ploughing such as the Belfry Golf Centre at SP183956 (MWA12012) On the carboniferous soils to the east of the River Tame the extensive networks of drainage ditches show that the, area is prone to water logging. It is here adjacent to the shrunken settlement of Drakenage farm that ridge and furrow is present over wide areas.

Prior to this work Warwickshire had no recorded floated water meadows although their presence had been suspected. The area of interconnected ditches beside the river Tame near Hams Hall is probably the first example. Further work is required to confirm this supposition. The other new monument type recorded during this survey was the dark circular crop marks associated with charcoal manufacture. These appeared mainly on the eastern edge of Survey Block 1. From medieval times up to the 18th century there must have been extensive areas of woodland devoted to producing fuel for the burgeoning metal industries of the midlands. Aerial photography could provide an efficient method of quantifying this rural industry, unless the areas plotted during this survey are exceptional.

The archaeology of the Second World War has proved to be ephemeral with few structures surviving into the later 20th century. There were more structures to be recorded in the immediate vicinity of Survey Block 3 than elsewhere. The Whitley aircraft factory just to the north west of Baginton Airfield was surrounded by light anti aircraft gun pits, at least one other barrage balloon and numerous other defensive works.

Changes in the landscape could be observed when comparing the earliest APs with more recent ones. The main changes were settlement expansion, an increase in the area of open water due to mineral extraction, the change of land use form agriculture to recreation, mainly as nature reserves, and a general increase in field size to meet the demands of modern agriculture.

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WCC Warwickshire County Council, 1993	*Warwickshire Landscape Guidelines*, (3 vols), Warwickshire County Council and Countryside Commission,
WCC Warwickshire County Council, 1995	*Minerals local plan for Warwickshire: written statement*, Warwickshire: County Council

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Tables

Table 1 Block 1: HER Recording Statistics

Monument Type	SMR Records	
	Created	Modified
Discrete areas of ridge and furrow	46	5
Boundary banks and ditches	2	
Pit alignments		1
Circular or ring ditches		3
Linear ditches		3
Pen annular ditch	1	
Charcoal burning sites	6	
Military sites	1	
Garden features	1	
Earthen Long Barrow		1
Moated site		1
Totals	**57**	**14**
Total HER records created and modified	**71**	

Table 2 Block 2: HER Recording Statistics

Monument Type	SMR Records	
	Created	Modified
Discrete areas of ridge and furrow	32	1
Pit alignments	1	
Pit	1	
Circular or ring ditches	1	3
Linear features	2	9
Enclosures: curvilinear/rectilinear	0	1
Charcoal burning sites	2	
Parkland and gardens	0	1
Water management	4	
Track way	1	
Railway track	1	
Earthworks	1	
Moated sites		
Totals	**46**	**15**
Total HER records created or modified	**61**	

Table 3 Block 3: HER Recording Statistics

Monument Type	HER Records	
	Created	Modified
Discrete areas of ridge and furrow	44	1
Pit alignments		3
Circular or ring ditches		2
Linear features	4	3
Banks (headlands)	2	
Enclosures (prehistoric)		3
Enclosures (medieval)	1	
Water management	4	
Track way (medieval)	1	
Track way (modern)	1	

World War 2 sites	12	1
Settlements (prehistoric)		1
Settlements (medieval)	1	1
Parkland and gardens		
Modern agricultural		1
Totals	**70**	**16**
Total HER records created or modified	**86**	

NMP Methodology

Introduction

The aim of the National Mapping Programme (NMP) is to enhance the understanding of past human settlement, by providing primary information and synthesis for all archaeological sites and landscapes from the Neolithic period to the twentieth century.

NMP aims to do this to a consistent standard by interpretation, mapping, classification and description of all archaeological sites and landscapes in England that are visible on APs. This comprehensive synthesis of the information available is intended to assist planning, protection and research of the historic environment.

The specific aims of NMP are:

To produce a geo-referenced digital transcription of the form and extent of all archaeological features visible on APs for the whole of England

To record the location, indexed classification, archaeological description and analysis, and main sources of all archaeological sites visible on APs. For those sites for which meaningful morphological comparisons can be made, additional morphological recording of archaeological features is attempted.

To provide a synthesis of the archaeology in each project area in the form of a report on the character, diversity, association and distribution of archaeological sites and landscapes.

Rectification of Aerial Photographs

Rectified and geo-referenced digital images were produced by transforming oblique and vertical photographs using AERIAL5. Where no digital image was available the relevant photograph(s) was (where) scanned.

Control information was taken from digital copies of OS 1:10,000 scale maps and the relevant scanned photograph(s) were normally rectified to an average level of accuracy of less than 2m with regards to the map. This gives an overall accuracy of plotted features, relative to true ground position of within +/- 5 - 15m.

A digital terrain model function was used to compensate for steep or undulating terrain.

Digital Transcription/Mapping

Archaeology was traced off the geo-referenced and rectified photographs using MapInfo. Archaeological features were depicted on different layers mainly on the basis of form (eg bank, ditch etc) irrespective of preservation as this was recorded in the database.

Although NMP has a standard set of colours for different layers they have been set up, on the basis of form (eg bank, ditch) so that they could be viewed in any colour or in a GIS environment where colours and symbols may relate to interpretation eg period, type etc Symbols and unusual line types were avoided to facilitate transfer between GIS packages. Exceptions to this were ridge and furrow, which was drawn in a semi-conventional manner because it would be too time consuming to map every strip of rig blocks are outlined with a polygon using a broken line and the direction of the individual ridges and furrows are indicated with a broken line terminated with arrows.

Sources

Aerial Photographs:

1. National Monuments Record
   Enquiry & Research Services
   National Monuments Record

English Heritage
Kemble Drive
Swindon SN2 2GZ
Tel: 01793 414 600

2. Cambridge University Unit for Landscape Modelling (formerly CUCAP)
   University of Cambridge
   Unit for Landscape Modelling
   Sir William Hardy Building
   Tennis Court Road
   Cambridge CB2 1QB
   Tel: 01223 764377

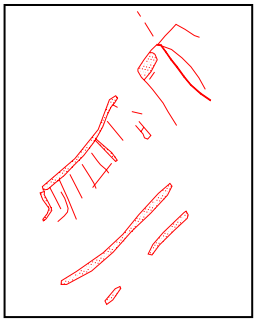
Documentary Sources:
Local HER monument records: The relevant Monument and Event records from the HERs were used as an aid to interpretation.

National Monuments Record (NMR): The relevant Monument and Event records from AMIE (including the Excavation Index) were used as an aid to interpretation.

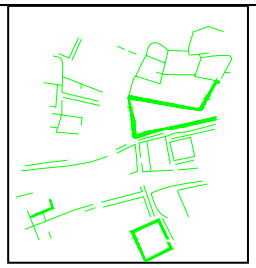
Historic maps: These included Ordnance Survey first and second edition 25" maps from the late 19th and early 20th centuries. The 1955/6 edition Ordnance Survey Archaeology Division 1:10,560 field sheets (the precursors to the current NMR record maps) were also consulted and proved valuable in identifying removed field boundaries and structures.

NMP Mapping Conventions and Layers

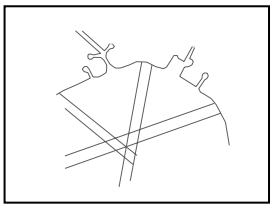
Layer name	Colour	Line type
BANK	1 (red)	CONTINUOUS
Purpose		
For drawing the outline of all features seen as banks or positive features eg platforms, mounds and banks, and is also to be used for agger of Roman Roads. Thin banks will also go on this layer as a single line.		
Layer name	Colour	Line type / Fill
BANKFILL	1 (red)	DOT SCALE: 2.25 ANGLE: 53
Purpose		
A stipple that in-fills the bank outline "bank".		



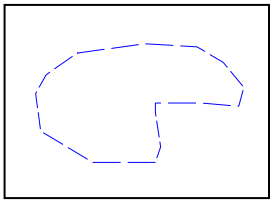
Layer name	Colour	Line type
DITCH	3 (green)	CONTINUOUS
Purpose		
For drawing all features seen as ditches also dug features eg ponds and pits		
Layer name	Colour	Line type / Fill
DITCHFILL	3 (green)	A solid fill
Purpose		



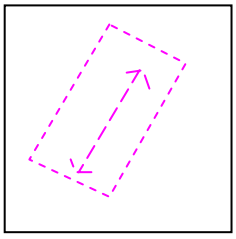
Layer name	Colour	Line type
EXTENT OF AREA	8 (grey)	DASHEDX2
Purpose		
To be used in to depict the extent of large area features such as the outlines of airfields, military camps, mining/extraction		



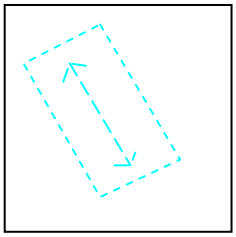
Layer name	Colour	Line type
LARGE CUT FEATURE	5 (blue)	ACAD_ISO02W100
Purpose		
Originally the "T-hachure", now represented by a dashed line. The use of symbols from other packages is to be avoided because of questions of migration in to GIS systems. To be used for large cut features such as quarries, ponds, and perhaps scarps that can not easily be depicted with the use of either bank or ditch.		



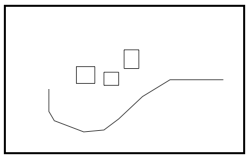
Layer name	Colour	Line type
RIGDOTSLEVEL	6 (magenta)	DOTX2
Purpose		
Outline of a block of ridge and furrow, seen as earthworks or crop marks, but known to have been ploughed level		
Layer name	Colour	Line type / Fill
RIGARRLEVEL	6 (magenta)	ACAD_ISO03W100
Purpose		
Arrow depicting direction of rig in a single block ridge and furrow, seen as earthworks or crop marks, but known to have been ploughed level.		



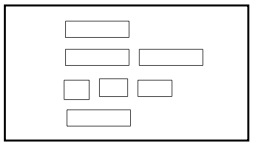
Layer name	Colour	Line type
RIGDOTSEWK	4 (cyan)	DOTX2
Purpose		
Outline of a block of ridge and furrow still surviving as earthworks on the latest available APs		
Layer name	Colour	Line type / Fill
RIGARREWK	4 (cyan)	CONTINUOUS
Purpose		
Arrow depicting the direction of rig in a single block of ridge and furrow seen as earthworks on the latest available APs		



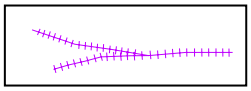
Layer name	Colour	Line type / Fill
STONEWORK	8 (grey)	CONTINUOUS
Purpose		
To be used for exposed stonework eg walls, cairns, standing stones and could be used for building platforms that are concrete		



Layer name	Colour	Line type / Fill
STRUCTURE	9 (grey)	CONTINUOUS
Purpose		
To be used for features that do not easily fit into other categories because of their form, eg tents, radio masts, paint (camouflaged airfields)		



Layer name	Colour	Line type / Fill
TRAMWAY	200 (purple)	TRACKS
Purpose		
To be used for presence (or implied presence) of tramways mainly associated with industrial areas		



Layer name	Colour	Line type / Fill
CHARMAC	Orange	CONTINUOUS
Purpose		
An areas of soil (commonly circular) darker than its surroundings the discolouration being caused by high levels of charcoal left by charcoal production		
Layer name	Colour	Line type / Fill
CHARMACFILL	Orange	STIPPLE
Purpose		
A stipple that in-fills the outline “CHARMAC”