Historic England

Bedford Borough Aerial Investigation & Mapping project report

Amanda Adams and Stephen Crowther

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Bedford Borough: Aerial Investigation & Mapping Project Report

Amanda Adams and Stephen Crowther

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SUMMARY

The Bedford Borough Aerial Investigation and Mapping project combined the mapping and interpretation of vertical and specialist oblique aerial photographs, as well as airborne remote sensing data (lidar), to identify, map and record archaeological remains dating from the Neolithic to the mid-twentieth century. The project was carried out to provide comprehensive information from aerial sources to inform local and national planning and research.

The project covered the whole of Bedford Borough and a contextual area. This was an area of 875 square kilometres and extended southwards from Raunds in Northamptonshire to just north of Ampthill in Bedfordshire and from Olney in Buckinghamshire in the west to Great Gransden in Cambridgeshire in the east.

The Bedford Borough aerial investigation and mapping project, in combination with Historic England's oblique aerial photography programme, has significantly increased the evidence base and understanding of the historic landscape, particularly the extent and form of buried Iron Age and Roman settlement seen as cropmarks on the claylands. The project also recorded widespread medieval field systems and settlements, along with significant twentieth century military airfields, camps and depots.

This report summarises the project results by broad chronological periods, with a more in-depth analysis of features related to the Iron Age and Roman landscape, as well as a discussion on the purpose and dating of an extensive complex of earthwork embankments associated with the medieval field system, but elements of which may have much earlier origins. Scheduled monuments were also rapidly assessed using aerial photographs and lidar (where available), to review interpretation, location and potential management issues.

The project added 1,275 records to the National Record of the Historic Environment (NRHE), and provided enhanced information for a further 1,383 records. This represents an increase of records within the project area in the NRHE of 48% and enhances information on 52% of extant records. The project data was also provided to the relevant local authority Historic Environment Record (HER) to inform heritage protection.

CONTRIBUTORS

Digital mapping, interpretation and report writing was undertaken by aerial archaeology specialists Amanda Adams and Stephen Crowther of Skylarkeology, between February 2016 and March 2019. The project was managed by Skylarkeology, and the Quality Assurance Officer was Helen Winton, National Aerial Investigation and Mapping Manager, Archaeological Investigation, Policy and Evidence Group, Historic England. Helen Winton edited the report.

ACKNOWLEDGEMENTS

The authors wish to individuals who have provided their service, knowledge and skills through the project: Luke Griffin from Historic England's Archive team who provided the main aerial photographic sources: Debra Melsom from Historic England's corporate GIS team who provided Ordnance Survey data. Information and support was generously provided by Vanessa Clarke, Senior Archaeological office (planning) and members of her team Geoff Saunders and Matthew Tuohy at Bedford Borough Council; by Sally Croft, Senior Archaeological Officer (HER) and Ruth Beckley at Cambridgeshire County Council; by Stephen Coleman, Historic Environment Information Officer, Central Bedfordshire Council; by Nick Crank, Senior Archaeological Officer and Milton Keynes Council; and by Charlotte Walker, Historic Environment Record Advisor, Northamptonshire County Council. Thanks also to Andrew Dennis of the Royal Air Force Museum, Hendon for providing historic airfield plans, Ian Meiklejohn for sharing his research, and the Airship Heritage Trust for permission to use imagery from their collection.

ARCHIVE LOCATION

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DATE OF SURVEY

February 2016-March 2019

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INTRODUCTION

The Bedford Borough aerial investigation and mapping project was carried out by Skylarkeology (Aerial Archaeology Specialists) between 2016 and 2019 and was funded by a grant from Historic England. This report presents background and highlights, presenting some selected examples of the monuments and themes that have been recorded, along with some recommendations for possible future research.

The AIM project's primary product, the digital mapping and monument records, have been added into the National Record of the Historic Environment (NRHE) and provided to the relevant County Council Historic Environment Records (HERs) to provide and enhance baseline evidence to better inform landscape management strategies, as well as aid regional and local research.

The aerial survey was undertaken to Historic England (HE) standards in a hitherto relatively understudied, but potentially archaeologically rich area of Bedfordshire and its environs. The Bedford Borough Local Plan has set out plans for significant strategic allocations for housing within the project area to 2032, where new areas of aggregate extraction and waste management schemes have been identified, renewable energy generation sites have been approved and large-scale landscape regeneration is being undertaken (Figure 1).

Following the commissioning of the AIM project in 2016, an extension to the original two phased project area was funded by Historic England to provide information in advance of increases in the strategic housing allocation outlined by the borough local planning authorities. Two entirely new settlements are planned that extend into the area northwest of Bedford. Moreover, because of a forthcoming government policy announcement, there is the likelihood of even further increases to the planned housing development within the borough, over and above those already outlined to a maximum of 40%. Since the Bedford Borough AIM project was commissioned, the development of a cross country railway route has been agreed and work begun, joining the West Country mainline with East Anglia through Bedford, with a projected significant effect on job creation which will, in turn, drive housing need further. Another notable change to the borough's planning strategy policy proposal is the identification of suitable locations for large-scale renewable energy generation sites, a large proportion of which fall within the area of the project's extension phase. Further landscape change is planned with The Forest of Marston Vale, one of 12 Community Forests across England, which aims to increase woodland cover in the vale to 30 per cent by 2031.

The Bedford Borough aerial investigation and mapping project was based on priorities set out in Heritage 2020, the historic environment sector's framework for strategic priorities for England from 2015 to 2020 (The Heritage Alliance 2015/Historic Environment Forum 2015). The aims and results of the project support the contribution of Historic England's Action Plan (2015-2018) (Historic England 2015), subsequently superseded by the Three Year Corporate Plan (2018-2021) (Historic England 2018b), to the Heritage 2020 framework:

Aim 1. Championing, to improve the appreciation and understanding of the historic environment; 6. Publishing new data, analysis and commentary to enhance sector knowledge, reach and effectiveness

Aim 2. Protecting through the listing and planning system; 1.Better understanding of significance and threats to the historic environment and effective responses to fill gaps in knowledge, advice and policy

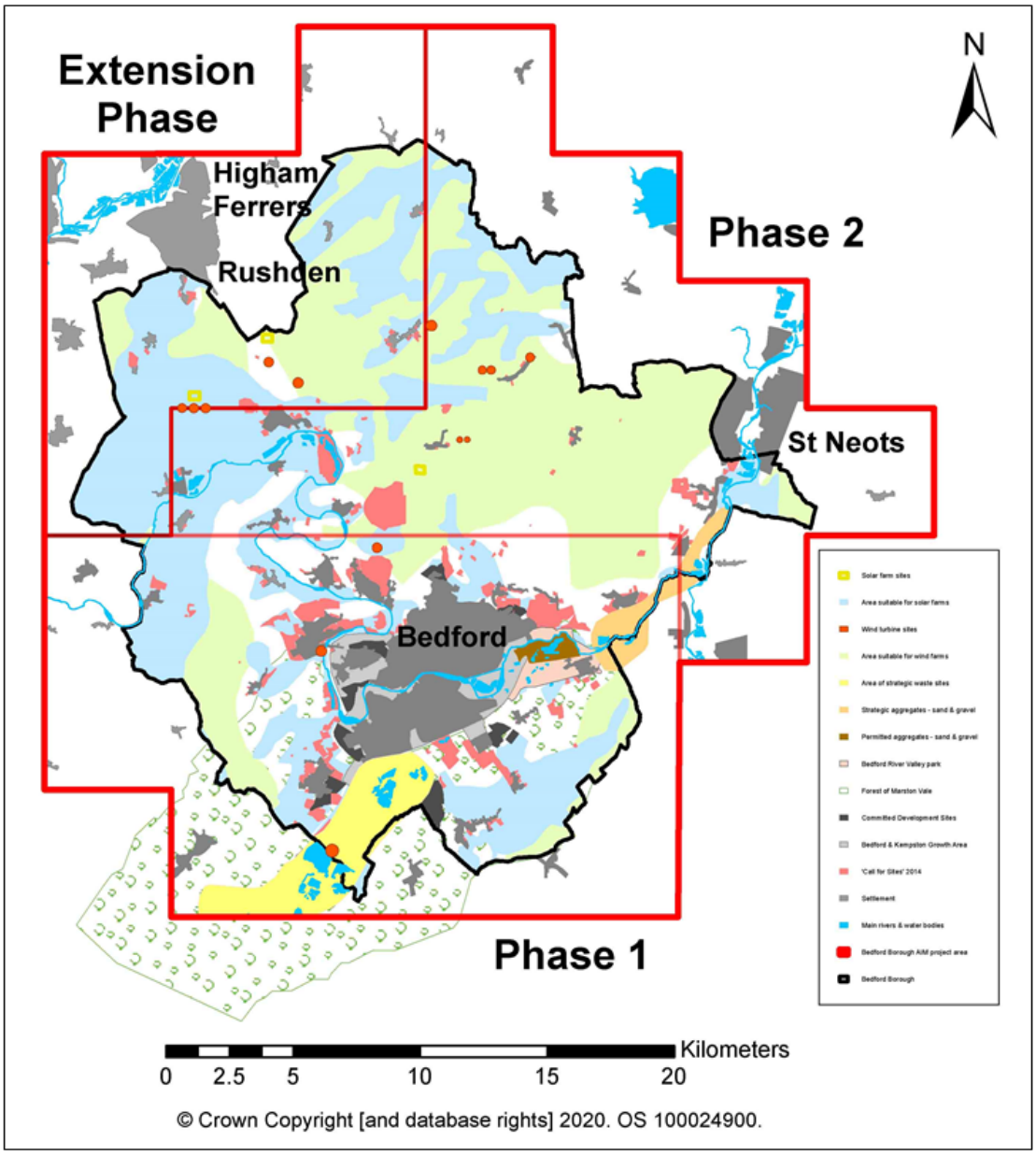

Figure 1 The Bedford Borough project area, with proposed developments sites. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

It was a generally held view that the soils of the claylands, of which much of the project area is comprised, were generally unresponsive to formation of

archaeological cropmarks (Brown & Glazebrook 2000: 14). However, in the late 20th century and early 21st century, following a number of drought years, favourable for the visibility of below surface features, the situation has shifted considerably. Over a number of flying seasons, Historic England's specialist aerial reconnaissance programme discovered and recorded numerous sites visible as cropmarks. This highlighted the archaeological potential in the area and the requirement to map the high number of new discoveries to better understand this extensive buried archaeological landscape.

The aerial investigation and mapping project's data contributes to archaeological understanding of the project area, as well as aiding management of the historic environment landscape through development control and other Historic Environment Record (HER) based advice. It may also raise awareness of the archaeological potential of the area amongst other curators, as well as academic researchers and enhance local distinctiveness amongst communities.

Research Objectives

Bedford Borough falls within the area covered by the regional Eastern Counties Research Framework (Glazebrook 1997, Brown and Glazebrook 2000), updated and revised by Medlycott (2011), as well as Bedfordshire Archaeology Resource Assessment, Research Agenda and Strategy (Oake et al. 2007).

The significant dataset provided by the Bedford Borough Aerial Investigation and Mapping project may provide evidence that addresses some specific research aims within the Eastern Counties Research Framework:

Neolithic

- patterns of burial, providing evidence to interpret the relationship between settlement and mortuary sites as key elements in understanding the landscape;

- cropmark complexes outside those areas affected by gravel extraction that will feed into the aim to excavate and study these features to better understand landscapes and the interaction of monuments;

- field patterns and settlement that may provide evidence that addresses issues of the region's late transition to farming in the Neolithic. Arable farming is thought to have been a late development in Neolithic East Anglia, but its character is unclear.

Bronze Age

patterns of burial practice. The landscape-scale of AIM mapping datasets will assist in interpreting the relationship between settlement and mortuary sites as key elements in understanding the landscape;

settlement patterns, variations and inter-relationships between settlements and monuments to recreate landscape, economy and social change;

- cropmark complexes outside those areas affected by gravel extraction, which will feed into the aim to excavate and study these features to address geographical imbalance and test interpretations;

- sites that were buried under colluviation, but which have since become visible through agricultural practice changes.

Iron Age

- The distribution and character of Early Iron Age open settlement sites need further research as evidence to develop a better understanding of the Bronze Age/Iron Age transition;

- field systems and enclosures and their relations to earlier Iron Age settlement patterns;

- the distribution density of settlement, field systems types, long distance trackways, enclosures and funerary sites to study and compare more holistically known archaeological evidence;

- Late Iron Age complexes, providing mapping to study the role and function of late Iron Age settlement;

- field systems to provide more landscape context for interpreting possible 'planned' land division and enclosed landscapes in the region.

Roman

- rural settlement sites to better understand location, density, form and function and establish if there are regional variations in the same;

- Field systems and enclosures and their relationships with rural and urban sites;

- Any aisled buildings to contribute to a regional synthesis;

- Rural sites dating to the late Iron Age and early Roman period, to establish whether this pattern is also seen within the region;

- Roman military sites which, when added to the uniform dataset of other NMP projects in the region, may help analysis of a regional military presence and disposition which are understudied and poorly understood;

- Roman ritual or temple sites, to assist synthesis of regional burial practices and sites;

- Roman quarries and extraction sites and their relationship to topography.

Anglo-Saxon

- Anglo-Saxon settlements. It is suggested aerial photography might be effective, using the morphology of known settlement sites as templates, for identification of possible new sites;

- farms and field systems, their morphology, location and density. This may be problematic for AIM aerial photographic interpretation as Anglo-Saxon settlement morphology is difficult to distinguish from earlier patterns;

Medieval

- Medieval settlement sites, field systems, enclosures and, trackways will add wider regional evidence to the extant large body of medieval archaeological records produced by other AIM projects;

- farms and field systems locations, to establish whether regional variations exist;

- moated sites, to provide additional evidence for a regional study of these features;

- green lanes and other transport infrastructure, to identify main communication routes throughout the region and their relationship to settlement patterns;

Post-medieval and modern

- industrial extraction sites, such as for brickmaking, as well as energy creation sites such as windmills, which requires further study in the region;

- water management sites, such as water meadows and land reclamation, to provide additional evidence for a regional study of these features which has been integral to landscape formation in the East of England;

- post-medieval field systems and trackways, contributing to the large body of regional evidence from other AIM projects;

- military sites and bases, contributing to the class of recorded monuments that are a unifying theme in the region, but the impact of which upon the landscape and agriculture is understudied;

- crashed aircraft, which are present in large numbers in the region and which are important for local and national history, but which have been poorly recovered in an archaeological context.

PROJECT AREA

Bedfordshire County is sometimes considered as one of the shires that make up the 'Home Counties' group due to its proximity to London, but is also included in the East of England group as it abuts the county of Cambridgeshire. Since 2009, Bedfordshire has been split into three unitary authorities (councils) for purposes of local government: Bedford Borough, Central Bedfordshire District and Luton Borough.

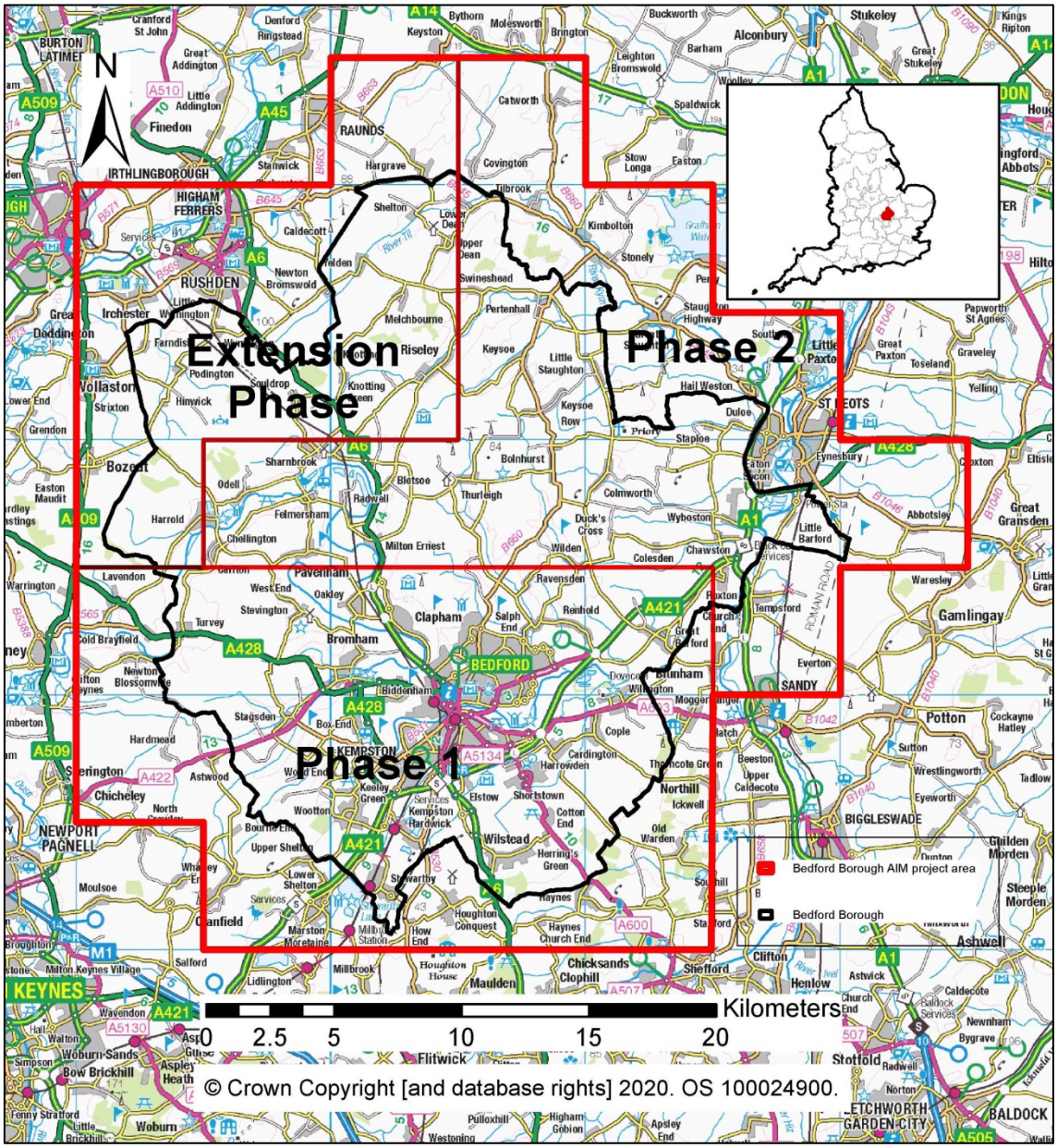

Figure 2 The Bedford Borough aerial investigation and mapping project area, split into three phases. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Due to the size of the project area, the survey area was divided into three phases: Phase 1 (350 km²) and Phase 2 (325 km²), which were followed by an extension to

the original project boundary, adding 200km² to the original project area (Figure 2). The latter extended the original Bedford Borough AIM project area to cover the entire Bedford Borough administrative area and its environs, providing enhanced evidence to better inform management of the historic environment landscape through development control and other HER-based advice in the face of considerable land-use change within the next decade. The project's extension has also updated results of an earlier Northamptonshire NMP project (Deegan 2002) that had only partly covered the Bedford Borough administrative area.

Entire Ordnance Survey (OS) quarter sheets (25 km²) were used in defining the project boundary, making the extraction of large numbers of aerial photographs from Historic England's archive efficient. The project area extends beyond the Bedford Borough Council borders into parts of Central Bedfordshire Council, Milton Keynes Council (in Buckinghamshire), Northamptonshire and Cambridgeshire. The Bedford Borough survey area comprises 875 km², which includes 100% of Bedford Borough Council's total land area (476.4 square kilometres), but also includes 137.5 km² of Cambridgeshire, 116.3 km² of Central Bedfordshire Council area, 49 km² of Milton Keynes Council (in Buckinghamshire) and 95.8 km²of Northamptonshire.

Previous Aerial Survey Projects

A number of aerial surveys have been undertaken within and around Bedford Borough (Figure 3).

Aerial Survey of Bedfordshire 1974

The Aerial Survey Study of Bedfordshire was undertaken in 1974 (Fadden 1996, Ampthill Archaeological & LHS 1974), based upon flights by Hunting Services Ltd for the National College of Agricultural Engineering. This survey appears to have covered much of Bedfordshire, though its photographs are referred to as sources in only a handful of archaeological sites (8 in 1974 and 17 in 1976) in the Borough Council HER database. These aerial photographs were not available to the AIM project.

The Cropmarks in Hertfordshire National Mapping Programme project

With project borders separated by 7 kilometres to the southeast of Bedford Borough, the Cropmarks in Hertfordshire National Mapping Programme (NMP) project (Fenner 1992) was undertaken in the early 1990s and was one of the pilot NMP projects for the Royal Commission on the Historic Monuments of England (RCHME) Air Photography Unit (APU). This had a different methodology to the now-standard AIM methodology and recorded cropmarks only and used manual transcription. The inked overlays are now available as georeferenced scans for use in GIS. It does not adjoin the project area but recorded 2,649 cropmark sites, of which 1,207 were newly identified at that time. These ranged from Neolithic to

post-medieval in origin and were most densely concentrated on the chalk ridge 'uplands' to the county's north. It was noted that archaeological cropmark densities in Hertfordshire were highest on the calcareous pelosols and typical argillic brown earths that are prevalent in the Bedford Borough project area (Fenner 1992:3).

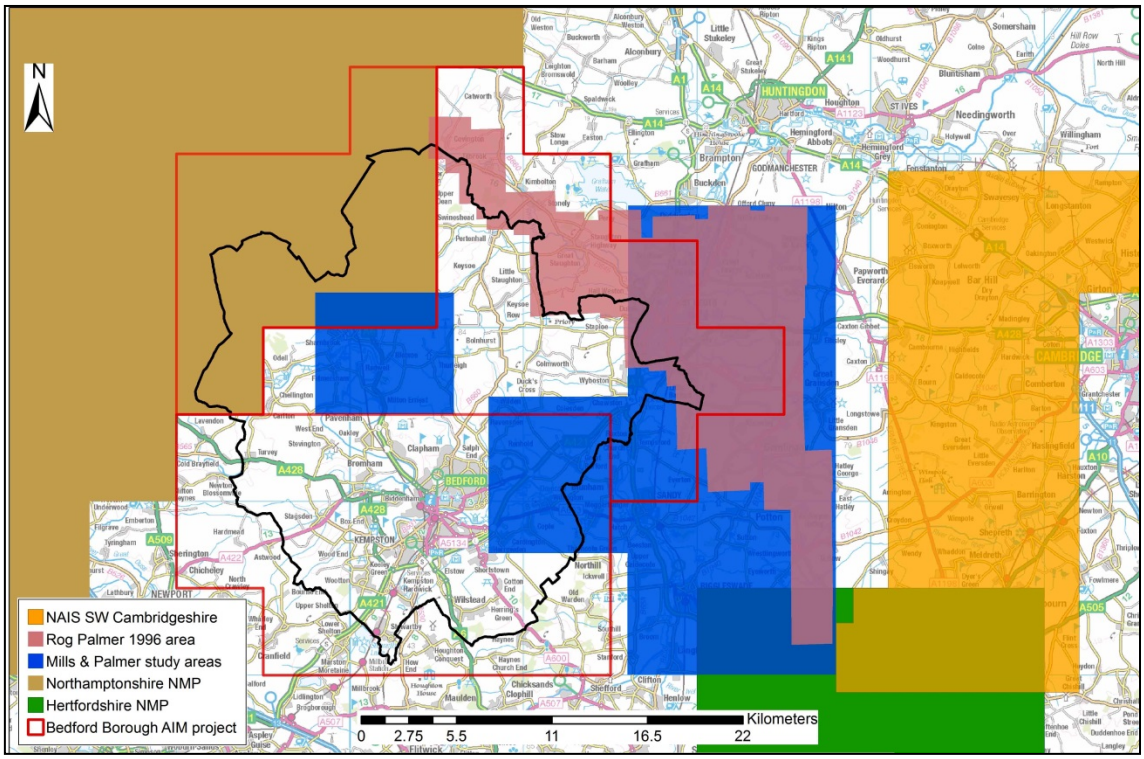

Figure 3 Previous aerial mapping projects. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Northamptonshire NMP project

The Northamptonshire NMP project (Deegan 2003; Deegan and Foard 2007) included about 96 square kilometres (c.20%) of land within Bedford Borough Council's to the very north-west and some within Milton Keynes Borough Council boundary. The project was completed in 2001 and added over 2000 new sites to Northamptonshire's HER. Mapping was completed of sites beyond the country boundary but no monument data was added to the HERs or the national record. Northamptonshire NMP sites that fall within the Bedford Borough project area were remapped and updated using the latest available aerial photography.

Other aerial survey research on the claylands

Work in Bedfordshire prompted a wider review of aerial research on claylands in England (Mills and Palmer 2007). This originated from a 1996 vertical aerial photographic survey of Bedfordshire undertaken by Simmons Aerofilms, commissioned and funded by local government. This fortuitously recorded significant archaeological cropmarks in the county, many hitherto unrecorded. Mills

studied 162 square kilometres focused around Sharnbrook and the other at Tempsford, both areas overlaid by glacial and fluvial gravel and Boulder Clays. In total 413 archaeological sites were identified within the study areas, mostly on gravels. Notable amongst her analysis was the differential visibility of archaeological cropmarks in areas with Boulder Clays, river gravels and underlying Oxford Clays, the latter being particularly poor. Mills questions whether this is a genuine reflection of the absence of human settlement in the Oxford Clays due to the waterlogged nature of these land, or whether it is geological factors affecting visibility of subsurface archaeological features. Palmer also used the 1996 photographs for a study of approximately 323 square kilometres of the eastern side of Bedford Borough and into Cambridgeshire, where more than 300 archaeological sites were identified. In 2008 Palmer undertook further study of the 1996 vertical aerial survey photographs for Cambridgeshire Council, mapping and recording archaeological features within their County border.

In Bedfordshire, the 1996 vertical aerial photographic survey was used to enhance the HER. This monument recording, by Angela Simcoe on behalf of Bedfordshire County Council HER, located and summarised numerous features. This extensive recording is the main reason for the relatively modest percentage increase (8.38%) of new monuments to the HERs from the Bedford Borough AIM project.

These previous studies used one year of aerial photography to undertake their studies, but the Bedford Borough AIM project had access to the historic aerial photographic collection at Historic England, which also now includes significant numbers of recent specialist oblique aerial photographs. The Bedford Borough AIM project also greatly enhanced existing HER records by mapping the form and extent of the sites.

National Archaeological Identification Survey – South West Cambridgeshire

About 6 kilometres eastwards of the Bedford Borough project boundary, the National Archaeological Identification Survey (NAIS) south-west Cambridgeshire project (Knight et al. 2018) assessed 374 square kilometres from the fen edge to the chalklands on the Cambridgeshire Hertfordshire border. The project nearly doubled the number of existing monument records, whilst also adding information to several hundred already recorded monuments. One of this project's aims was the comparison and integration of the aerial survey results with dating and extent of features derived from developer-led excavations undertaken in and around the project area, where it might provide ground-based corroborative evidence of the aerial mapping (Knight et al. 2018:123)

Projects results suggest a complex pattern of linear embanked boundary systems, which may range in date from the late prehistoric to medieval periods, extends to a wider regional landscape, with a similarly complex land boundary system being recorded across the Bedford Borough project area. Similarly, there are possible morphological similarities in Iron Age and Romano-British settlement cropmarks that reveal broader settlement themes, discussed further within this report.

Landscape Character and Topography

This summary of the landscape character is mostly based upon information provided in the National Character Area (NCA) profiles (Natural England 2014a-d) and The Landscape Character Assessment of Bedfordshire (LUC 2012).

Bedford Borough lies on the transitional between three regions: the East of England region, being bordered by Cambridgeshire: the east midland region, being abutted by Northamptonshire: and adjoining the most northerly of the southeast region counties, Buckinghamshire.

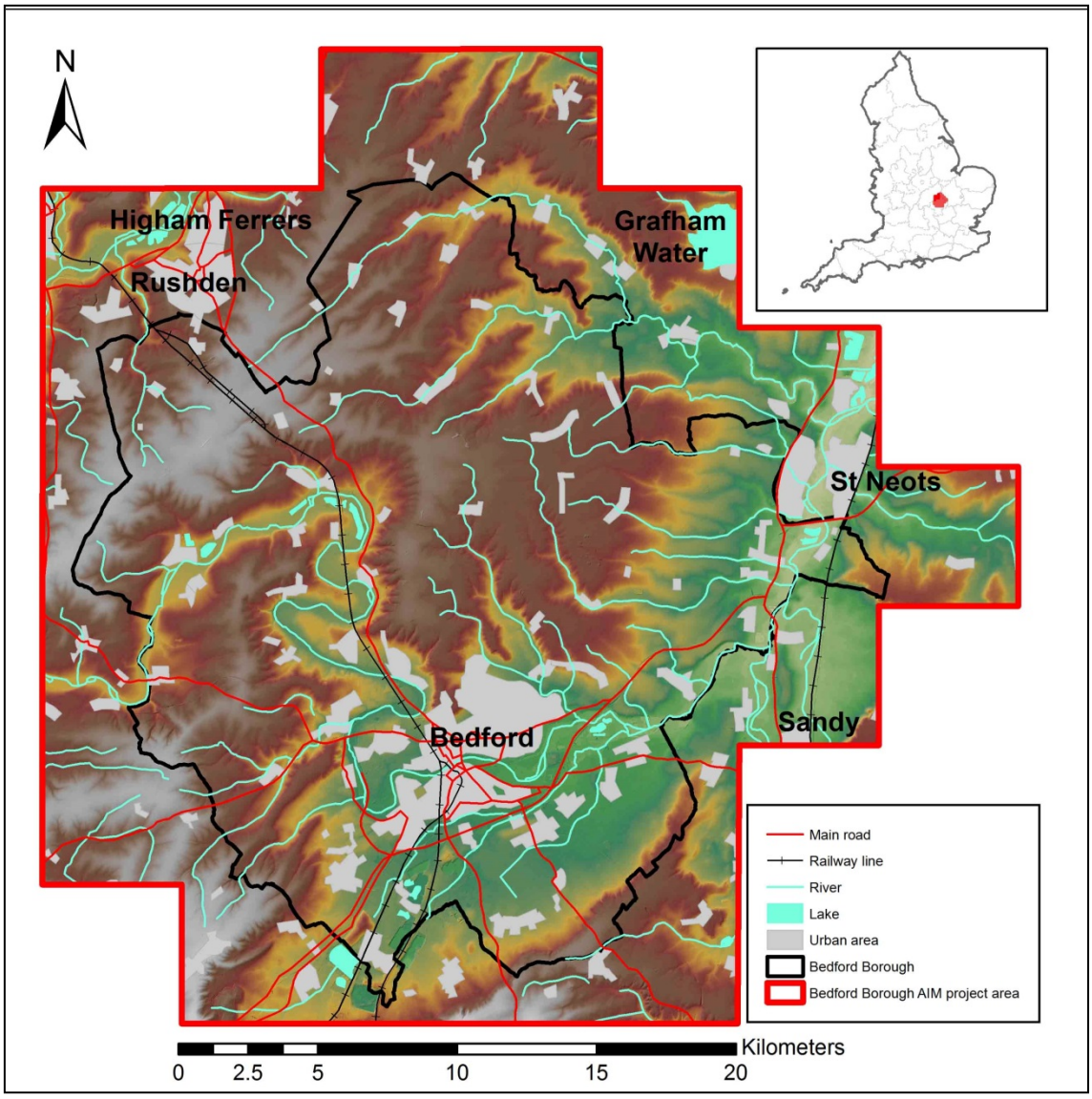

Figure 4 Bedford Borough AIM project elevation model shaded to illustrate topographic relief. Height data taken from Ordnance Survey. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

The Bedford Borough AIM project area is located in the northern reaches of Bedfordshire and takes in parts of Cambridgeshire, Northamptonshire and Buckinghamshire. The Landscape Character Assessment of Bedfordshire identifies that much of the topography to the north of Bedford is dominated by the rural, arable clay plateau (LCA type 1). Its character is typically undulating, open and exposed lowland giving extensive vistas, with scattered woods and dispersed settlement (LUC 2012).

Cutting through the landscape from the west to Bedford, the River Great Ouse takes a sinuous course through a limestone valley (LCA type 3), flanked by wooded wolds (LCA type 2). These sloping and rolling wooded wolds have small blocks of woodland surrounded by irregularly shaped arable fields and isolated settlement. The River Great Ouse crosses the open and flat limestone valley floodplain, with its meadows and mixed pastoral and arable cultivation, with a settlement pattern varying from hamlet to urban fringe. Lakes are formed from former aggregate extraction sites (LUC 2012).

The elevation model shaded to illustrate topographic relief shows the River Great Ouse valley meandering from west to east, cutting into the undulating plateau to the north, with the Greensand Ridge escarpment in the southeast overlooking the wide Marston Vale south of Bedford, where the Great Ouse valley broadens (Figure 4).

To the east of Bedford, the Great Ouse heads to the county border through a clay valley (LCA type 4), fed by the River Ivel. The clay valley of the Great Ouse and Ivel rivers are notable for their wide character and shallow slopes, with alluvium and gravel drift deposits, on which land is a mixture of arable, pastoral land and market gardens. Settlement pattern varies from villages to urban fringe areas, with former aggregate extraction sites that are under restoration for community recreational use (LUC 2012).

The River Great Ouse runs eastwards through the centre east of the project area, on into Cambridgeshire before finally discharging into The Wash and the North Sea at Kings Lynn in Norfolk. The River Ivel runs northward through Sandy to join the River Great Ouse at Tempsford, in the southeast of the project area.

The major route ways within the project area are the A1 (M), A6, A45 and the upgraded A421 roads. Current railway lines are oriented north south, connecting Milton Keynes and Leicester through Bedford to the west and London to The North through St Neots to the east. However, plans are underway for the restoration of the old 'Varsity Line', connecting Oxford and Cambridge via Bedford, closed in the 1960s and so now requiring some as yet undefined re-routing through the Bedford Borough project area north of Sandy.

Bedfordshire Historic Landscape Character project

The raw data for the Bedfordshire Historic Landscape Characterisation project was compiled in 2004-5. Unfortunately, the raw data is flawed and publication of the full

HLC report and the circulation of the data was withheld (Simcoe 2008). Although available to the AIM project, use of the HLC digital dataset was used with caution.

National Character Areas

The Claylands

The Bedfordshire and Cambridgeshire Claylands National Character Area 88 (Natural England 2014a), covering much of north Bedfordshire, east Buckinghamshire and Northamptonshire and west Cambridgeshire, dominates the project area at 653 square kilometres (74.6%) (Figure 5). It comprises a lowland plateau that has a gently undulating topography derived from the underlying clay geology, divided by the shallow valleys of the meandering Rivers Nene and Great Ouse.

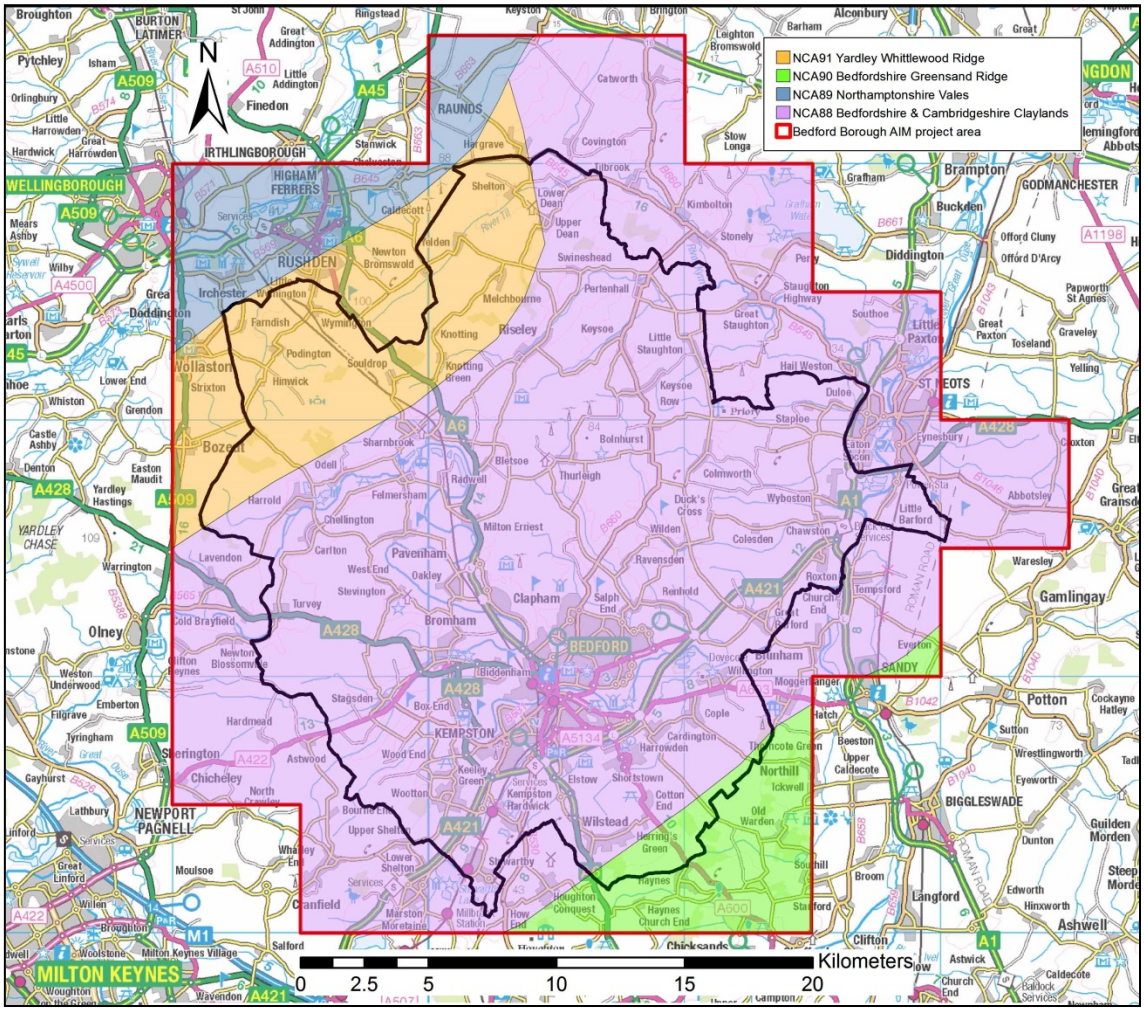

Figure 5 National Character Areas showing the dominance of Claylands. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

The claylands abut the Greensand Ridge in the southeast of the project area. Between Bedford and the Greensand Ridge is the open North Marston clay vale (Bedfordshire LCA type 5) (LUC 2012). The Oxford Clay of the vale is responsible for much of its industrial character, with extensive former 19th and 20th century brickmaking and clay extraction sites that have been repurposed for landfill and also industrial estates. The claylands gradually transition to the Northamptonshire Vale and Yardley Whittlewood Ridge NCAs in the northwest. Grafham Water reservoir in the northeast has an area of over 6 square kilometres and was created from farmlands in 1965 with an earthwork dam construction.

Flat or gently dipping Jurassic Oxford and Cretaceous clays underlie later Quaternary glacial and fluvial deposits, including till (chalky boulder clays) and within the river valleys, sand and river terrace deposits.

The soils are moderately fertile, dominated by lime-rich, loamy and clayey soils with impeded drainage; but in the river valleys are better-drained, fertile soils. The landscape is mostly open and intensively cultivated arable farming with lesser amounts of grass pasture, within a dominant character of larger, planned, geometric fields from 18th and 19th century enclosure, with ditched and maintained hedge boundaries. Woodland is generally scattered and fragmentary. Ancient woodlands are mostly restricted to the north of the project area.

Larger settlements are focused in the river valleys. The linear and nucleated settlement pattern is generally sited along transport infrastructure corridors. Smaller villages have areas of paddock and closes. North of Bedford, settlement is sparse, with a character of isolated dispersed farmsteads and linear villages. There has been significant post-war expansion of larger settlements, such as Bedford and St Neots.

The effects of a large-scale historic brickmaking industry south of Bedford in the Marston Vale exploiting the abundant Oxford Clays have resulted in numerous man-made water bodies and areas used for civic landfill. Widespread sand and gravel extraction along the valleys of the rivers Ivel, Great Ouse and Nene has resulted in numerous artificial water bodies.

The Yardley Whittlewood Ridge

Abutting the Claylands on its NW border is the more elevated Yardley Whittlewood Ridge NCA 91 (Natural England 2014d), which at 112 square kilometres encompasses about 12.8% of the project's landscape. It takes in a 7.5 kilometres wide strip that extends from the hamlet of Warrington in the SW to Raunds in the NE and is part of a low limestone plateau. The ridge's elevation serves to separate the catchments of the Nene and Great Ouse rivers and is bisected by the A6 road.

Northamptonshire Vales

In the NW corner of the project area and covering only 55 square kilometres (6.3%) of the project area, the Northamptonshire Vales NCA 89 (Natural England 2014b) is dominated by the flat flood plain of the River Nene, being an open landscape

The Greensand Ridge

In the SE of the project area is a 55 square kilometres area of The Greensand Ridge NCA 90 (Natural England 2014c). This narrow island rises above the claylands, with a NW facing scarp of mixed woodland, arable, pasture and heath that overlooks Marston Vale, Bedford and the claylands; a dip slope faces SE on which are grown cereal and vegetables. Soils on the non-arable land are mostly free draining and acidic, supporting low quality pasture and woodlands. Settlement is dispersed along the ridge, several of which are estate villages, connected by a complex of small lanes.

Geology and Soils

The following geological information is taken from 1: 625,000 scale British Geological Survey (BGS) maps and digital mapping available at http://maps.bgs.ac.uk/geologyviewer. Soil information has been collated from Ordnance Survey 1:250,000 scale maps produced for the Soil Survey of England and Wales and from Cranfield University's Soilscapes website http://www.landis.org.uk/soilscapes.

Solid Geology

The solid geology of the Bedford Borough project area is comparatively simple. Over most of the borough, the underlying bedrock of Jurassic Oxford Clay dominates and is responsible for its characteristic rolling landscape, which is most evident on the clay plateau to the north of the River Great Ouse. The exposed Oxford Clays are deepest south of Bedford, the numerous sites of former industrial-scale brick making marking its presence (Figure 6). Erosion from the River Great Ouse's course has exposed the underlying Jurassic limestone deposits of Great Oolite, Inferior Oolite and Cornbrash, the fertile soils of the latter being characteristically located on the boundary between the formations of Great Oolite and Oxford Clay. The exposed limestones on the borough's western fringes have formed a more wold-like appearance (LUC 2007).

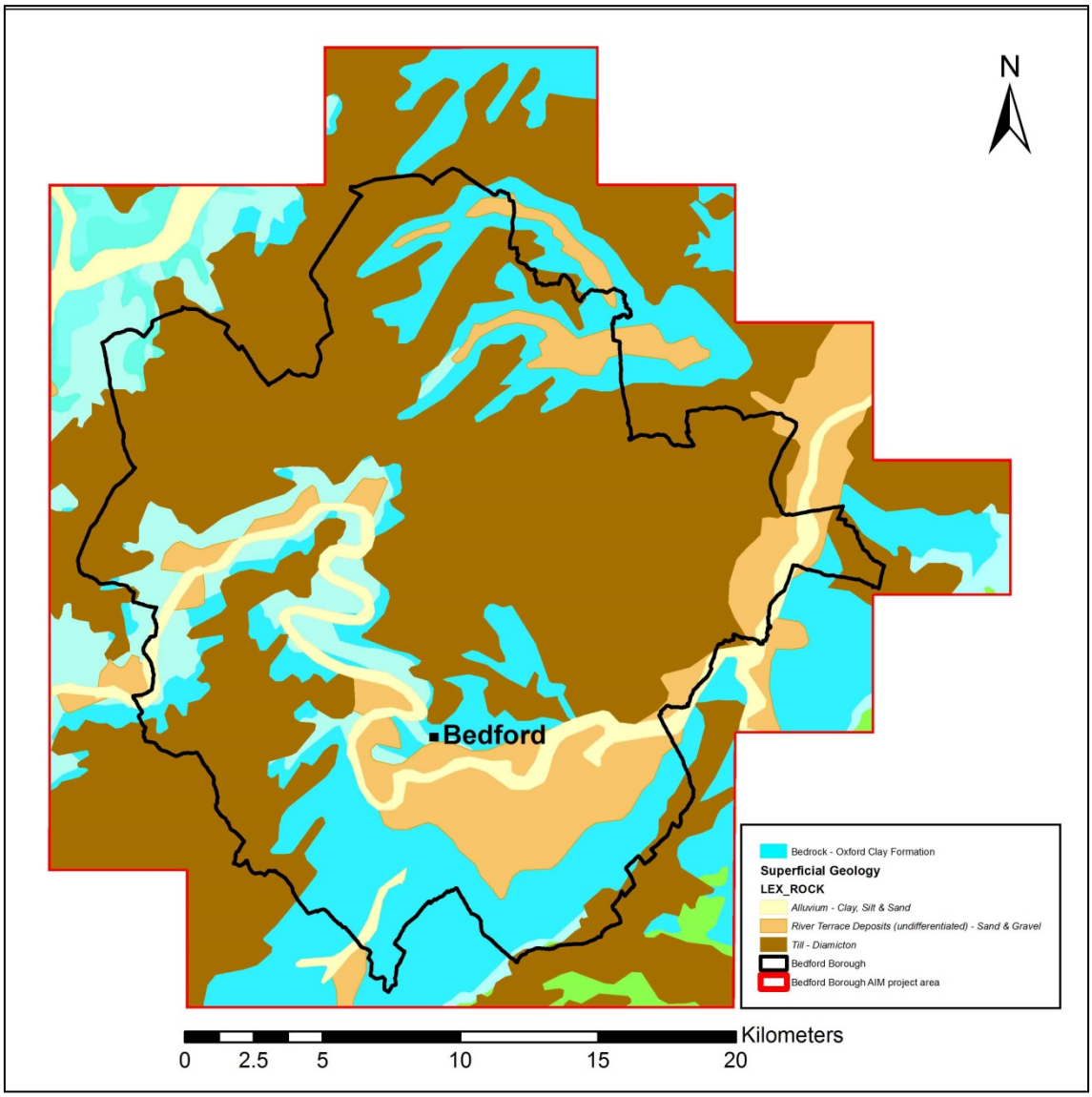

Figure 6 Superficial geology map for the Bedford Borough project area. Based upon 1:625,000 scale digital mapping, with the permission of the British Geological Survey. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

The superficial or drift geology (less than 2.6 million years old) within the project area is dominated by Oadby Member till (more usually referred to as Boulder Clay) of the Wolston Formation, being unstratified glacial deposits, usually composed of boulders, pebble and fine clays, which are up to 30m in depth west of Sharnbrook (LUC 2007). The Oadby Member till is defined as grey gravelly clay, silty, with clasts of flint, chalk, quartzite, quartz and limestone (after BGS map 203, 2010). The course of both the River Great Ouse and the River Ivel can be seen in the sinuous ribbon of alluvium running from west to north-east through the project, flanked by a wide band of sands and gravels of river terrace deposits from Bedford eastwards, but only by small pockets of the same to the west of Bedford town. To the north of the project area, two further thin bands of alluvial gravels extend west east, over which the Rivers Til and Kym flow, which discharge into the River Great

Ouse at St Neots. These deposits of alluvial drift are extremely suited to arable agriculture.

Soils

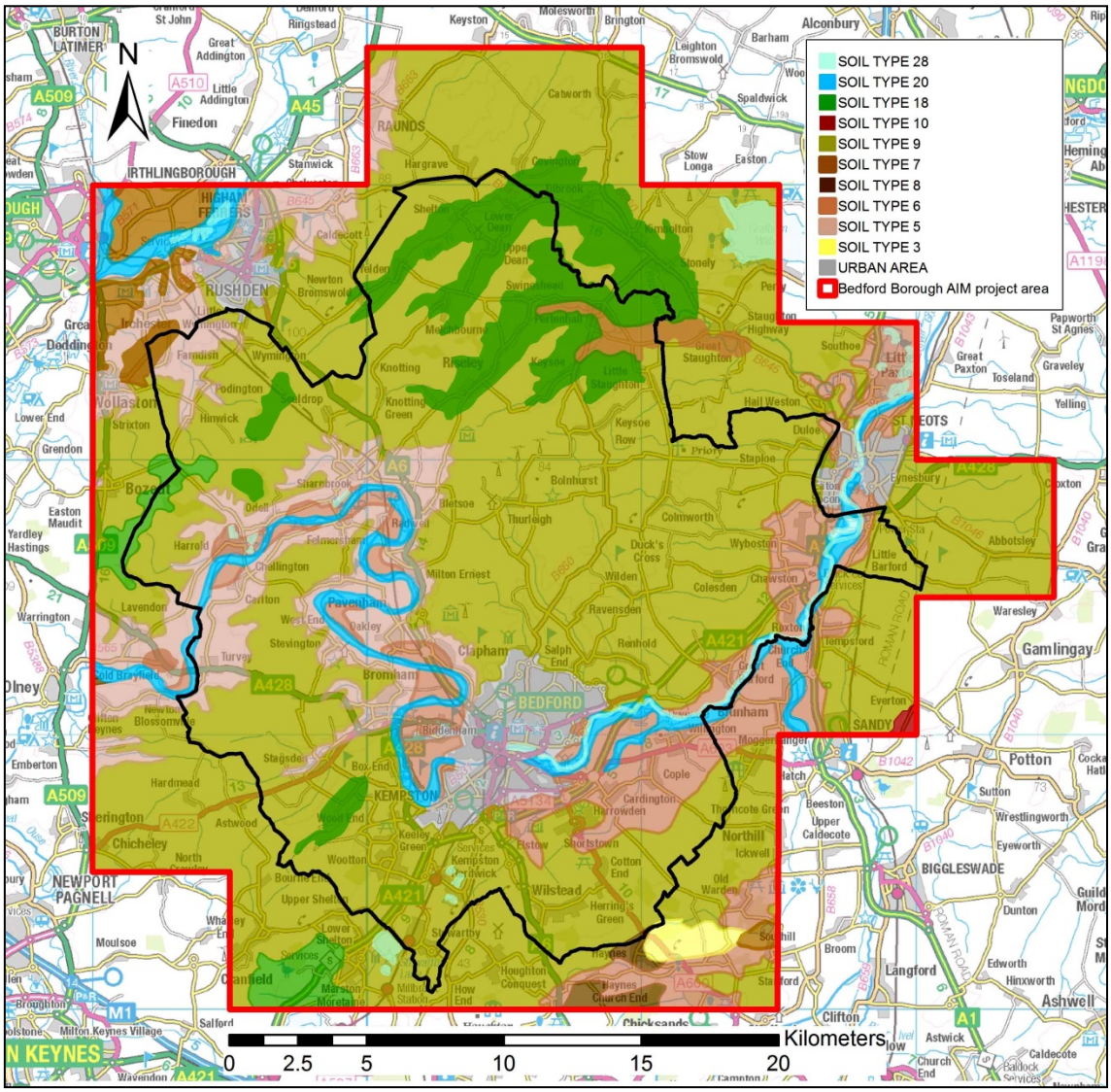

Figure 7 Soils within the project area, using data derived from Soil data © Cranfield University (NSRI) and for the Controller of HMSO 2019. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

As evident in Figure 7, the predominant soil within the project area is lime-rich, loamy and clayey, with impeded drainage (typical calcareous pelosols/ Soilscape type No. 9). To the west of Bedford town, which sits astride the River Great Ouse, the river is bordered by loamy and clayey floodplain soils with naturally high groundwater (Pelo-calcareous alluvial gley soils/ Soilscape type No. 20) which are in turn flanked by freely draining lime-rich loamy soils (Typical brown calcareous

earths/ Soilscape type No. 5). To the east of Bedford and up to St Neots in Cambridgeshire, the loamy and clayey floodplain soils with naturally high groundwater (Pelo-calcareous alluvial gley soils/ Soilscape type No. 20) are bordered by freely draining slightly acid loamy soils (Typical argillic brown earths/ Soilscape type No. 6).

To the north of the project area, the dominating lime-rich, loamy and clayey soil with impeded drainage is broken by an area of slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (Pelo-stagnogley soils/ Soilscape type No. 18) around Risely, Kimbolton and Yeldon. This is associated with the seasonally wet pastures along the Rivers Til and Kym and their tributaries, which flow east to feed into the River Great Ouse at St Neots.

The Soilscapes soil types illustrated in Figure 7 are defined as follows:

Soilscape No. 3
Typical brown calcareous earths - Shallow lime-rich soils over chalk or limestone;

Soilscape No. 5
Typical brown calcareous earths - Freely draining lime-rich loamy soils;

Soilscape No. 6
Typical argillic brown earths - Freely draining slightly acid loamy soils;

Soilscape No. 7
Typical argillic brown earths - Freely draining slightly acid but base-rich soils;

Soilscape No. 8
Stagnogleyic argillic brown earths - Slightly acid loamy and clayey soils with impeded drainage;

Soilscape No. 9
Typical calcareous pelosols - Lime-rich loamy and clayey soils with impeded drainage;

Soilscape No. 10
Argillic brown sands - Freely draining slightly acid sandy soils;

Soilscape No. 18
Pelo-stagnogley soils - Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils;

Soilscape No. 20
Pelo-calcareous alluvial gley soils - Loamy and clayey floodplain soils with naturally high groundwater;

Soilscape No. 28
Water

ARCHAEOLOGICAL SCOPE AND METHODOLOGY

Archaeological Scope

There are Historic England standards for the interpretation and mapping of archaeological features visible on aerial sources (Winton 2019). This includes recording sites visible as cropmarks and earthworks but also structures, in particular those relating to early 20th century military activities. The AIM methodology typically records all archaeological features dating from the Neolithic up to and including the 20th century.

The following list summarises which classes of monument are depicted and how they were recorded:

Earthworks, plough-levelled features and buried remains

All cropmarks, parchmarks and soil marks that represent sub-surface features of archaeological origin have been recorded. Some earthworks, for example field boundaries, have not been mapped where they are clearly marked on the first edition Ordnance Survey maps unless they are associated with other mapped features. In this case this will be clearly stated in any monument records. Features which have an uncertain date or which are thought to be possible geological marks have been recorded (though not necessarily mapped) where they are associated with, or may be confused with, other archaeological features.

Post-medieval field boundaries

These have not been mapped generally, except where they are part of larger field systems and are not depicted by the Ordnance Survey. They may be mapped where they have been considered to be regionally or nationally archaeologically significant.

Military remains

Military buildings and structures from the First and Second World Wars and The Cold War were recorded and mapped according to the form and extent of the remains, except in some cases where they were marked on Ordnance Survey maps. In this case, this was clearly stated in any monument records.

Ridge and furrow

Medieval and/or post-medieval ridge and furrow was also recorded regardless of condition. Levelled and extant fields of ridge and furrow were depicted using the same conventions and furrow directions were indicated by arrows, but their condition was differentiated/ identified in the polygon metadata. Plough headlands

and boundary banks or ditches were depicted individually on the relevant BANK or DITCH layer, but were recorded within the ridge and furrow record.

Industrial archaeology

Areas of industrial archaeology have been recorded where the features can be recognised to pre-date 1945 and where their industrial buildings are no longer extant or not clearly marked on the first edition Ordnance Survey maps. Small local extractive sites were not mapped, except where they formed part of a significant, i.e. particularly extensive, area of extraction, or where it directly impinged on or truncated an archaeological monument. Industrial complexes and large extractive sites were mapped as an extent of feature and any elements of the industrial process not visible on Ordnance Survey maps were depicted.

Buildings and structures

Buildings and structures were not generally mapped if first edition or later Ordnance Survey maps depict them. However, in specific contexts (e.g. industrial and military complexes, or country houses) and when in association with other features, they were sometimes mapped. The foundations of ruined buildings visible as cropmarks, soilmarks, parchmarks, earthworks or stonework not depicted on Ordnance Survey maps, were mapped and recorded.

Transport

Major transport features (e.g. canals and railways) have not been mapped except where they are considered to be archaeologically significant. Smaller features, such as tramways for extraction sites, were mapped and recorded, especially in the context of associated features.

Parks and gardens

Only vestigial man-made parkland features, not botanical features, were mapped and recorded. In urban areas, only significant parks and gardens were recorded and 20th century features were not mapped.

Natural features

Natural features of geological or geomorphological origin were not mapped, unless there was risk of confusion in contexts with archaeological features, when they were described in the textual record.

Sources

Aerial photographs

The survey team reviewed over 25,000 aerial photographs taken of the project area over a period of nine decades for both archaeological and non-archaeological purposes. This included an extensive collection of Historic England aerial reconnaissance oblique aerial photographs that first recorded significant sites visible as cropmarks.

All available vertical and oblique aerial photographs held in the Historic England Archive in Swindon were consulted (cover search loan refs 98303, 98499, 96592, 110607 and 110608), numbering 24,711. These included 11,076 vertical prints, 749 military obliques and 12,886 specialist oblique aerial photographs, of which 5,122 were digital images taken as part of Historic England's Aerial Reconnaissance programme since 2005.

Most of the new discoveries mapped from oblique aerial photographs came from the flights by Historic England's aerial reconnaissance programme and taken by Damian Grady. This included flights in the summers of 2003, 2006, 2009, 2010 and 2011. These revealed a significant number of previously unknown cropmarks that appear to be late prehistoric or Romano-British in date, which will transform our understanding of settlement in this landscape that had been thought to be sparsely populated.

The Historic England Archive collection provided the project with cover of large areas with a broad range of dates in various formats and usually of good enough quality for prospecting for archaeological remains. Most historic vertical aerial photographs were not taken for archaeological purposes and as a result, conditions for either earthwork or cropmark visibility are serendipitous. The earliest runs of vertical images, which were mostly taken by the Royal Air Force (RAF), were useful for recording wartime and post-war activity as well as earthworks that have been levelled since the photographs was taken. Meridian Airmaps Limited (MAL) and Ordnance Survey (OS) photography, mostly dating from the 1960s onwards, have good control, enabling accurate rectification of images, and the colour vertical imagery was particularly useful for cropmarks due to the ground conditions and time of year of the photography.

In some instances, post-war landscape change had been such that the landscape depicted in the image and the modern maps no longer had any correlation. Where this occurred, iterations of Ordnance Survey mapping contemporary with the aerial photographs were used to provide base map for adequate control information to allow georeferencing and rectification to a true plan position in accordance with Historic England standards.

Oblique aerial photographs usually provide targeted imagery taken under optimal conditions to record archaeological or architectural subjects. Oblique aerial photographs of the project area held by the Historic England Archive ranged in date

between the 1920s and 2018. The Historic England Archive holds that part of the Aerofilms Ltd collection of aerial photographs that cover England, with historic oblique and vertical aerial images taken from the 1920s onwards, a large selection of which are available to view free through the online portal Britain From Above (https://www.britainfromabove.org.uk/).

Next Perspectives TM orthophotography was provided through the Aerial Photography for Great Britain (APGB) agreement and ranged in date between 1999 to 2017. This was supplied as 1 square kilometre tiles in Tagged Image File Format (TIFF) format, covering the entire project area, with a one kilometre buffer around the project boundary.

A key national collection, the Cambridge University Collection of Aerial Photography (CUCAP) is closed. Bedford Borough Council has some CUCAP photographs in a digital PDF format and these were used by the project team. The quality of the scans was variable and some of the earlier dated oblique photographs lacked mapping control, which made rectification problematic.

Bedford Borough HER supplied additional vertical georeferenced orthophotography for the project, dated to the '1940s' (undefined), 1968, 1976, 1986, 1991 and 1996. These air photo layers were of variable quality resolution and due to the season in which flown, of limited use archaeologically, with the exception of 1996. Cambridgeshire HER does not hold its own oblique photographic archive.

Google Earth's vertical air photography was used throughout the project for the purposes of georeferencing and rectifying features not otherwise recorded on any other available imagery, with years 2003, 2006 and 2009 having been taken in seasonal conditions conducive to cropmark formation. Some nominally '1945' dated mosaic vertical cover was also available for part of the project area but was of limited use.

Some recorded photographic sources could not be consulted. In some instances, the county council's HER makes reference to images taken some decades ago that could not be traced for assessment.

Airborne laser scanning data and digital elevation models

A digital elevation model (DEM) data derived from airborne remote laser scanning (lidar) was acquired from the Environment Agency under an Open Government licence and was used for mapping.

The digital terrain model (DTM) data was provided as gridded ASCII files in 1 and/or 2-metre resolution. The ASCII files were processed using the Relief Visualization Toolbox version 1.1, available from The Institute of Anthropological and Spatial Studies at The Research Centre of the Slovenian Academy of Sciences and Artson (at https://iaps.zrc-sazu.si/en/rvt#v), producing various visualisations at GeoTIFF images for import to AutoCAD 3D.

In conjunction with vertical and oblique aerial photographs, lidar was particularly useful for identifying and recording extant medieval and post medieval earthworks, especially ridge and furrow cultivation blocks, linear embanked boundaries, field systems, mill mounds, as well as moated sites that can often remain under tree cover. If available, 2m resolution lidar was used where 1 metre coverage was not and was suited to record substantial earthworks.

The project area is not a densely wooded landscape. However, where copses and larger woodlands do exist and lidar is coincidentally available, the visualised DTM data was of sufficient resolution to record archaeological remains contained therein.

Monument records

Where relevant, the Bedford Borough, Cambridgeshire, Milton Keynes, Central Bedfordshire or Northamptonshire HERs' unique monument numbers were attached to the digital mapping and National Record of the Historic Environment (NRHE) monument records. Digital mapping metadata was also cross referenced to the NRHE database.

Access to the National Heritage List for England (NHLE) assisted the interpretation of scheduled monuments. A database was compiled to provide a basic assessment of monument condition using the latest aerial photographic evidence (Appendix A).

Other sources

The use of historic mapping was of great importance in aiding interpretation and dating. The Inclosure Acts of the early 19th century had a major impact in this part of Cambridgeshire, but there are numerous pre-inclosure field systems visible as low earthworks on lidar.

Digital Ordnance Survey (OS) mapping was available to the project team area, from the current OS Master Map back through previous iterations or 'Epochs' through Historic England's mapping licence. The one inch to the mile mapping of the early 19th century Ordnance Surveyors' Drawings, downloaded and viewable as georectified .KMZ format files to Google Earth Pro, was accessed via the British Library website (https://www.bl.uk/collection-guides/ordnance-survey-mapping)

Early editions of OS maps can provide information on areas of extraction or military features and sometimes provide evidence of grubbed-up field boundaries, or the origins of structures or features only visible on aerial photographs as cropmarks.

Bedford Borough Council provided tithe and inclosure maps for some parishes that were used to clarify interpretation. Some online estate maps and historical maps (such as Old Maps Online (https://www.oldmapsonline.org/) were also available.

The project's extension phase of the Bedford Borough AIM project overlapped with an area previously covered as part of the Northamptonshire Aerial Investigation &

Mapping project, the latter comprising digital mapping but with no NRHE records for that mapping. The previous mapping was viewed and either using the original source imagery or with updated aerial photography where relevant, was remapped to reflect current Historic England digital mapping standards and appropriate monument records created in the NRHE.

The National Soil Resources Institute (NSRI) online Soilscapes portal and online digital British Geological Society (BGS) bedrock and superficial data were accessed. These informed the analysis of the distribution and visibility of archaeological and non-archaeological cropmarks and soilmarks, as well as for the identification of visible subsurface geology, such as cracks in underlying glacial deposits are caused by freezing and thawing that can give the appearance of being caused by human agency. Other areas of geology created large-scale cropmark mottling over the gravel terraces of the River Great Ouse south of Bedford that impeded interpretation of archaeological cropmarks.

Administrative boundaries were routinely consulted, largely for recording purposes, but also to aid the interpretation of land division of medieval and earlier date.

The Bedford Borough project area has seen considerable developer-funded commercial excavation in advance of large-scale infrastructural projects, such as the Bedford Western Bypass, Stagsden Bypass, Biddenham Loop, and the A421, A420 and A422 bypasses. Where relevant, publications arising from these projects, as well as grey literature, academic research and publications were consulted for the interpretations and dating of sites and for the analysis in this report. Other books, journal articles and various grey literature sources were also referenced, as well as some internet resources, as set out in the Bibliography.

Where available, local groups were consulted, such as the Airship Heritage Trust, Kimbolton Local History Society and Catworth Local History Society, who generously provided their knowledge of their local landscape and history.

Second World War dated Air Ministry airfield site plans, provided by the RAF Museum at Hendon, were used to assist mapping and interpretation of these large-scale wartime military sites.

Methodology

Examination and Evaluation

Vertical aerial photographs, where available/appropriate, were examined under magnification and stereoscopically. Where no print was available, oblique and vertical aerial photographs in a digital format were viewed using Adobe Bridge CS6. The Environment Agency's lidar data was visualised using the Relief Visualisation Tool and viewed on a computer screen.

Rectification and georeferencing

Where required, vertical and oblique prints were scanned at the highest resolution and converted to a digital Tagged Image File Format (TIFF) using Adobe Photoshop CS6.

Chosen aerial photographs were rectified using a specialist software package AERIAL, versions 5.35 and 5.36. Control was derived from OS MasterMap 1:2,500 scale base mapping. A digital terrain model function used points derived from 5 metre interval contour data to compensate for steep or undulating topography for increased accuracy of the rectified image.

Control points typically had an average error of less than 2m: i.e. each photograph was rectified to an average level of accuracy of less than 2m to the 1:2,500 scale base map.

Mapping accuracy of features relative to their true ground position will depend on the source. The Ordnance Survey advise their 1:2,500 scale map data has an accuracy of ±0.4m for rural towns and ±1.1m in all other rural areas. Therefore, the archaeological features transcribed for aerial investigation and mapping projects will, on average, be accurate to within two to three metres of true ground position. The APGB vertical orthophotographs and the Environment Agency's lidar data are stated to be accurate to within 10–15cm and may result in sub- metre accuracy to true ground position for features mapped from these sources.

Mapping

Archaeological features were traced using standard AIM drawing conventions (see below) from rectified photographs and lidar tiles in Autodesk AutoCAD Map 3D 2017 and 2015.

Rectified and georeferenced vertical and oblique aerial photographs and lidar data were imported into AutoCAD Map 3D using a Tiff World File (.TFW) format file. When required, Google Earth Pro vertical aerial photography was saved as JPEG raster images and aligned to the 1:2,500 Ordnance Survey map base.

Most features were mapped as closed polygons. Polylines were used to represent features such as scarp slopes via a schematic T-hachure convention. The boundaries of medieval and/or post-medieval ridge and furrow cultivation block boundaries were mapped as a closed polygon, the form and direction of ploughing within each block depicted with a single polyline 'arrow'.

Metadata was attached to each polygon/polyline that comprises a feature, including the NRHE monument number for each individual features or group of features that comprise the monument.

AutoCAD map layer content and drawing conventions:

LAYER NAME	COLOUR	DESCRIPTION
BANK	Red	banks, platforms, mounds.
DITCH	Green	cut features such as ditches, ponds, pits or hollow ways.
EXTENT_OF_FEATURE	Orange	extent of large area features such as airfields, military camps or major extraction.
MONUMENT_POLYGON	White	extent of the monument record as defined in the NRHE or HER database.
RIDGE_AND_FURROW_AREA	Cyan	Outline of a block of ridge and furrow.
RIDGE_AND_FURROW_ALIGNMENT	Cyan	Line or arrow(s) (hand drawn not a symbol) depicting the direction of the rigs in a block of ridge and furrow.
STRUCTURE	Purple	structures including stone, concrete, metal and timber e.g. buildings, Nissen huts, tents, radio masts, camouflaged airfields, wrecks, fish traps, etc.
SCARP_SLOPE_EDGE	Blue	scarps, edges of platforms and other large earthworks where the top of the 'T' indicates the top of slope and the body indicates the length and direction of the slope.

The metadata table contains the following information:

ATTRIBUTE	DESCRIPTION	EXAMPLE
HER_NUMBER	HER unique identifier (UID)	6789
MONARCH	NRHE unique identifier (UID)	123456
PERIOD	Earliest interpreted date of feature. Single indexed term.	IRON AGE
TYPE	Monument Type. Specific monument type where identified. Single indexed term.	RECTILINEAR ENCLOSURE
EVIDENCE	Latest known form of remains. Single indexed term.	CROPMARK
PHOTO	Source image reference (vertical or oblique aerial photograph, lidar tile data, Google Earth year etc.) from which feature was mapped.	NMR 26067/35 21-JUL-2008

Monument Recording

New monuments records were created and existing monument records updated in Historic England's NRHE database in accordance with current standards. The NRHE monument number is referred to throughout this report. Each monument record provides a textual description of the site, as well as information on sources such as the best aerial photographs of the site and other indexed information. Monuments records that were linked to an existing HER record, were linked to that local authority's record UID within the NRHE database.
Data archive and dissemination

The Event Record in the NRHE database is: 1600528 Bedford Borough NMP.

Project Archive

The HE grants project number is 7302MAIN and 7302MISC to cover the area of extension.

Within the Historic England Archive catalogue, a Measured Drawing Record was created for the digital transcription of the project's mapping. This drawing number is linked to all relevant monument records. The HE Archive Number is AF00381 and the Measured Drawing number is MD003015. Requests for mapping should be made through Historic England Archive.

Monument records created and updated by the project team are available to view via the online Heritage Gateway service.

The AIM digital mapping data and monument record information has been provided to project stakeholders as ESRI .shp format files: Bedford Borough Council HER, Central Bedfordshire Council HER, Milton Keynes Council HER, Cambridgeshire County Council HER and Northamptonshire County Council HER, for integration into their GIS and record database.

The digital AIM layers are also available to via through Historic England's corporate GIS, where it can be interrogated with other archaeological and non-archaeological dataset layers. This is available to Historic England and English Heritage staff via ESRI ArcMap or WebGIS.

CHRONOLOGICAL SUMMARY OF RESULTS

This summary provides highlights of the results in chronological order. Relevant National Record of the Historic Environment (NRHE) numbers are mentioned for each site discussed and can be used to find the records on the Heritage Gateway.

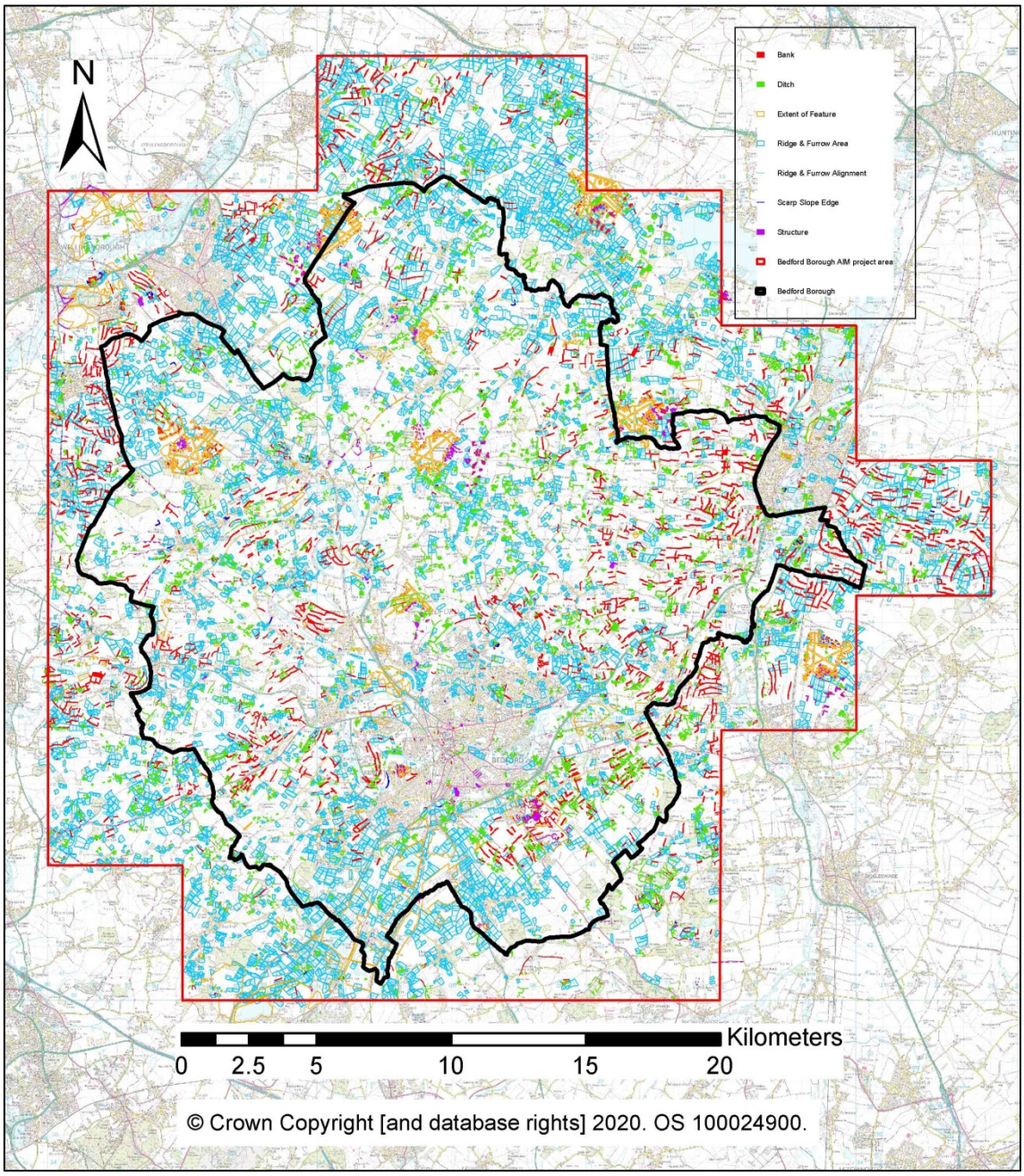

Figure 8 All featured mapped by the Bedford Borough AIM project. Banks in red, ditches in green, ridge and furrow in pale blue. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Neolithic and Bronze Age

Features identified as Neolithic or Bronze Age in date mainly clustered along the gravel terraces of Great Ouse river valley (Figure 9). The Neolithic and Bronze Age features recorded were, with few exceptions, associated with the prehistoric funerary and ceremonial landscapes.

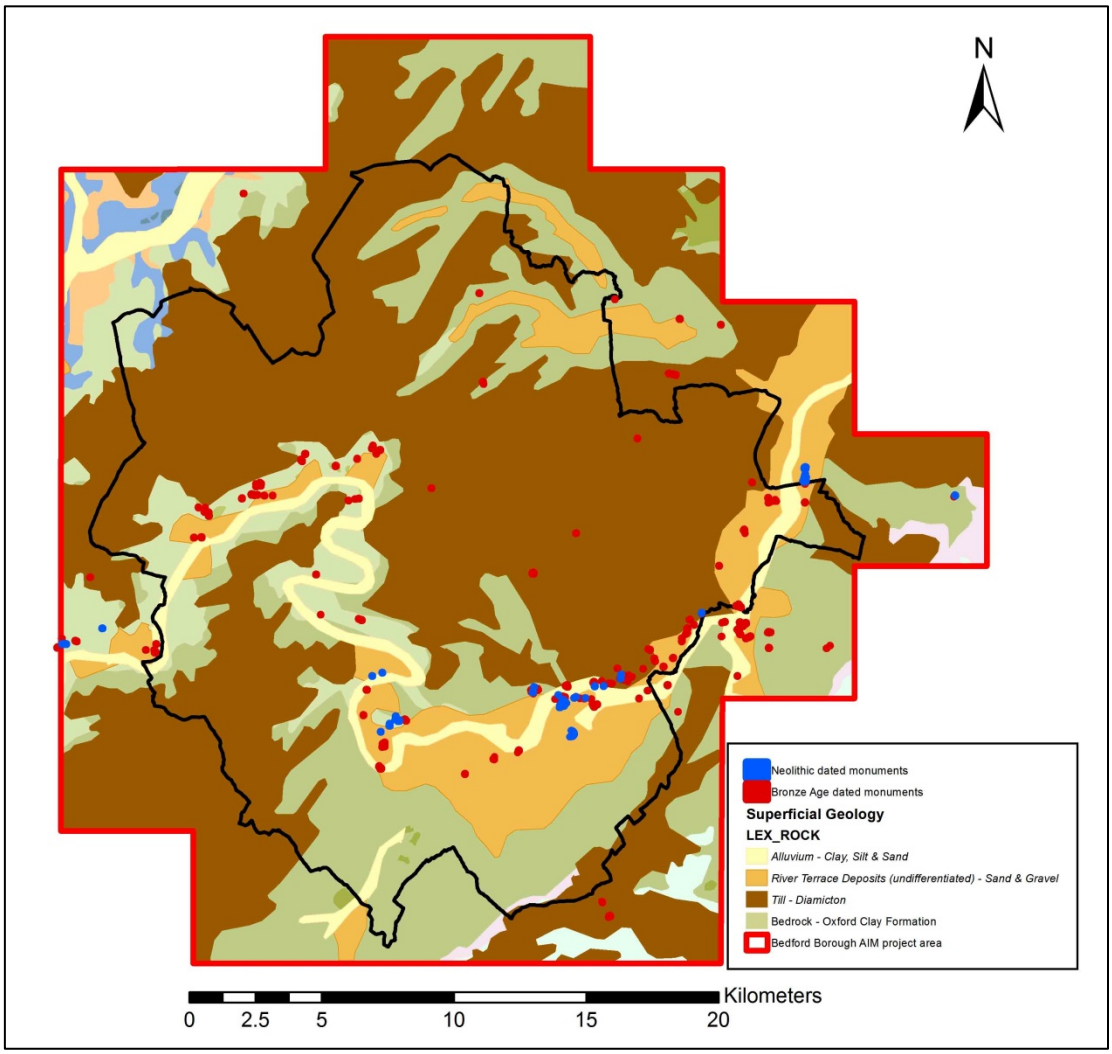

Figure 9 The distribution of Neolithic (blue) and Bronze Age (red) monuments seen on aerial sources against superficial and bedrock geology. Base map based on 1:625,000 scale digital mapping, with the permission of the British Geological Survey.

Most new records were for cropmarks of ring ditches, believed to be the buried remains of round barrows. At Tempsford, there is a ceremonial landscape indicated by cropmarks of ten ring ditches. A ring ditch (NRHE 1607176) was recorded at Great Barford that may also be part of a wider landscape of barrow monuments. Possible mortuary enclosures or cursus monument, probably dating to the Neolithic, were identified from recent Historic England aerial photographs on the edge of the project area at Clifton Reynes, near Olney (Figure 87). After the Bedford Borough AIM project completed, another long enclosure was identified during 2018

Historic England aerial reconnaissance – see the Review of Archaeological Significance chapter below for more details.

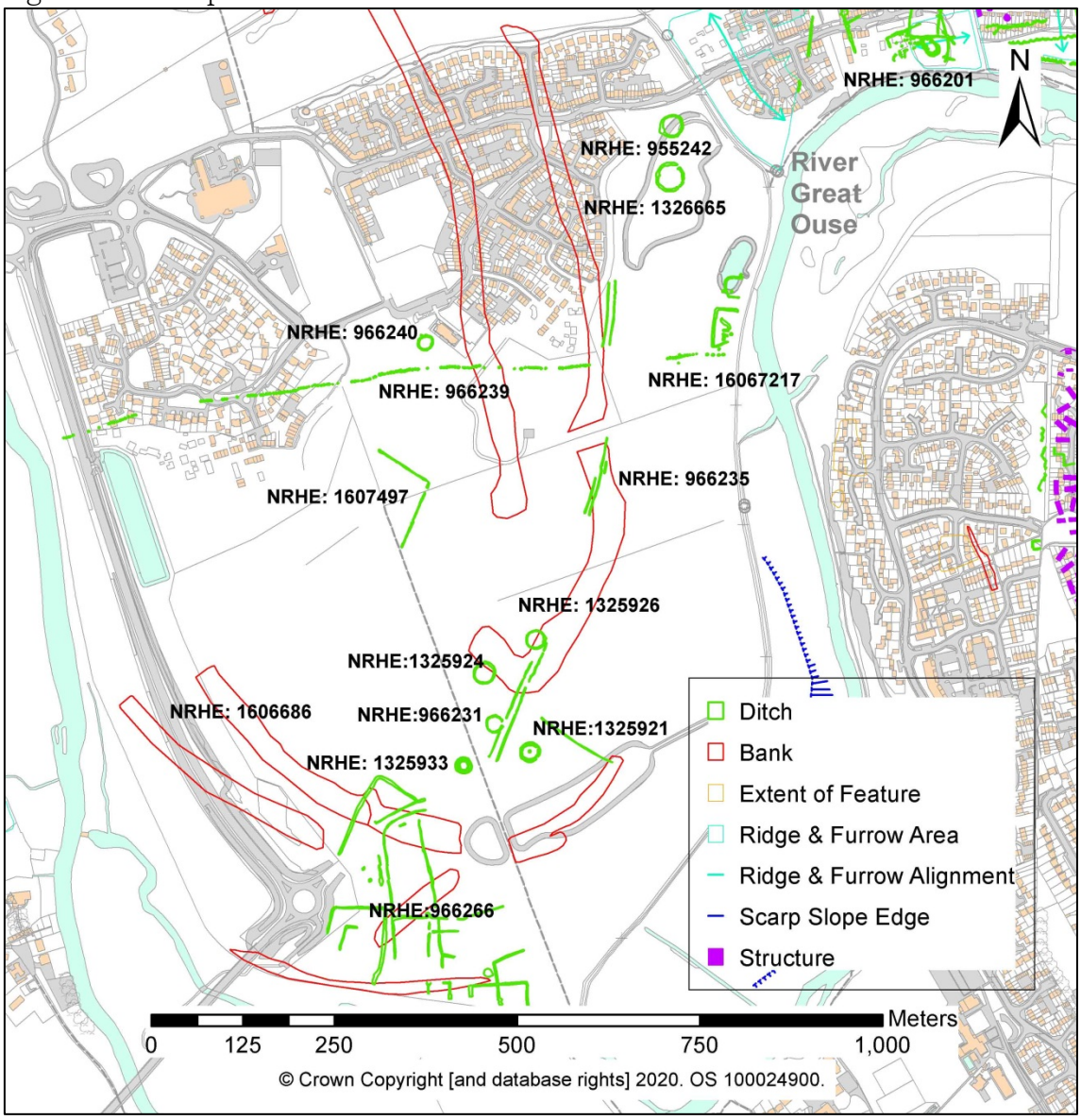

Figure 10 Neolithic and Bronze Age funerary or ceremonial monuments amidst Iron Age and Roman settlement in the 'Biddenham Loop' of the river Ouse. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

From the air, Neolithic and Bronze Age settlement can be difficult to distinguish from later settlements as they do not have a distinctive form. They also seem to be ephemeral and rare making them less likely to form cropmarks. For example, large-scale excavations and geophysical survey of 90 hectares of the 'Biddenham Loop' in the river Ouse, west of Bedford, in advance of the Bedford Western Bypass construction, revealed Neolithic oval and rectangular mortuary enclosures (Figure 10). The only evidence for Neolithic settlement within Biddenham Loop comprised small pits and dense concentrations of worked flint, suggesting increasingly intensive, prolonged seasonal or permanent settlement (Luke 2008:24, 2016). The

Bronze Age evidence comprised three clusters of ring ditches thought to be funerary monuments. An unenclosed roundhouse and associated pits dated to the late Bronze Age were the only evidence for settlement, interpreted as a seasonal site. No firm evidence for field or enclosure boundaries was identified (Luke 2008:32, 2016).

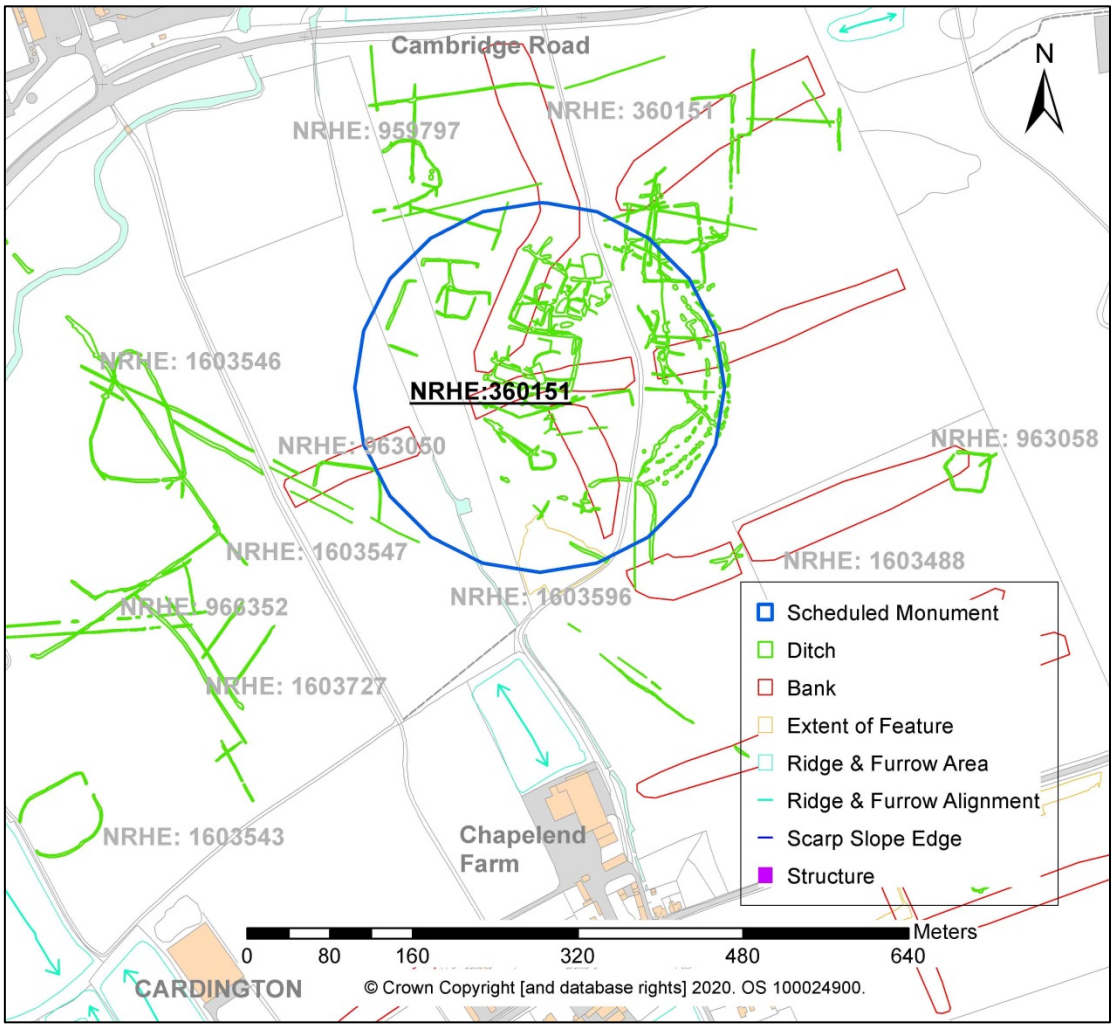

Figure 11 A Neolithic causewayed enclosure and later dated cropmark features at Cardington. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Cropmarks between Cardington and Cople, south of Bedford, suggest multi-period remains (Figure 11). A Neolithic causewayed enclosure (NRHE 360151), comprising three concentric circles of interrupted ditch circuits lies on a gravel island between two bands of alluvium. It is overlain by rectilinear ditches enclosures and other boundaries likely to be Iron Age or Roman. Part of the complex is scheduled (Figure 11, circled in blue). The extent to which the later inhabitants were aware of the Neolithic monument is unclear, but its boundaries appear to have been disregarded (Meade 2003).

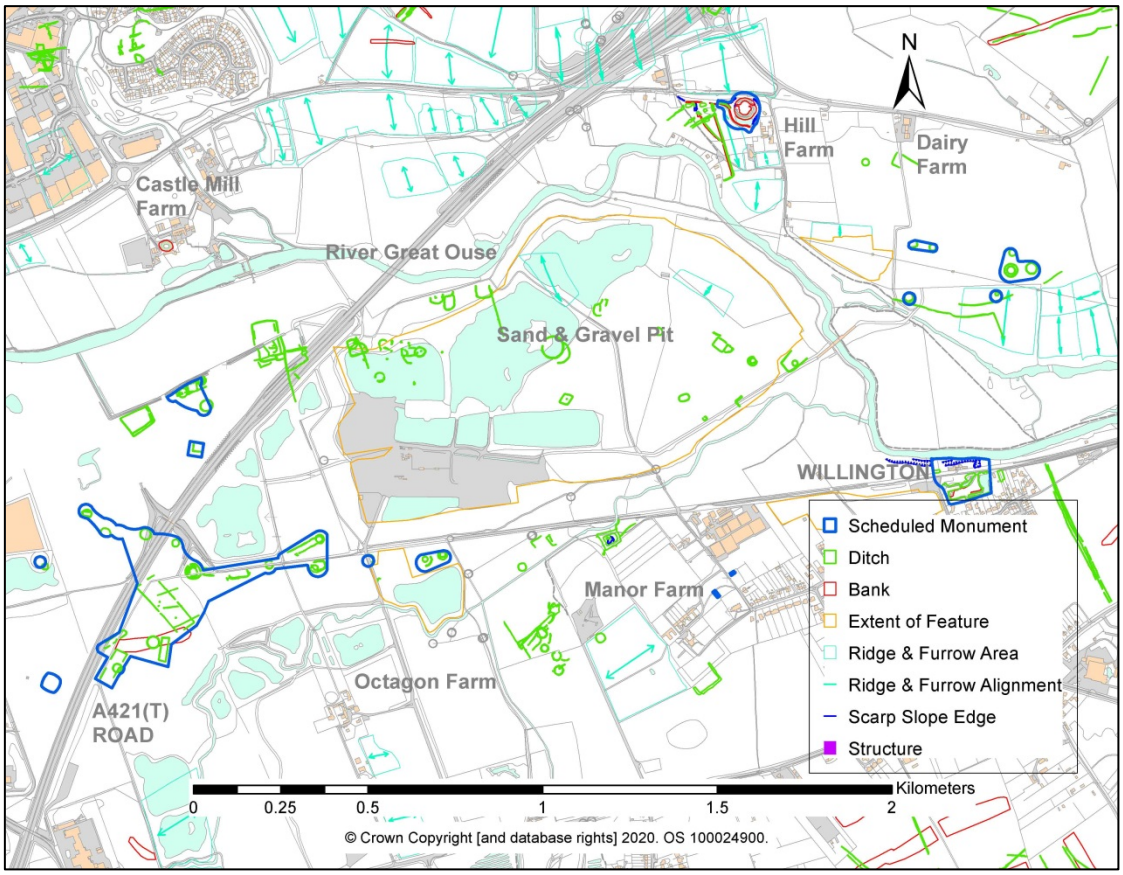

Figure 12 Cropmarks indicating complex prehistoric remains north of Octagon Farm, Willington. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

The suitability for arable cultivation of the river terraces has meant that prehistoric earthworks have not survived the plough but a range of buried features are still visible as cropmarks (Malim 2000: 61) (Figure 12).

Some archaeological features, which may be prehistoric in date and associated with settlement activity, could easily be misinterpreted as later features. For example, a ditch on the north side of Gadsey Brook at Dairy Farm (NRHE: 1607280) was dated with pottery to the Early Bronze Age during archaeological evaluations in 2005 and 2008 (Murrell 2009). Another linear ditch was also visible on aerial photographs on the same alignment, possibly indicating another prehistoric field system north of Gadsey Brook. This ditch remains undated as it fell outside the areas of trial trenching and was not visible on the geophysical survey. Without the additional dating evidence from excavation, it is likely to have been interpreted as a medieval or post-medieval field boundary. The NAIS SW Cambridgeshire aerial survey (Knight et al. 2019) also recorded early land divisions, visible as segmented ditches that were on a different alignment to later Iron Age ditches and features. Yates (2007) in his survey of Bronze Age field systems in England highlighted five examples that fall within the project area and all are located along the Great Ouse.

It is, therefore, also likely that other possible linear ditches assigned later dates could, in fact, belong to the Bronze Age period. During the aerial survey, where possible, mapped features were attributed a likely broad date, but some were difficult to interpret and were recorded as of 'Uncertain' date.

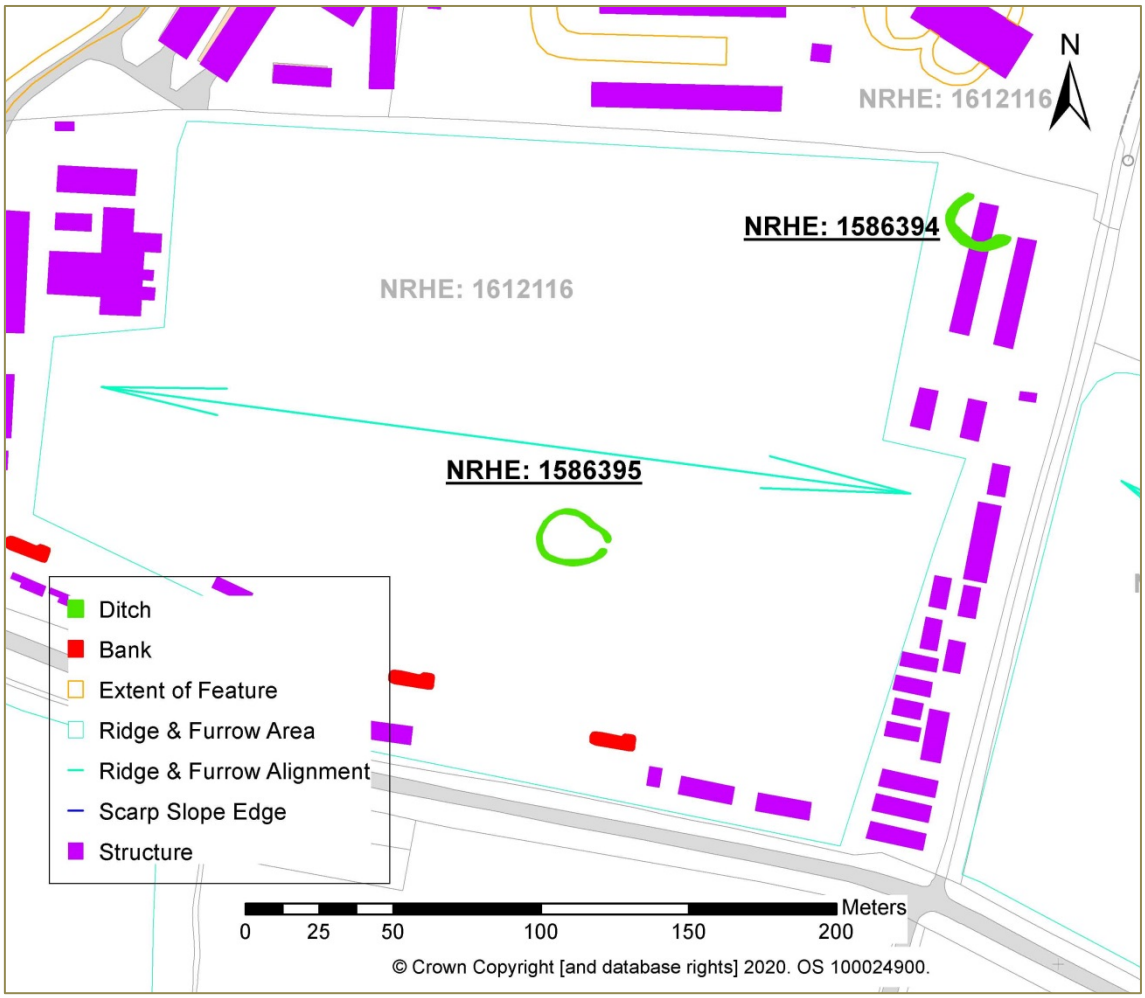

Figure 13 Newly identified curvilinear enclosures at Everton. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Very few Neolithic and Bronze Age archaeological features were recorded in areas away from the main river valleys including those with clay geologies. Factors such as aerial reconnaissance bias and problematic conditions for cropmark formation over certain geologies, may account for the lack of visible buried remains on aerial photographs. However, the visibility and quantity of cropmarks indicating Iron Age and Roman remains in these areas suggest this is not the case.

Some potential examples have been found and these comprise curvilinear features or ring-ditches. Their potential date and function are varied and without further context to assist, may be misinterpreted: for example, the curvilinear enclosures recorded at Everton (NRHE 1586395, 158639) and north of Wilden (NRHE 1595741) may be associated and contemporaneous with nearby Iron Age or

Roman settlement enclosures (Figures 13 and 14). The project also identified that cropmarks of a pair of ring ditches attributed to the 'Bronze Age' near Perry in Cambridgeshire (NRHE 1593122) indicated the buried remains of Second World War searchlight emplacements.

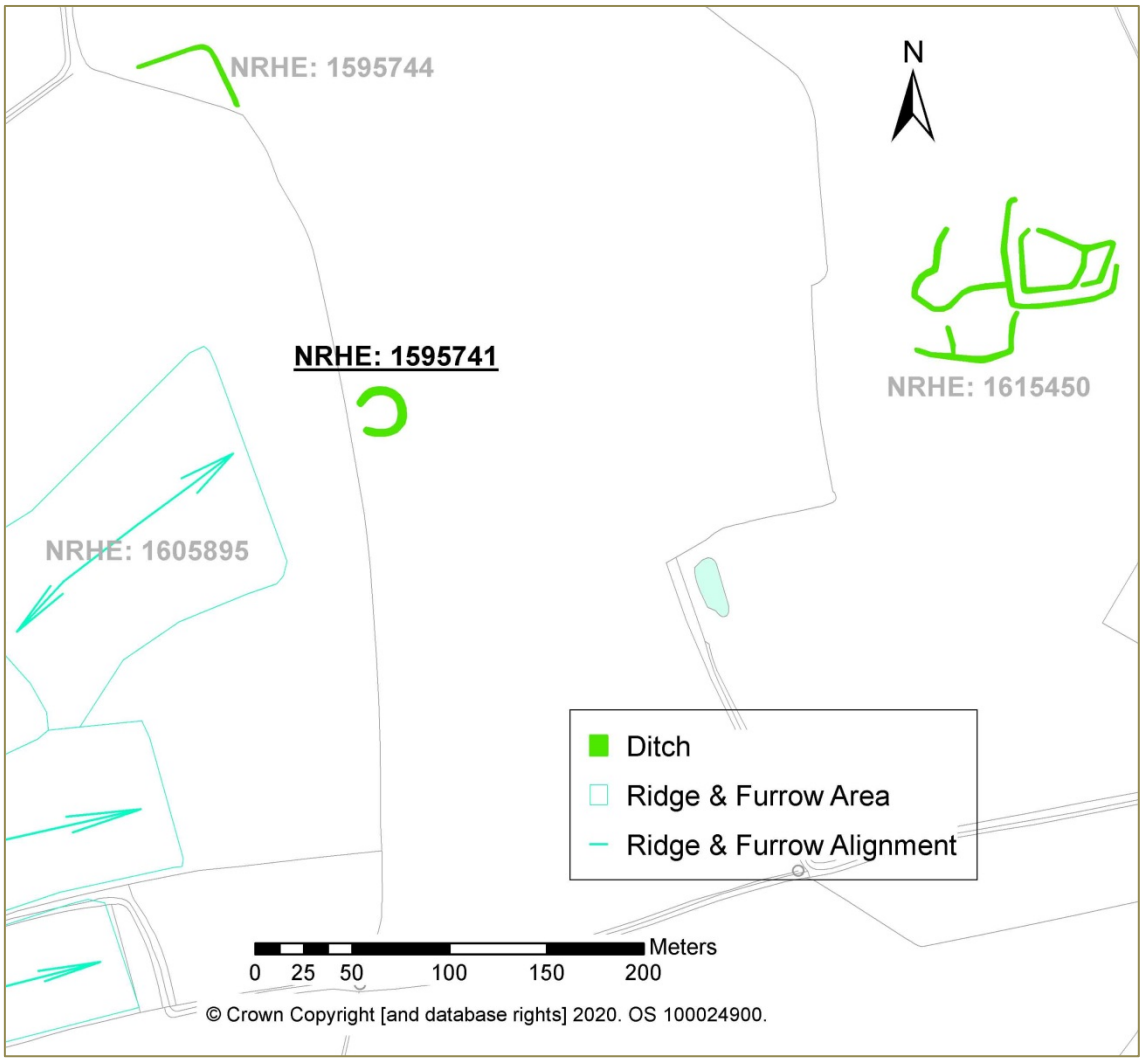

Figure 14 Newly identified ring ditch recorded at Wilden. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Two convincing examples of Neolithic/Early Bronze Age round barrows were seen as penannular or partial ring ditches at Hardwick End (NRHE 1614351). They are located at the head of a valley over Oxford clay by a now much-reduced stream (Figure 15). At Haynes (NRHE 1603990 and 1603891), two polygonal enclosures attributed with possible Bronze Age dates were also double-indexed as possibly Iron Age in date.

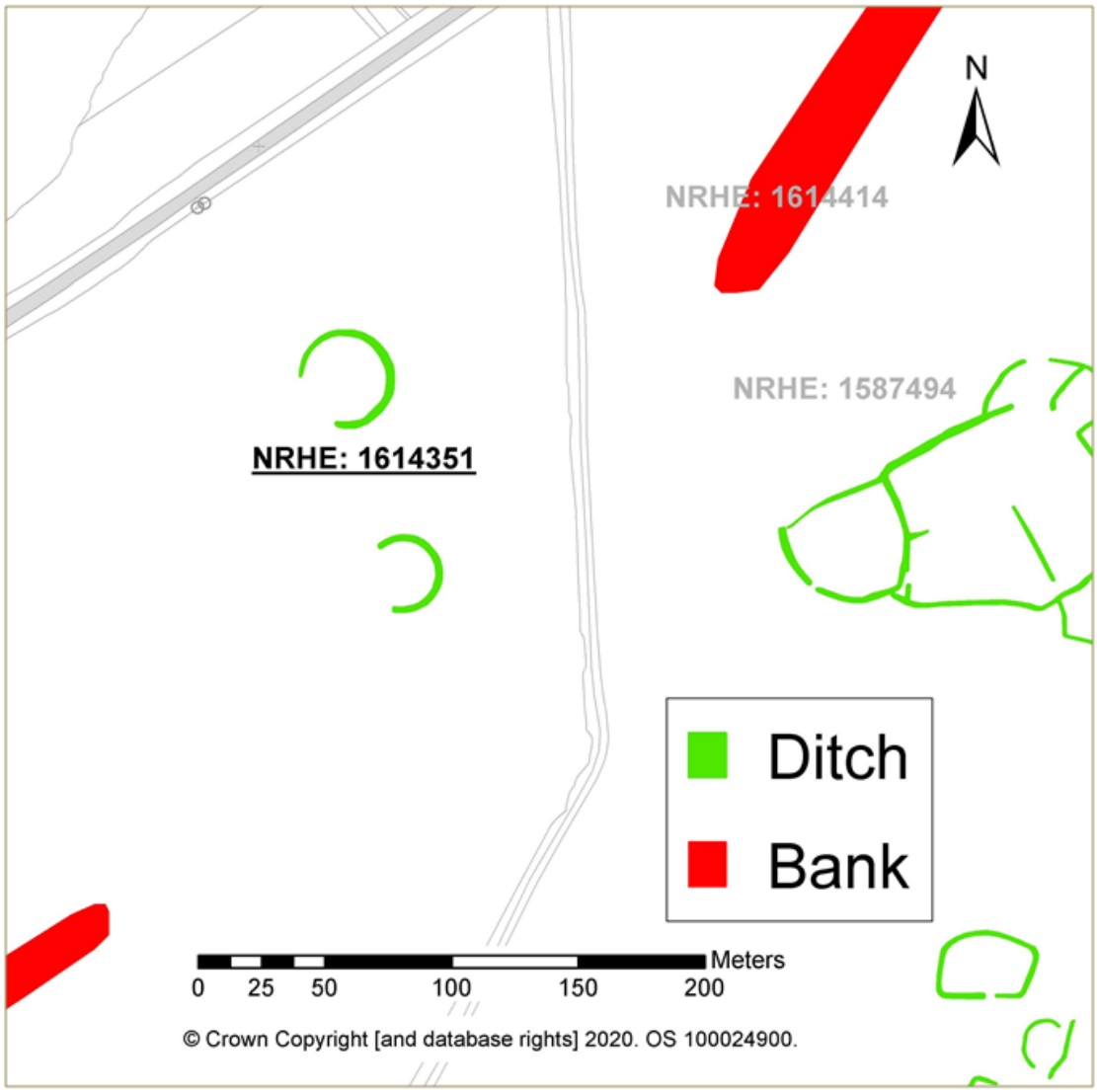

Figure 15 Newly identified ring ditches recorded at Hardwick End. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

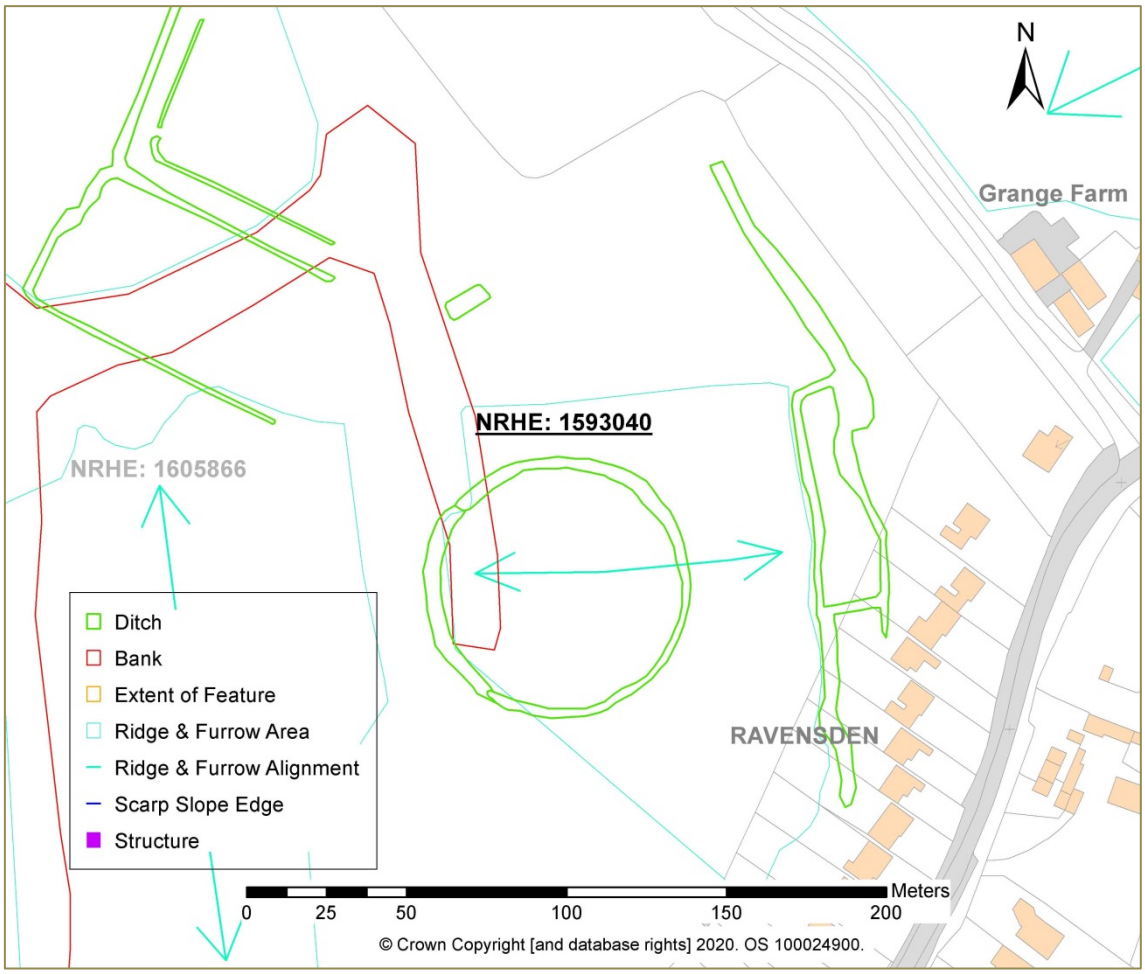

Figure 16 Newly identified ring ditches recorded at Ravensden. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence

A large ring ditch at Ravensden (NRHE 1593040) may be Neolithic in origin due to its large diameter of 75m (Figure 16). An excavated example about 100m in diameter at Wasperton, Warwickshire, was identified as a Late Neolithic/Early Bronze Age enclosure (Hughes, G. & Crawford, G. 1995).

At Staughton Moor (NRHE 1613745), three ring ditches measuring between 32 and 39m in diameter are spaced along a line 67m and 112m apart (Figure 17). They are situated on the boulder clay about 50m above Ordnance Datum (nominal sea level), overlooking an eastward flowing spring to the north.

The nearby newly identified Roman town at Great Staughton (NRHE 1593753), with its adjacent villa buildings (NRHE 363484), some 1.2 Kilometres to the north, may in fact suggest a Romano-British date for these features. Roman barrows are rare nationally, with no excavated examples recorded in Bedfordshire, but a small number of earthen round barrows are known from the Roman period in nearby Cambridgeshire, for instance at Moulton Hills (NRHE 368840), Bourn (Historic England 2018: 6).

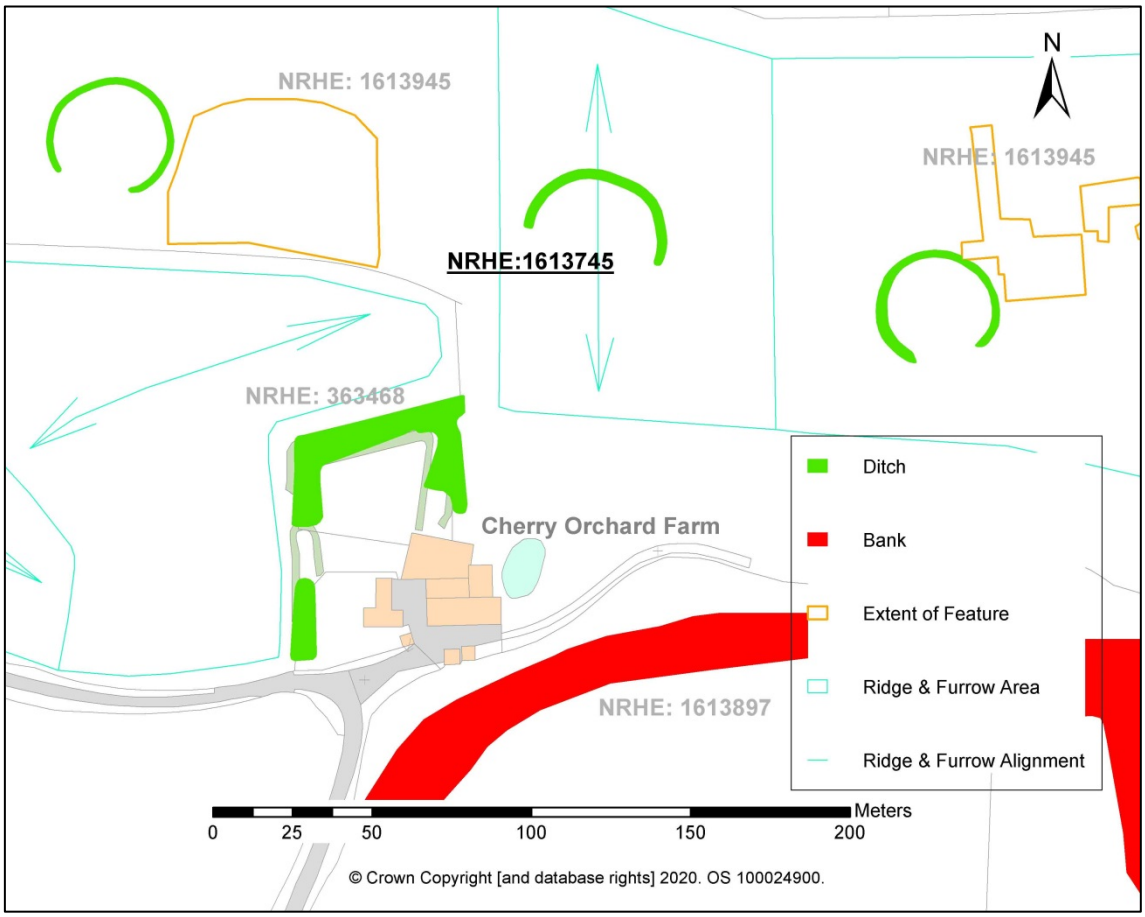

Figure 17 Ring ditches recorded at Staughton Moor. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence

Excavations during The Raunds Area Project (Harding & Healy 2007) recorded a Neolithic and Bronze Age landscape on the River Nene that was just outside the Bedford Borough project area. The Neolithic and Bronze Age evidence suggests there were largely mobile prehistoric communities that often returned again to a preferred site, perhaps seasonally or just temporarily (ibid: 27). In the 'Biddenham Loop' on the River Great Ouse, just west of Bedford, settlement sites were identified from small pits and flint knapping (Luke 2016: 85). Evidence suggests that extensive woodland clearance took place in the Biddenham Loop, from the early Neolithic to the Early Bronze Age. This may suggest an increase in population, which seems to correlate with perhaps larger social groups and therefore longer occupation of the settlement sites (Luke 2016: 106). Excavations along the A421 Bypass corridor at Great Barford (Timby 2007), located on the boulder clay plateau some distance away from the river Great Ouse, revealed that this was not a focus for permanent or repeated settlement during this period. However, areas of flint-knapping along the entire route, though sparse, suggest these areas were used to some extent by these early communities (ibid: 53).

These large-scale excavation projects (Harding & Healy 2007; Luke 2016; Luke 2008; Timby 2007) provide evidence that early settlement was concentrated within and along the edge of the river valleys. The Bedford Borough aerial survey project, the neighbouring Northamptonshire NMP project (Foard & Deegan 2007) and NAIS SW Cambridgeshire aerial survey project (Knight et al. 2019: 31) also suggest that extensive use of the claylands and interfluves for settlement and ritual monument building did not occur during the Neolithic and Bronze Age periods. It would seem, therefore, that the pattern of Neolithic and Bronze Age monuments, which are concentrated on the gravel terraces of the main rivers and tributaries, is a genuine distribution. Harding & Healy (2007: 27) provide a good visual description of the early prehistoric landscape in the Bedfordshire area based on this current evidence. Construction of large ceremonial monuments, such as long mounds or barrows, took place along the mostly cleared valley bottoms and the land elsewhere was still largely wooded throughout the period. A mosaic of different habitats co-existed, with small clearances, grazed park woodland but also abandoned clearances with varying scrub regeneration, and primary woodland. (Harding & Healy 2007: 27).

Iron Age and Roman

The aerial survey results from both the Iron Age and Roman periods are discussed together in this report, due to the types of archaeological features, such as rectilinear enclosures or field boundaries, which morphologically often extend in date across these two periods. Excavations have shown that Iron Age and Roman activity exists within the same geographical area, with evidence of continuous settlement, re-use or overlapping activity (Simmons & Welsh 2013).

Distribution of Iron Age or Roman features

Aerial evidence for Iron Age and Roman remains are distributed across the whole of the project area, though there are some notable gaps (Figure 18). Some of the gaps coincide with the locations of urban centres, woodland and the large Second World War airfields at Thurleigh, Podington and Chelveston, Kimbolton and Little Staughton. At the latter two airfields, however, some archaeological cropmarks were recorded in and around the airfield runways.

A number of HER records of cropmarks in the southeast of the project area were derived from photographs that are now missing from the 1996-dated Bedfordshire County Council georeferenced vertical aerial photographic survey. The monuments were not visible on any other aerial photographs available to the project and therefore could not be mapped. This southeast area mainly comprises the Greensand Ridge, a band of high ground and boulder Clay. Those features that could be mapped, along with the HER records, still suggest that Iron Age and/or Roman settlement is less dense there than in the uplands north of Bedford.

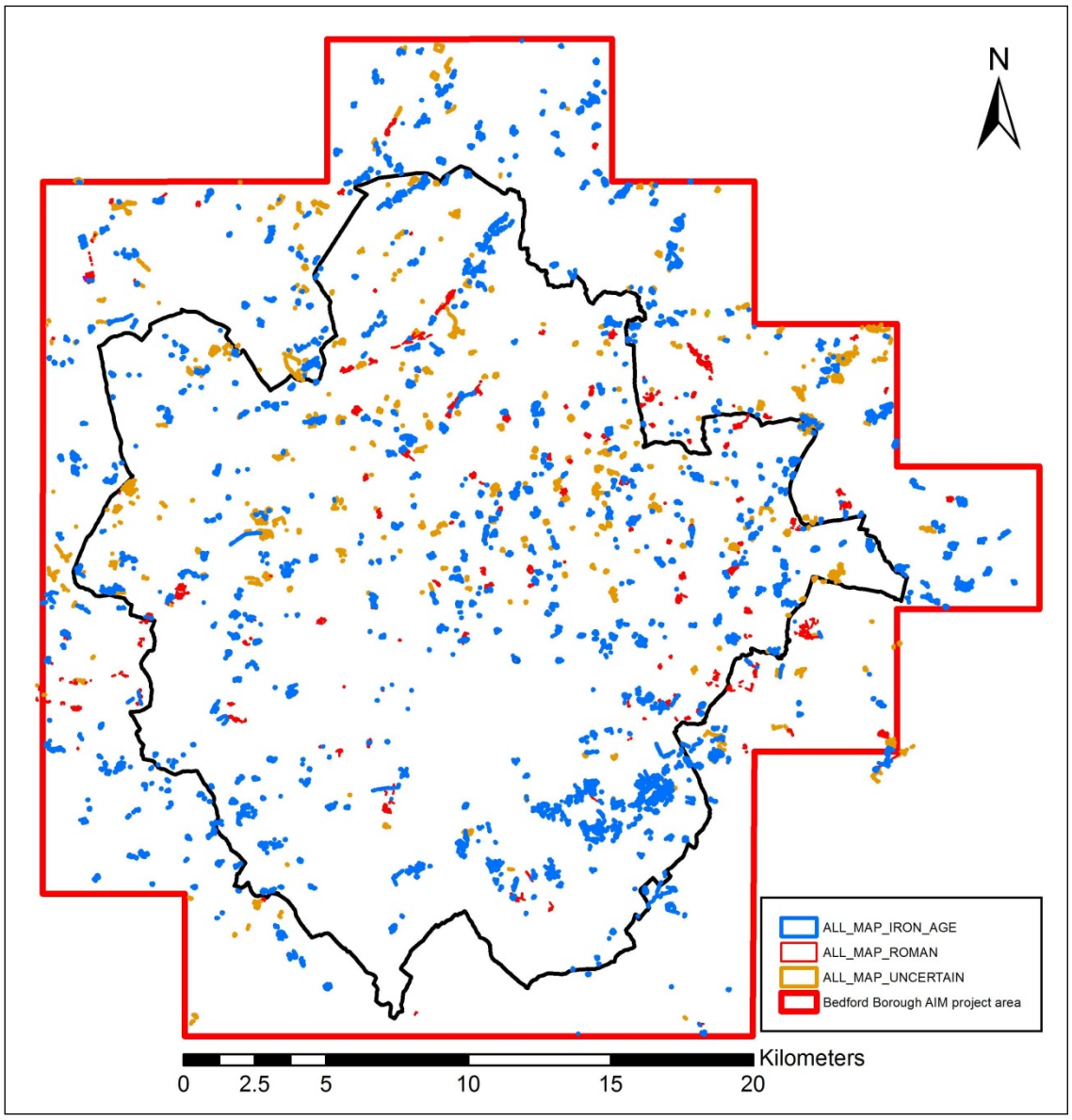

Figure 18 Mapped Iron Age, Roman and features of 'uncertain' date within the project area. Bedford Borough is outlined in black. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence

Those Iron Age and/or Roman settlements that are visible in the project's southeast tend to be smaller, isolated farmsteads. Typical examples of these are at Haynes (NRHE 1602801, 1589663 and 1589661) (Figure 19) and near Warden Abbey Farm (NRHE 1589668), rather than the larger more complex settlements visible elsewhere in the project area. Just outside the project area near Haynes, similar settlement cropmarks are recorded, all sitting behind the ridge before the dip slope (S. Coleman 2020, pers. comm., 28 January).

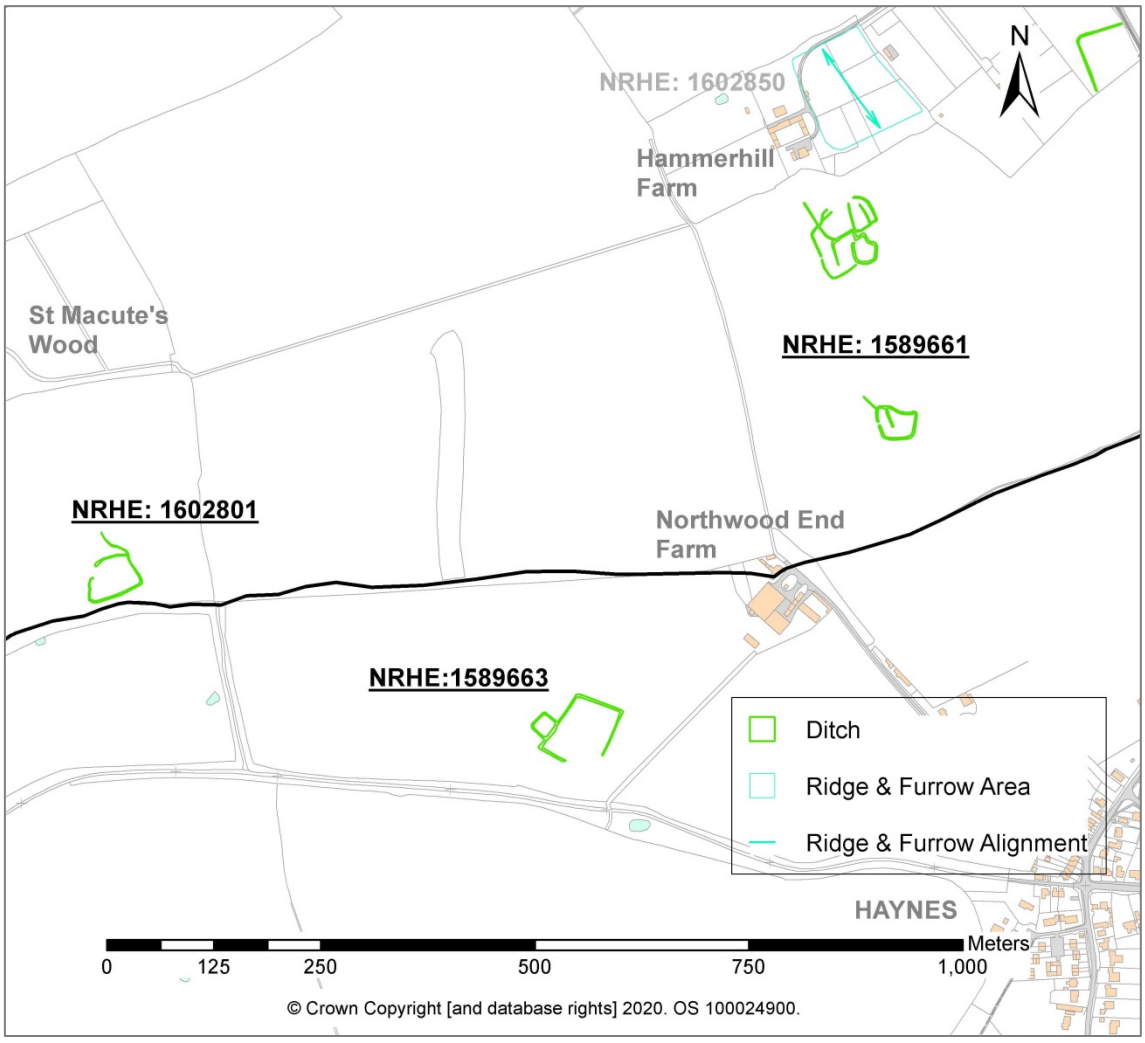

Figure 19 Possible Iron Age or Roman farmsteads indicated by isolated enclosures at Haynes. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

There are large areas of ancient woodland (known to have existed since the 17th century or before) on the Greensand Ridge, such as Palmers Wood and Warden Warren. These and aspects of the field patterns suggest that woodland clearance was more recent there than other areas within the project. The field pattern in this area, with its small, scattered and irregularly shaped fields and ridge and furrow cultivation blocks, is typical of woodland assarts - small areas converted from woodland in the medieval and later periods in a piecemeal fashion. The pattern of isolated Iron Age to Roman enclosures may therefore indicate scattered settlements within woodland on the ridge.

There is a probable gap in Iron Age or Roman settlement distribution on the clayey soils with impeded drainage in the north of the project area, though some features are visible. The previous suggestion that the Oxford Clay areas within Bedfordshire were largely unsettled in the Iron Age and Roman period has arisen mainly due to the heavier clay soils being under pasture rather than arable cultivation (Simco

1984, 21). The use as pasture meant that medieval and post-medieval ridge and furrow are more likely to survive as earthworks and this is probably masking earlier features from aerial prospection.

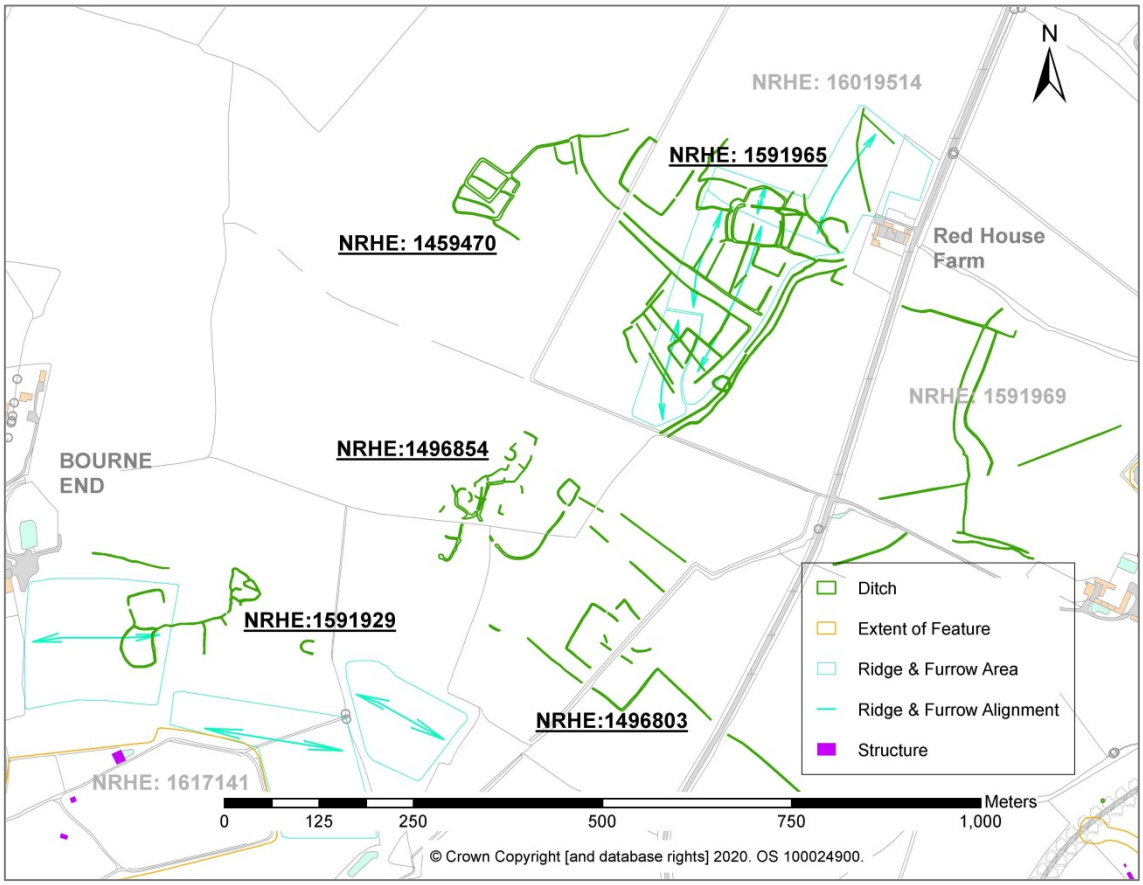

Figure 20 Medieval ridge and furrow, with underlying Iron Age or Roman settlement revealed as cropmarks at Bourne End. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Some cropmarks of Iron Age and Roman features were noted underlying levelled ridge and furrow, such as the settlement east of Bourne End (NRHE 191965), though most cropmark features are visible in areas with no mapped ridge and furrow cultivation (Figure 20).

In recent decades there has been an increase in the number of sites excavated on the clays (Crick 1999, Edmondson & Steadman 2001, Luke 2004, Timby et al. 2007 and Network Archaeology 2002; Luke 2010) that may indicate settlement expansion from the river valleys to the interfluves and clay uplands during the Iron Age. Excavations along the Great Barford Bypass (Timby et al. 2007) showed that the 'Boulder clay plateau underwent large-scale colonisation during the middle Iron Age and that the density of occupation continued in the late Iron Age' (ibid: 55). The distribution of cropmarks noted from this and earlier aerial surveys by Mills (2003) also supports this theory.

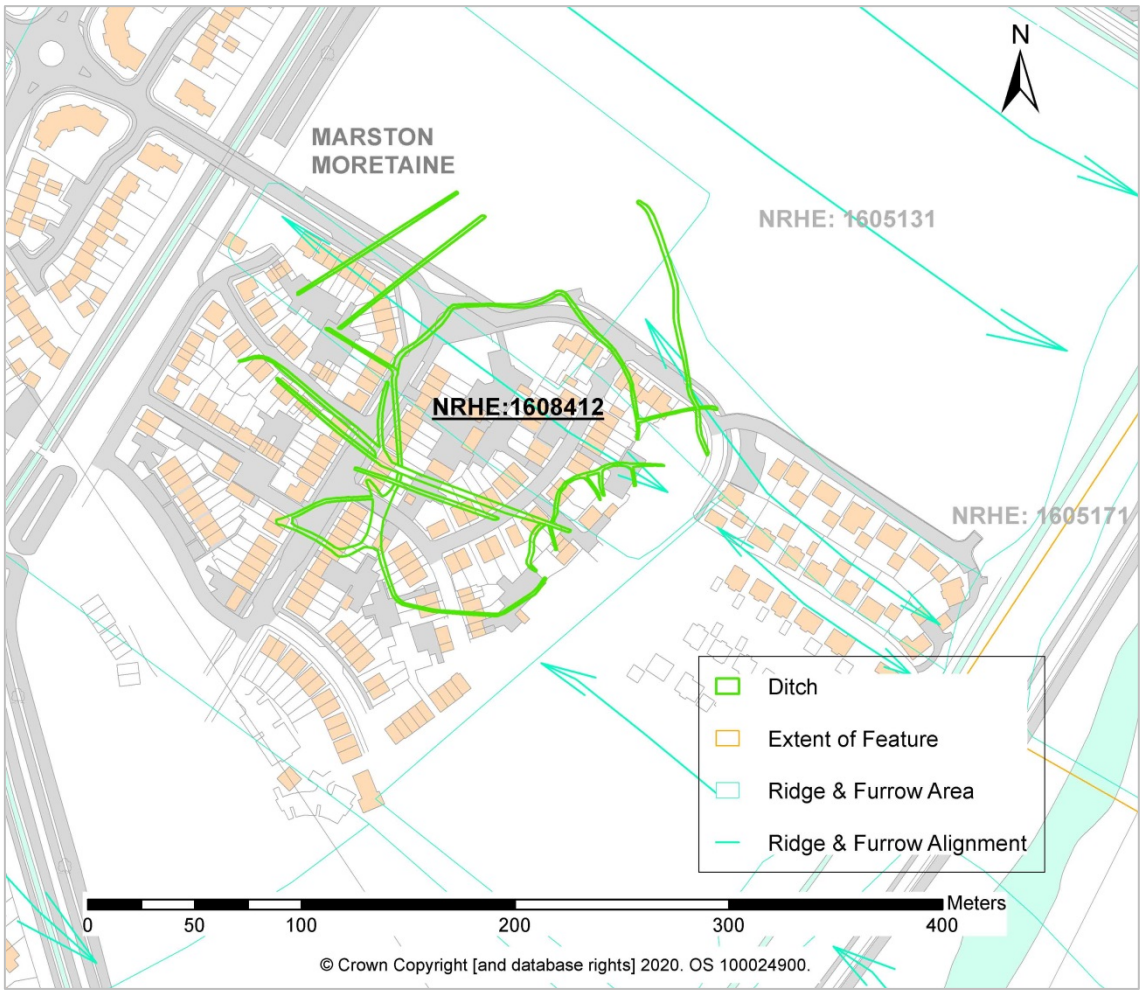

Figure 21 Cropmarks of Iron Age or Roman settlement enclosures at Marston Moretaine. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Examples of this can be seen in the Marston Vale, where cropmarks of Iron Age and Roman settlement were identified on aerial photographs at Marston Moretaine (NRHE 1608412) and north of Wootton Broadmead (NRHE 1605077 and 1604884) (Figure 21-22). Excavation of the settlement at Marston Moretaine ahead of housing development indicated that the occupation of the site was largely from the Late Iron Age to the Roman periods and that it had both an agricultural and domestic function (Hounsell 2003). The possible settlement north of Wootton Broadmead is situated in an area where the soils are clayey and have slightly impeded drainage (Soilscapes Type 9).

Excavations along the A421 Improvement scheme (Simmonds & Welsh 2013) provided further evidence that settlement of the clay landscape of Marston Vale occurred during these periods but there was no evidence of these sites from aerial photographs. For example, near Morteyne Farm (Site 4), an Iron Age circular enclosure defined by three ditches of at least three phases was uncovered over an area of Oxford Clay and with overlying soils of impeded drainage (Soilscapes Type

18). This feature was not visible on any of the available aerial photographs, nor was the Bronze Age to late Iron Age features excavated north of Stewartby (Collings 2013), or the Iron Age to Roman features at Wilstead (2010). Both areas are blanketed by medieval ridge and furrow and perhaps this is impeding the formation of cropmarks of earlier underlying features. Evidence that this could be the case is suggested by the Bedford Borough and other aerial survey projects in the midlands (Crowther & Dickson 2016) and by Clark & Dawson (1995) within Bedfordshire. These projects found that where areas of medieval and post-medieval earthworks, mainly ridge and furrow, are put into arable and start to be ploughed, buried archaeology from earlier periods can appear as cropmarks. Targeted aerial prospection where areas pasture, with ridge and furrow earthworks, have been converted to arable may lead to more discoveries of buried archaeological remains.

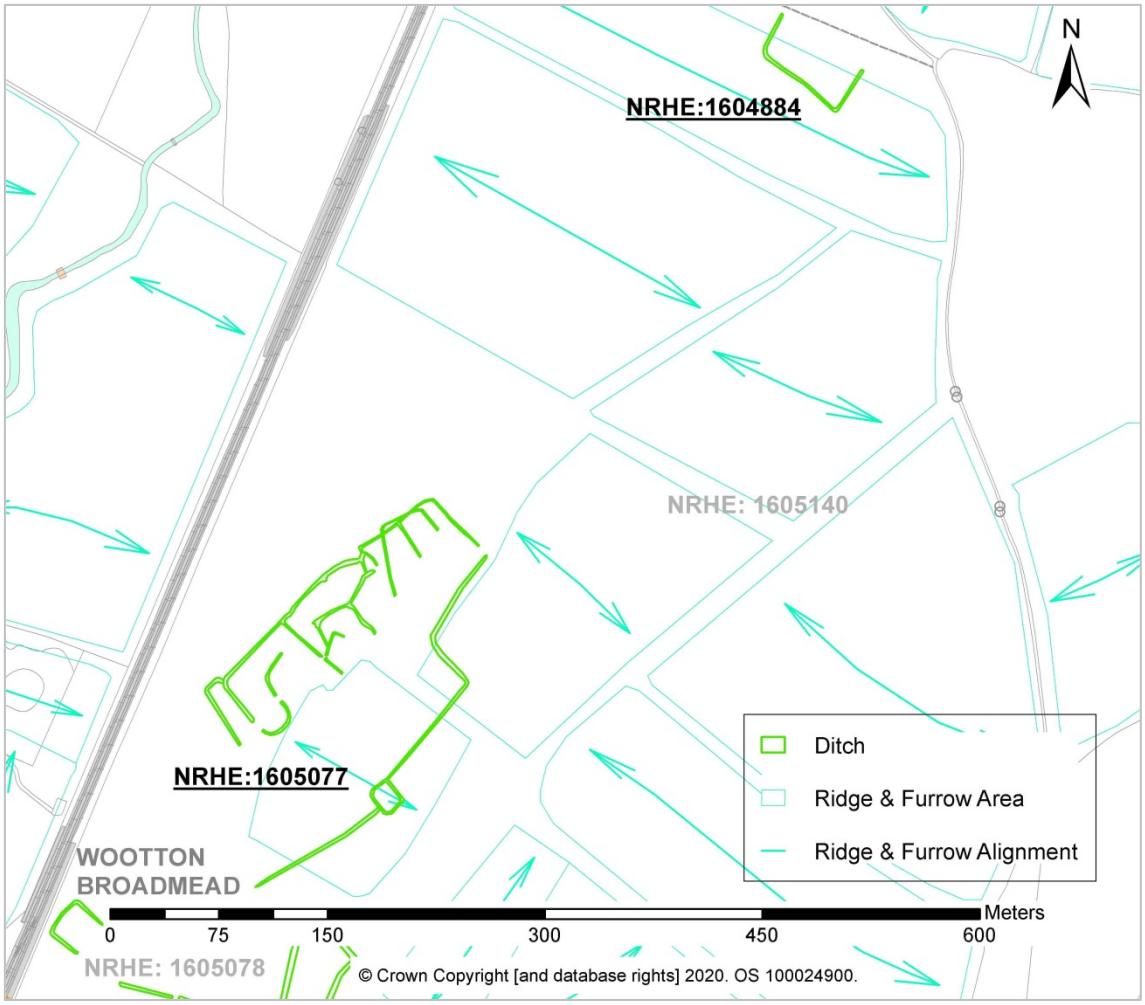

Figure 22 Settlement enclosures at Wootton Broadmead. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Types of Iron Age or Roman settlement

The morphological diversity of settlement forms increased from the middle Iron Age onwards, with both open and enclosed sites. From excavated evidence, earlier settlements appear to be featured with earlier activity and associated with Bronze Age funerary monuments (Oake et al. 2007: 63). Open settlements are difficult to identify on aerial photographs compared to enclosed settlements (Bryant 2000). Therefore unenclosed settlements could be hidden amongst the complex multi-period landscapes of ditch-defined enclosures and boundaries typically seen as cropmarks on aerial photographs (Deegan 2007). However, archaeological excavations are identifying open settlement within the project area, such as the middle to late Iron Age settlement at Milton Ernest (Ingham 2010).

Linear settlements

In the northwest of the project area, mapping of cropmarks from a range of photography taken in different years has allowed a better understanding of the relationship between once separately recorded features. The mapping shows long linear arrangements of settlement comprising rectilinear and square enclosures. These typically extend along the slopes just below linear plateaux of boulder clay that trend southwest-northeast (Figure 23).

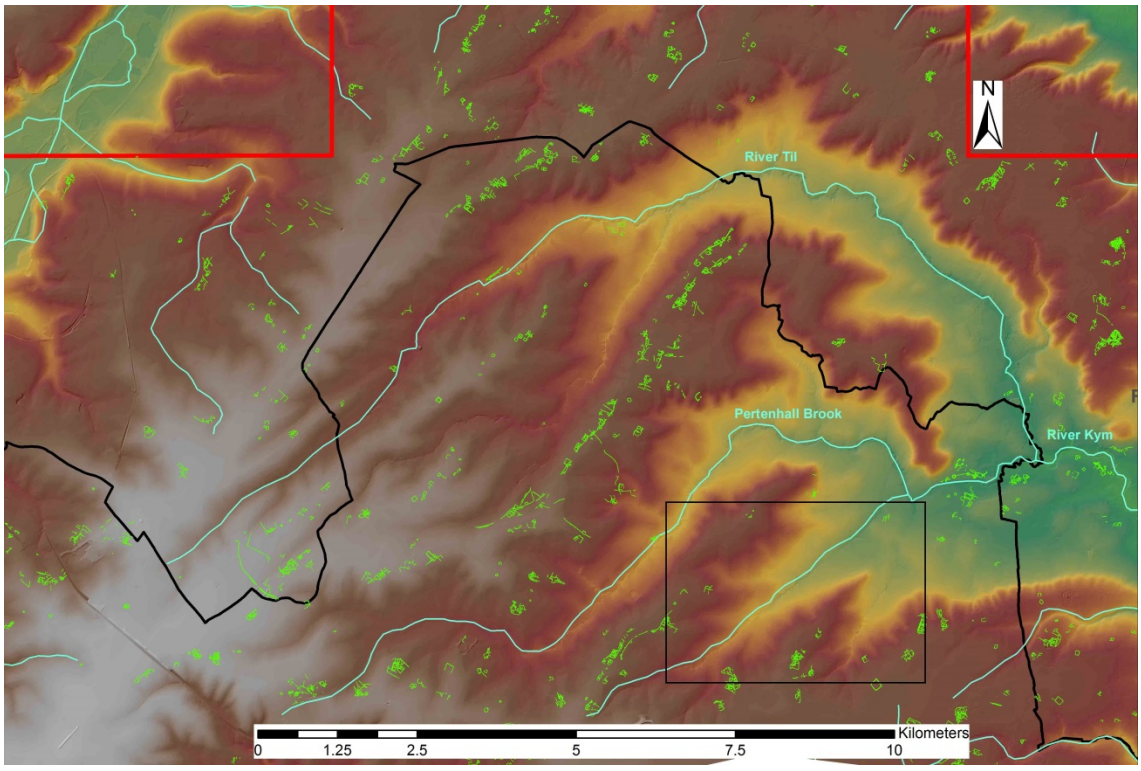

Figure 23 Iron Age/Roman linear settlements seen as cropmarks in the north of the project area, on a map rendered from 5m contours. The borough boundary is outlined in black. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence

This is particularly striking between Waley's Wood and Lower Dean, with a roughly 6 kilometres long arrangement of settlement enclosures, suggesting that topography was an important consideration in the location of settlement during these periods (Figure 24).

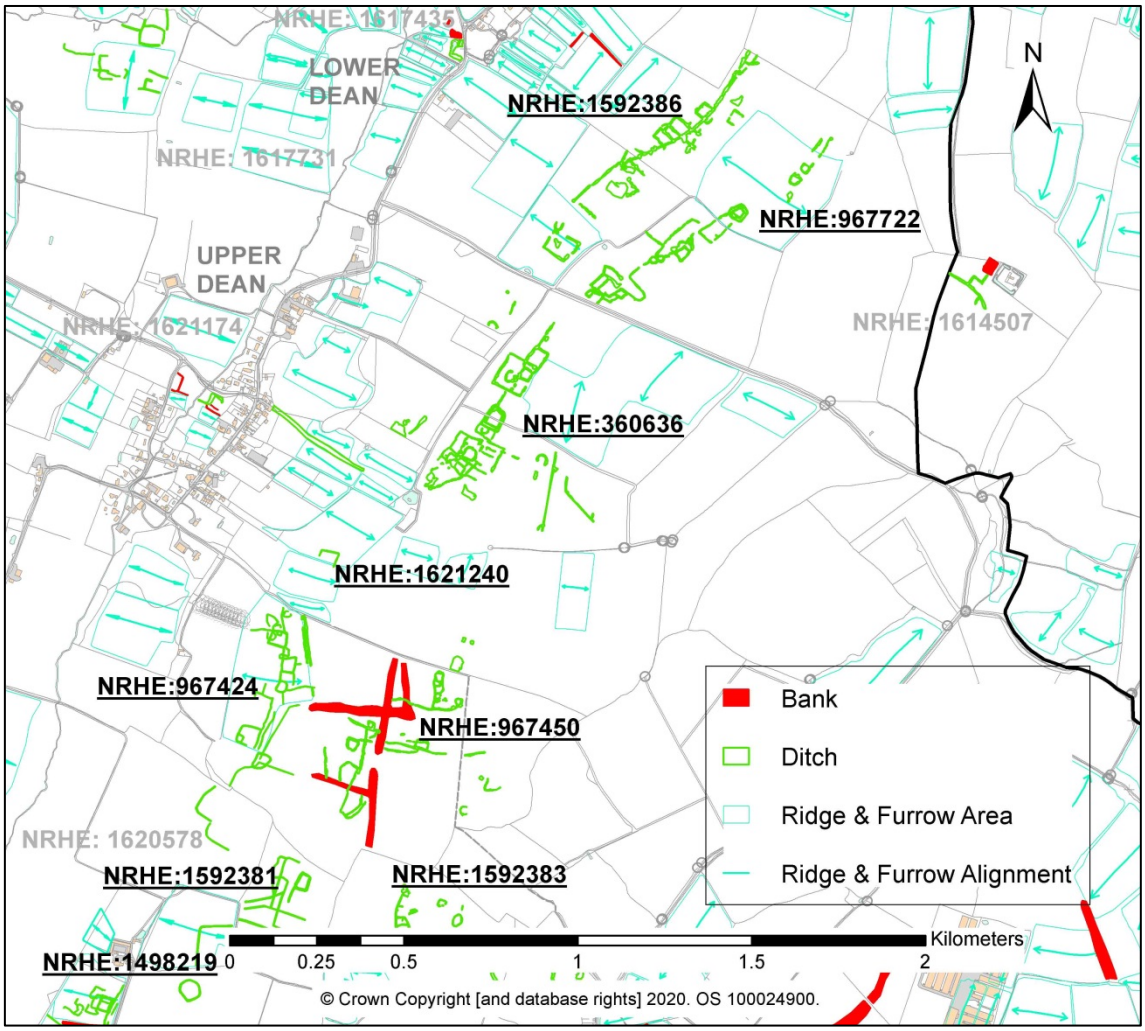

Figure 24 Iron Age/Roman linear settlement seen as cropmarks near Upper Dean in the north of the project area. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

The spit of high land between Yelden and Melchbourne does not reveal quite the same linear arrangement. However, the features that were mapped hint that a similar linear pattern exists here, but that other factors may be masking the visibility of cropmarks in this area, possibly the number of recorded blocks of ridge and furrow. If so, it is likely this area would benefit from further aerial reconnaissance in the coming years.

Isolated or 'farmstead' enclosures

There are a number of apparently isolated sites, probably indicating individual farmsteads, which are visible as conjoined enclosures. A partially excavated example at Willington (NRHE 1225485) was broadly dated to the Iron Age. There were possible roundhouses identified within the smaller enclosure and this probably functioned as the mainly domestic area with the larger enclosure used for stock (Pinder 1986). Based on similar morphology, the same interpretation and broad date may be applied to others within the project area, such as at Great Staughton (NRHE 1073264), Lowen Wood (NRHE 1587738) and Green End (NRHE 1592212 and 1593756) (Figure 25).

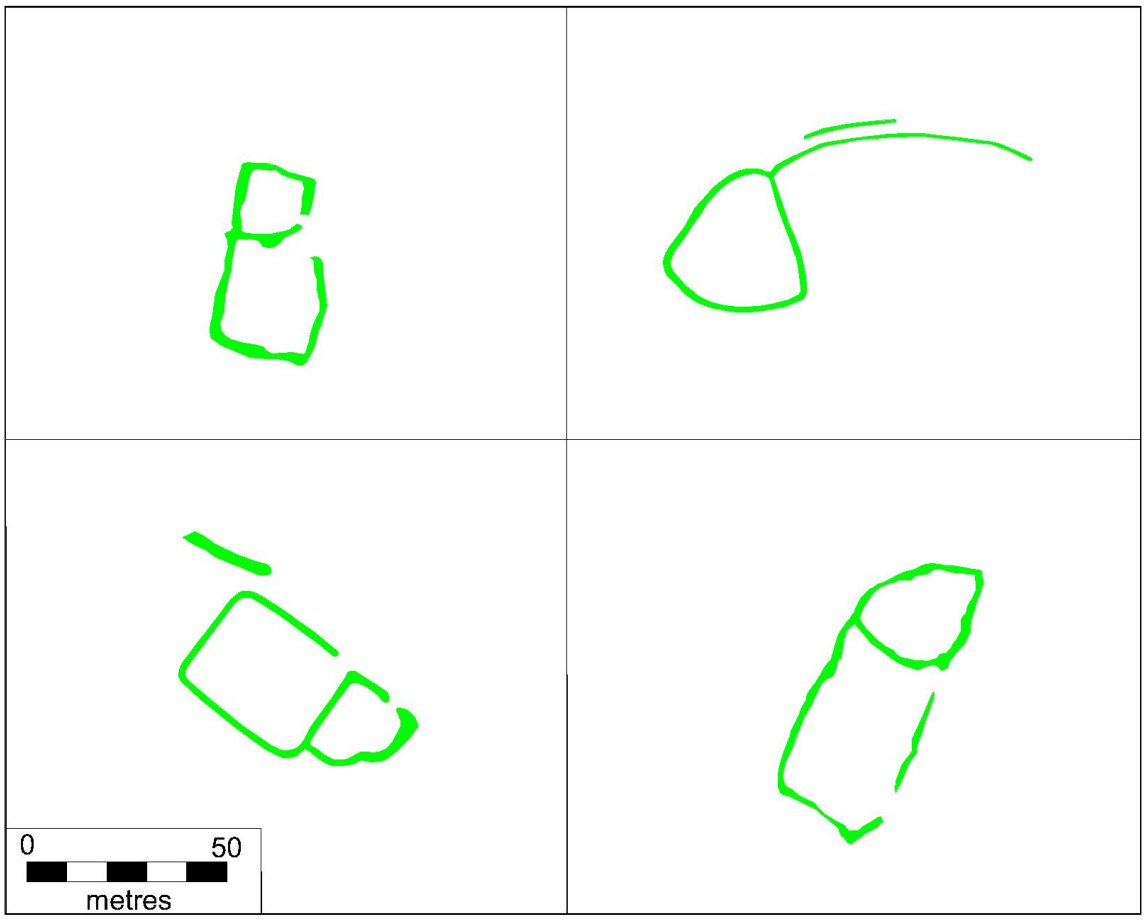

Figure 25 Ditched enclosures seen as cropmarks at (clockwise from top left) Lowen Wood, Green End, Great Staughton and Willington. Archaeological mapping © Historic England.

Some have additional annexe enclosures such as at west of Colmworth (NRHE 1592326). Some are even smaller, such as the two ring-like enclosures south of Wilden (NRHE 971287). These farmsteads are often seemingly isolated or are sometimes adjacent to larger complexes of settlement enclosures and linear ditches. Without dating evidence it is difficult to determine whether they are associated and/or contemporaneous (Figure 26).

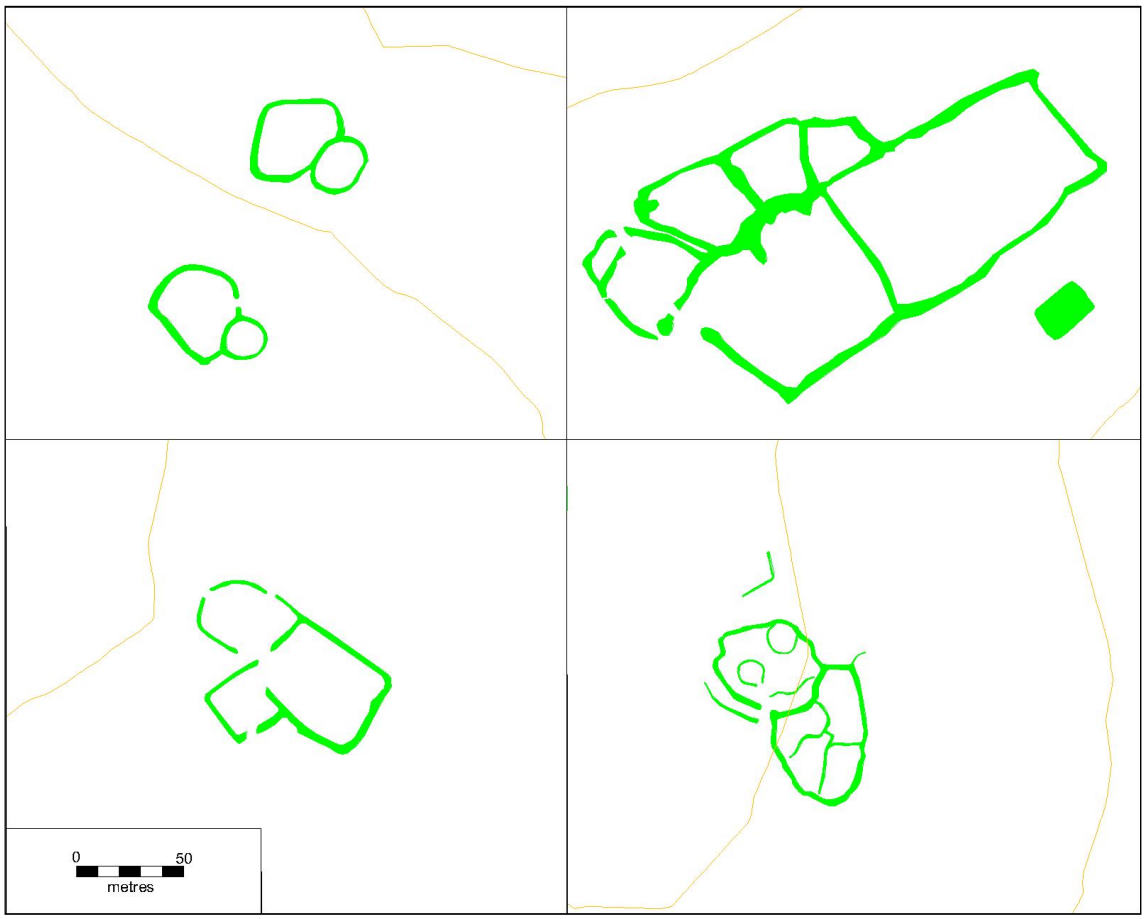

Figure 26 Cropmarks of possible farmstead enclosures at (clockwise from top left) Wilden, Stagsden, Wood End and Colmworth. Archaeological mapping © Historic England. Contours © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Speed (2010) aimed to group and characterize different farmstead forms within Leicestershire and Northamptonshire. Speed used excavated examples with a greater level of detail than is usually visible from cropmarks but further analysis such as this could be very useful in the Bedford Borough project area, especially as the settlements have broadly similar forms across the three counties. This could provide a better understanding of Iron Age and Roman family groups and larger communities with their differing and changing settlement forms over a wider landscape.

Complex enclosed settlements

Most of the settlement assigned an Iron Age to Roman date roughly extended over areas between 100m and 400m in length. They typically comprise multiple phases with circular, irregular, rectilinear and square ditched enclosures, with associated linear ditches and tracks and often include roundhouses. Phasing is problematic based upon morphology alone but excavation evidence suggests that circular features were associated with Iron Age and earlier activity, whereas overlying

rectilinear and square enclosures were associated with a Roman date (Timby et al. 2007:96).

South of Thurleigh, there is evidence of a number of different settlements types. Some features may be contemporaneous, but they are also likely to indicate shifts in settlement foci overtime. A keyhole-shaped enclosure (NRHE 1457063, Figure 27) situated south of Thurleigh shares similar characteristics to an enclosure in south west Cambridgeshire at Histon (NRHE 1593336, Knight et al. 2018: 38-39). Here it was concluded that the complex and unusual morphology 'suggests that it was of some importance, possibly with later Bronze Age or Iron Age origins, its use likely extending into the Roman period'. However, the enclosure at Thurleigh lacks the internal complexity of the site at Histon. Other examples of keyhole-shaped enclosures are located in fields near Boon's Barn, Turvey (NRHE 1458354) (Figure 28) and at Little Paxton (NRHE 1613461) (Figure 29).

Figure 27 A keyhole shaped enclosure (left) recorded at Histon, Cambridgeshire and a possible comparable example at Thurleigh (right). Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Figure 28 A variation on the keyhole shaped enclosure at Turvey (NRHE 1458354). 27055_002 29-JUN-2011 © Historic England.

Figure 29 A less clear example of a possible keyhole type enclosure at Little Paxton (NRHE 1613461). Left: Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence. Right: Earth.google.com © Getmapping plc.

In the fields between Cople and Willington is an extensive swathe of cropmarks, indicating rural settlement enclosures of diverse size and morphology that extend over 1.5 square kilometres (Figure 30). To the northwest are a series of conjoined rectilinear enclosures aligned SW-NE, to the south and southeast of which are a number of accreted irregularly shaped enclosures, all sited within a few hundred metres of each other. Further study of this complex pattern could attempt to determine whether this represents phased settlement, settlement movement over time or polyfocal rural settlement (Historic England 2018j).

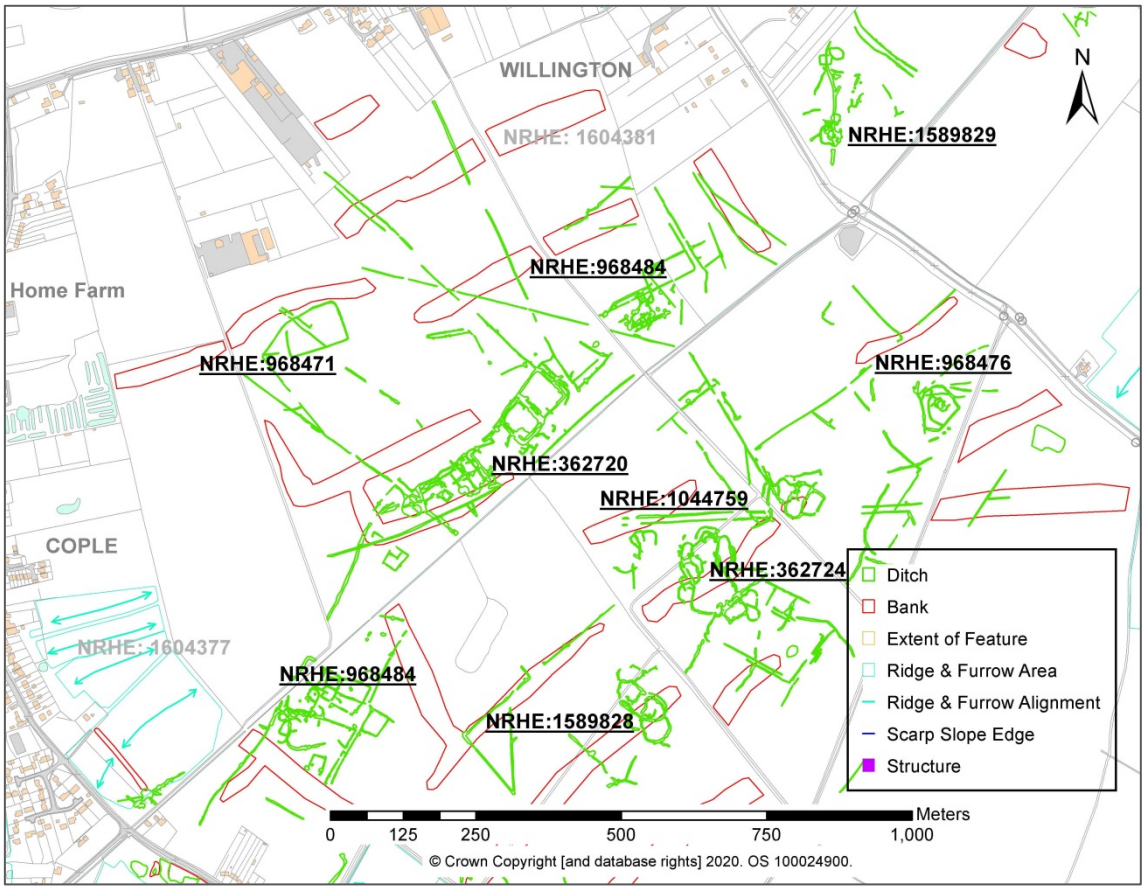

Figure 30 A swathe of Iron Age and/or Roman settlement seen as cropmarks between Cople and Willington. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Hillforts

There are few hillforts, or large settlement enclosures, within the project area and the wider region as a whole. This has been suggested to indicate that eastern England was peripheral to developments in Central Britain (Cunliffe 1974). The two hillforts mapped and recorded within the project area are not typical compared to those found elsewhere in the country. The earthworks of the small hillfort at

Mowsbury (NRHE 360543) are partly overlain by a medieval moat complex (Figure 31). Excavations in the early 1970s found Iron Age pottery and suggested use for a short period of time only, with evidence of the rampart being destroyed by fire (Dring 1971, 1972).

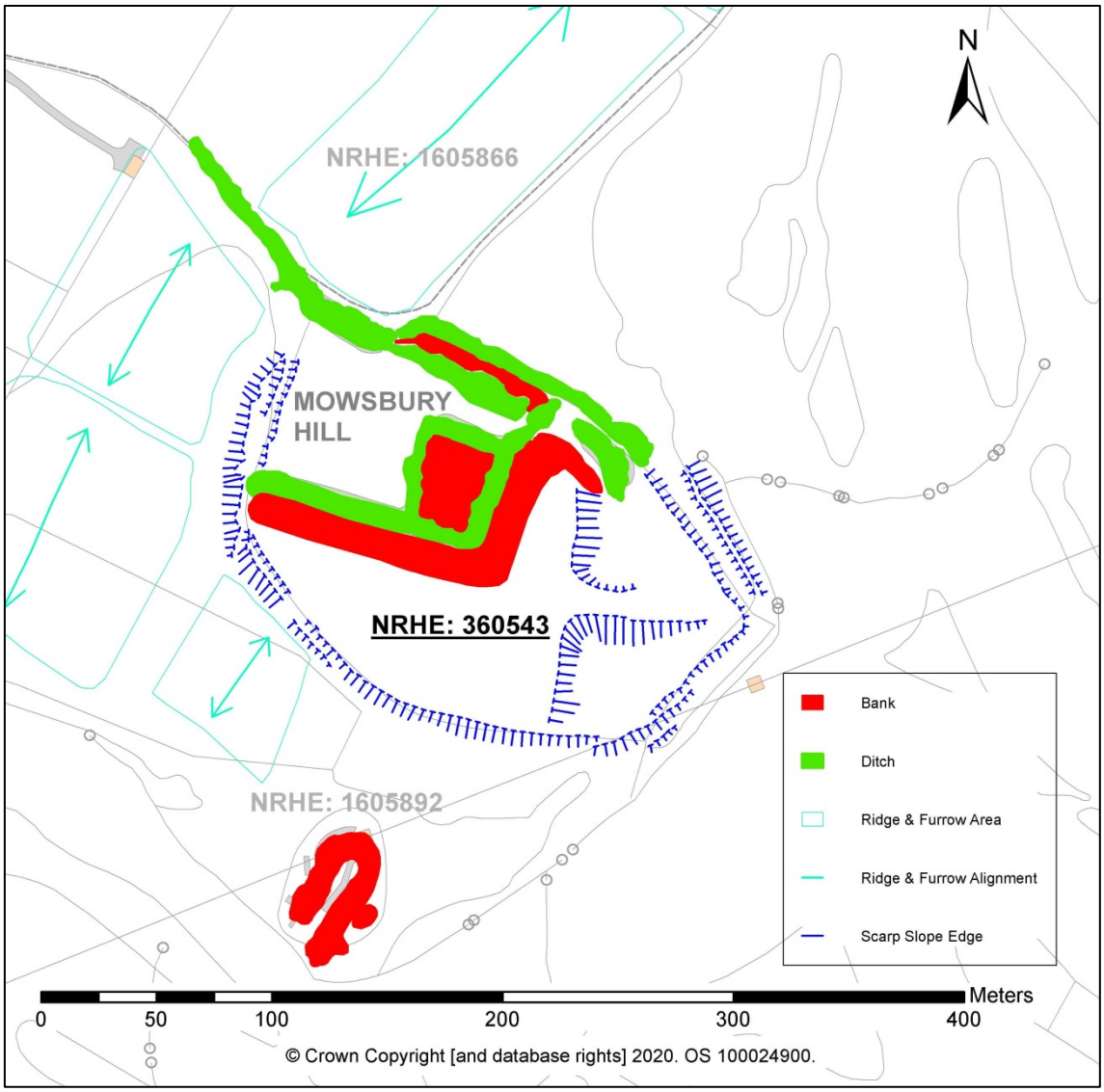

Figure 31 Iron Age hillfort at Mowsbury Hill. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

At Bolnhurst (NRHE 360303) a small univallate hillfort was also reused as a medieval moated site (Figure 32). As an unexcavated, the Iron Age date dating is debatable and Dyer (1972) suggested it is early medieval in origin, not prehistoric.

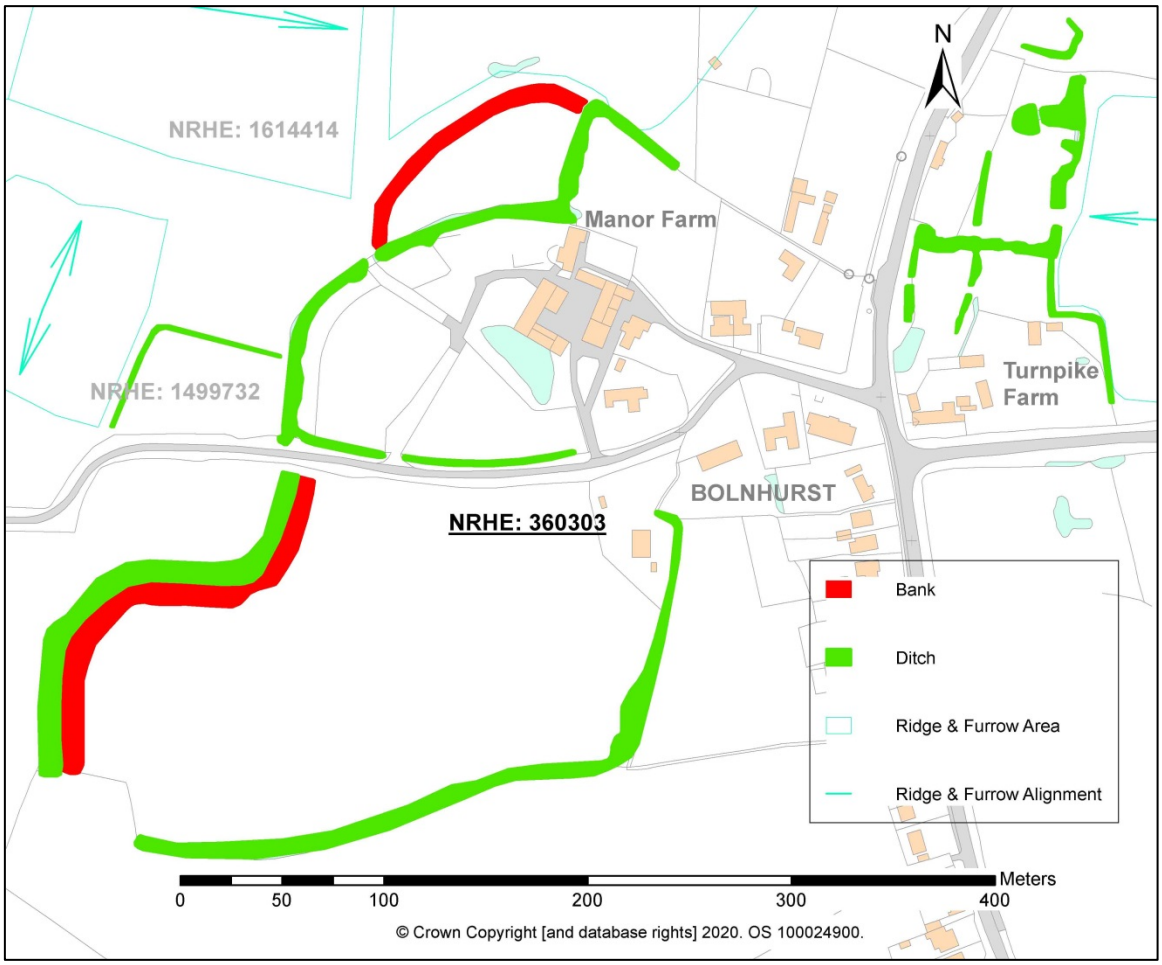

Figure 32 Supposed Iron Age hillfort at Bolnhurst that may be actually be medieval in date. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Banjo Enclosures

Nine banjo-shaped enclosures were noted within the project area. Iron Age banjo shaped enclosure had a range of functions including settlement and stock management. There were similar examples noted in Cambridgeshire apparently the focus of settlement as at Thurleigh (NRHE 1458397), or peripheral as at Keysoe Row (NRHE 161437). The Bedford Borough examples were mainly situated close to probable settlement features. They may have had a stock management function, but there is direct evidence of settlement in some. For example, at Little Staughton (NRHE 1593158) and at Clapham Park Wood (NRHE 1497170) there is a ring ditch visible within the enclosure, suggesting the presence of a round house (Figure 33). At Caldecote, an excavation showed that the enclosed ring ditch was a round-house of middle Iron Age date (Kenny and Lyons 2011: 70). A complex form of banjo-like enclosure was recorded north of Bozeat (NRHE 347145), where its

enclosure is surrounded by a double-ditched sub-circular enclosure suggesting a complex use of the space.

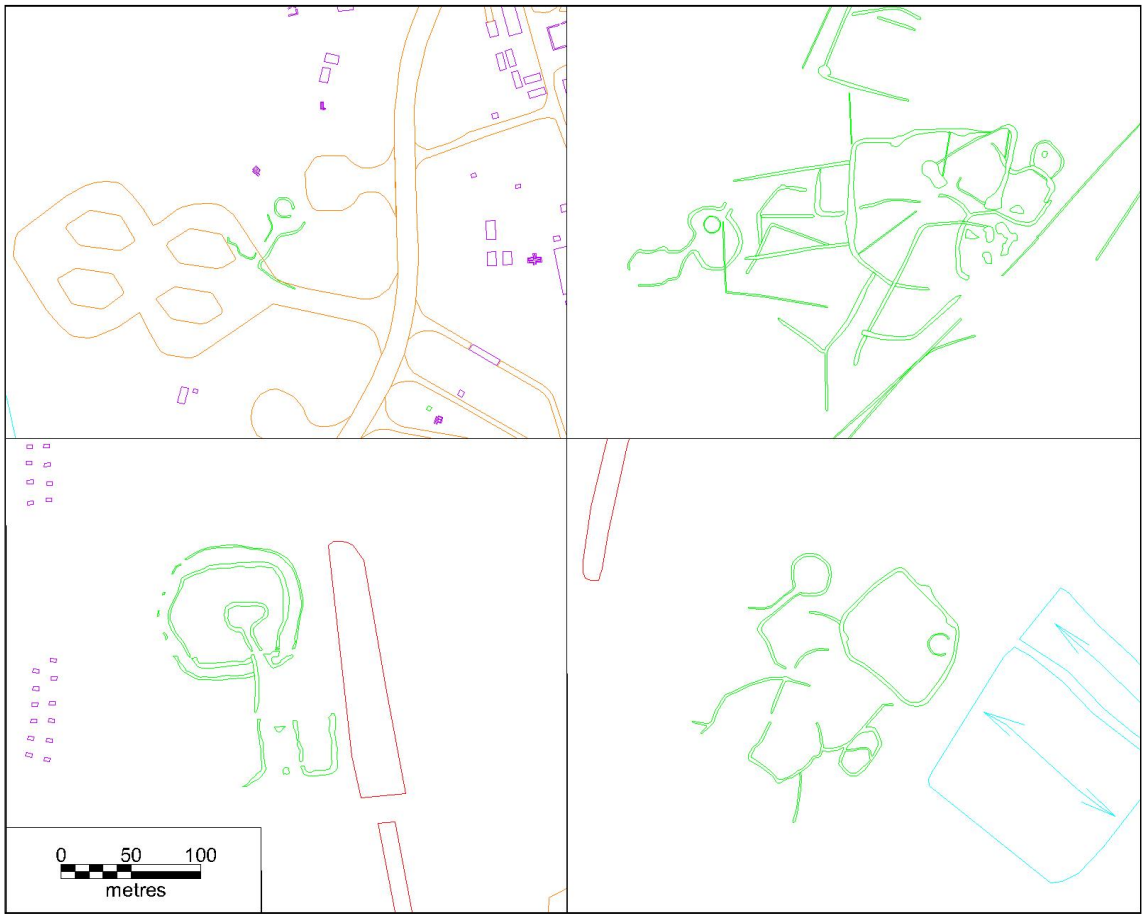

Figure 33 Banjo type enclosures recorded (clockwise from top left) at Little Staughton, Clapham Park Wood, Keysoe Row and Bozeat. Archaeological mapping © Historic England.

Clothes Line settlements

So-called 'clothes line' enclosures and associated linear ditches, although not common within the Bedford Borough project area, are intriguing nonetheless. They have been recorded from aerial photographs in Lincolnshire (Winton 1998; Boutwood 1998) and Northamptonshire (Deegan 2007). In both counties they did not appear to have a direct relationship to the local topography but are still felt to be defining different areas of land use.

There are no known excavated examples of this monument type in Bedford Borough but a similar feature was excavated at Shellington in Central Bedfordshire (Dawson 2004 in Oake et al. 2018: 7) and others in Warwickshire at Church Lawford (Areas F & AB) (Palmer 2002) and Bourton Heath (Hodgson 1991). In these cases, both were dated to the middle Iron Age period, though as some of the

enclosures were devoid of internal features, they may have been used for stock control rather than settlement (Alexander 2005: 44).

In Bedford Borough, at Great Barford, two clothes-line linear settlements (NRHE 972315 and NRHE 971713) extend between an area of Neolithic/Bronze Age funerary monuments to the southeast and areas of prehistoric settlement to the northwest (Figure 34). One of the small rectilinear enclosures that adjoin the linear ditch may also overlie an earlier ring ditch and certainly respects a larger probable barrow (NRHE 972312).

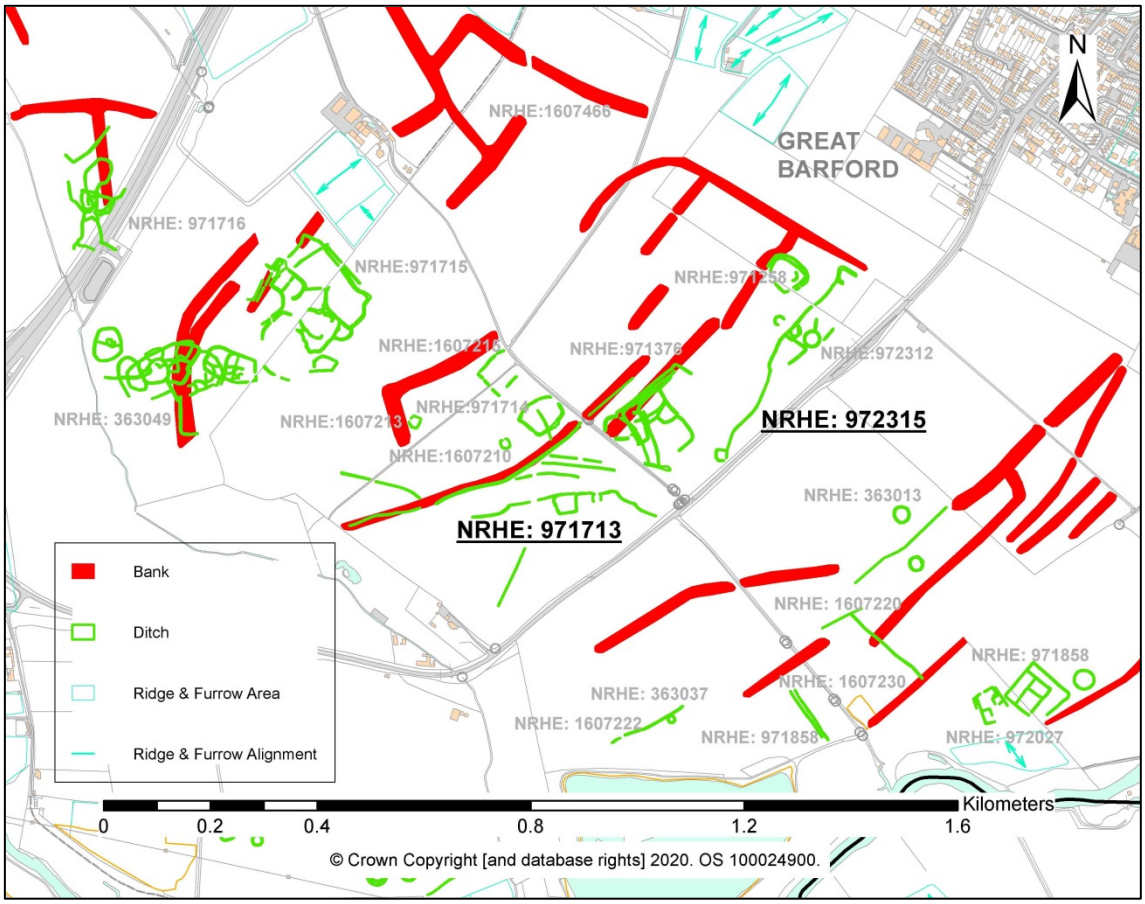

Figure 34 Cropmarks at Great Barford indicate a clothes-line settlement between an area of Bronze Age funerary monuments and other settlement. The banks are medieval features. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

At Riseley (NRHE 1496717) and Lower Dean (NRHE 1592386), the 'clothes line' appears parallel to linear arrangements of enclosures suggesting they were contemporary or at least laid out in relation to each other (Figure 35). West of Stevington (NRHE 1459544) there is a fragmentary evidence of a clothes-line ditch that describes an arc that partially encloses an area with enclosures on the inside and outside of the boundary. (Figure 36).

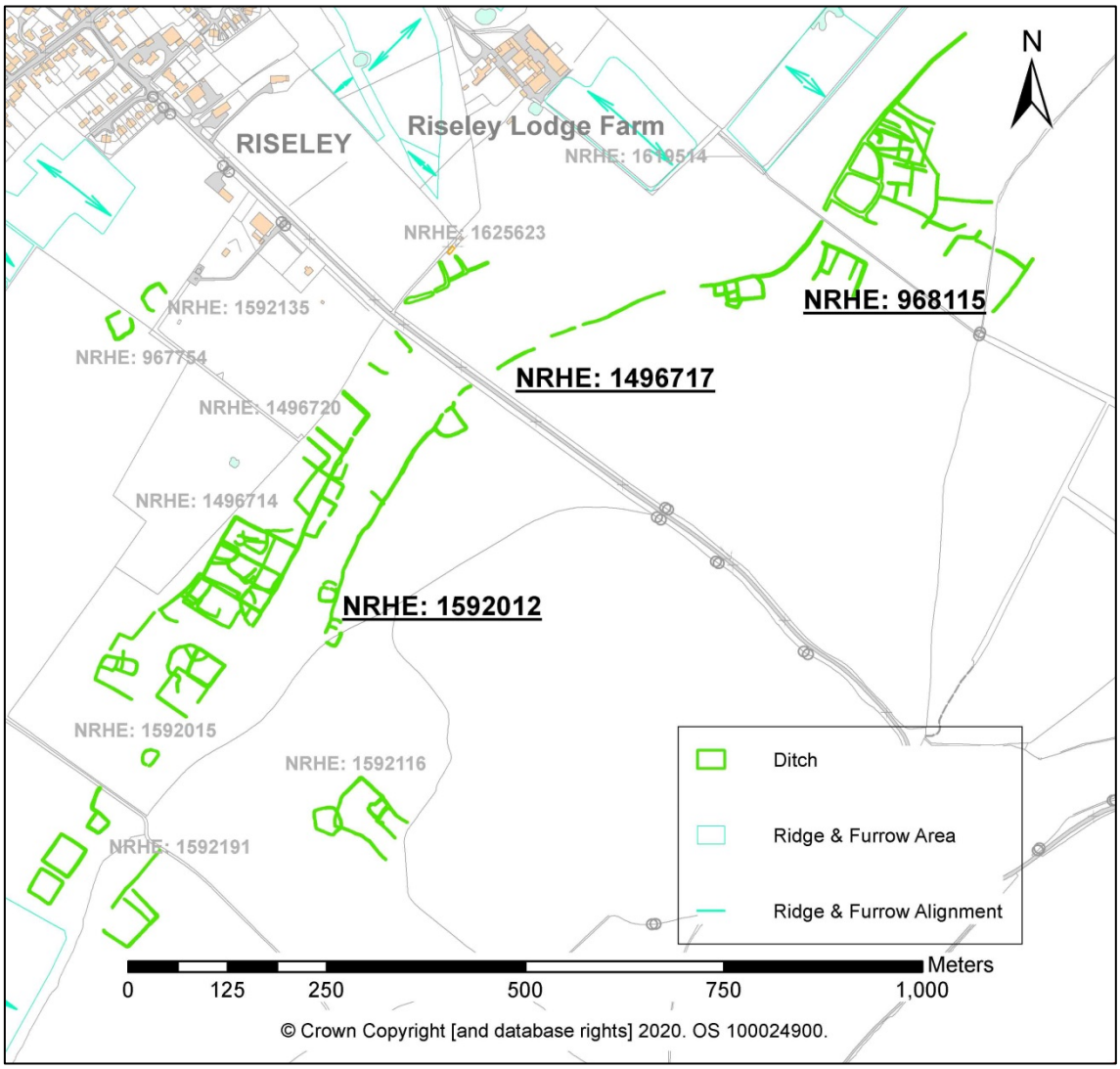

Figure 35 Riseley clothes-line and other possible settlement enclosures seen as cropmarks. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

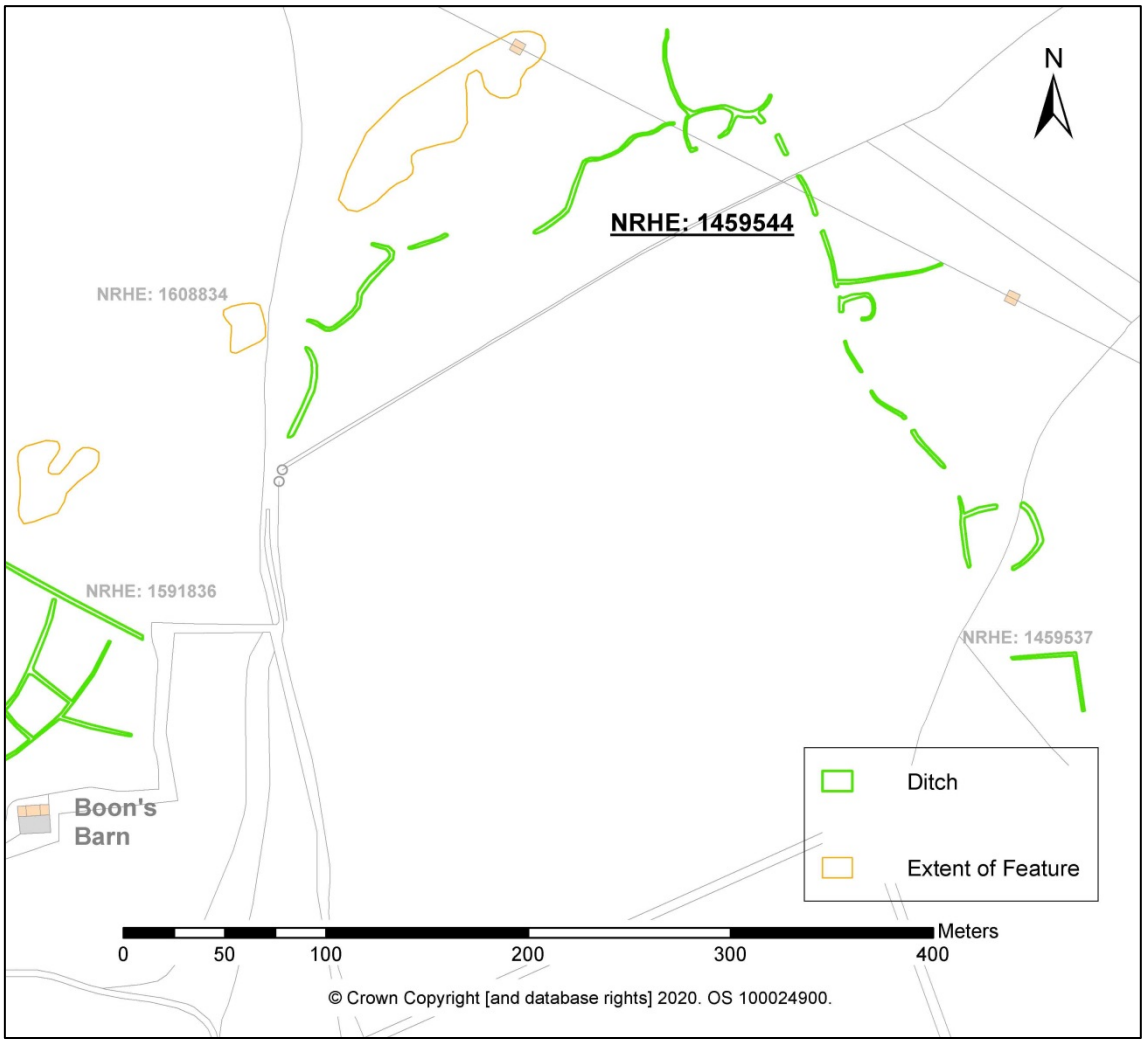

Figure 36 Mapping of Stevington 'clothes-line' settlement and boundaries seen as cropmarks. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Multiple Iron Age Linear ditches and Pit Alignments

Multiple linear ditches and pit alignments were visible along the River Great Ouse valley and are common archaeological features in the region (Jones 2003), including neighbouring areas of Northamptonshire (Deegan & Foard 2007), Lincolnshire (Bewley 1998) and Cambridgeshire (Knight et al. 2018). The Northamptonshire NMP project recorded numerous pit alignments, one of which extended over two kilometres (Deegan & Foard 2007: 82). Dating of those various alignments appears to extend from the Late Bronze Age and through the Iron Age. Some are visible as coherent systems, whilst others are fragmentary. Pickering (1978) postulated that these impressive multiple-ditch systems were perhaps associated with the Icknield Way, a supposed ancient route way from Norfolk to Wiltshire, as there are examples either parallel or perpendicular to it. Examples recorded for the Lincolnshire NMP project (Boutwood 1998: 34) found that there

was an association with water courses, a relationship also suggested in Bedfordshire.

In Bedford Borough, at Willington (NRHE 1607257), there is an Iron Age triple-boundary (Figure 37). This partially excavated site comprises a pit alignment, a ditch and a third boundary defined by both pits and ditch segments (Network Archaeology 2001)

Figure 37 Pit alignments outside Willington. 27075_038 29-JUN-2011 © Historic England.

The combination of different forms of boundary was found through excavation, but not visible on aerial photographs, at College Farm, Great Barford (Abrams 2005). A middle Iron Age pit alignment is parallel to three linear ditches. A subsequent ditch that followed the backfilling of the pit alignment suggested a continued effort to demarcate the land. The sites at Willington and Great Barford extend towards the River Great Ouse. At Willington another triple-ditched boundary (NRHE 1607420), which is orientated east-west, may have formed a junction with it. There is another multiple-ditched boundary at Eastcotts (NRHE 966354), where it too extends towards the river. Excavations dated these to the Iron Age.

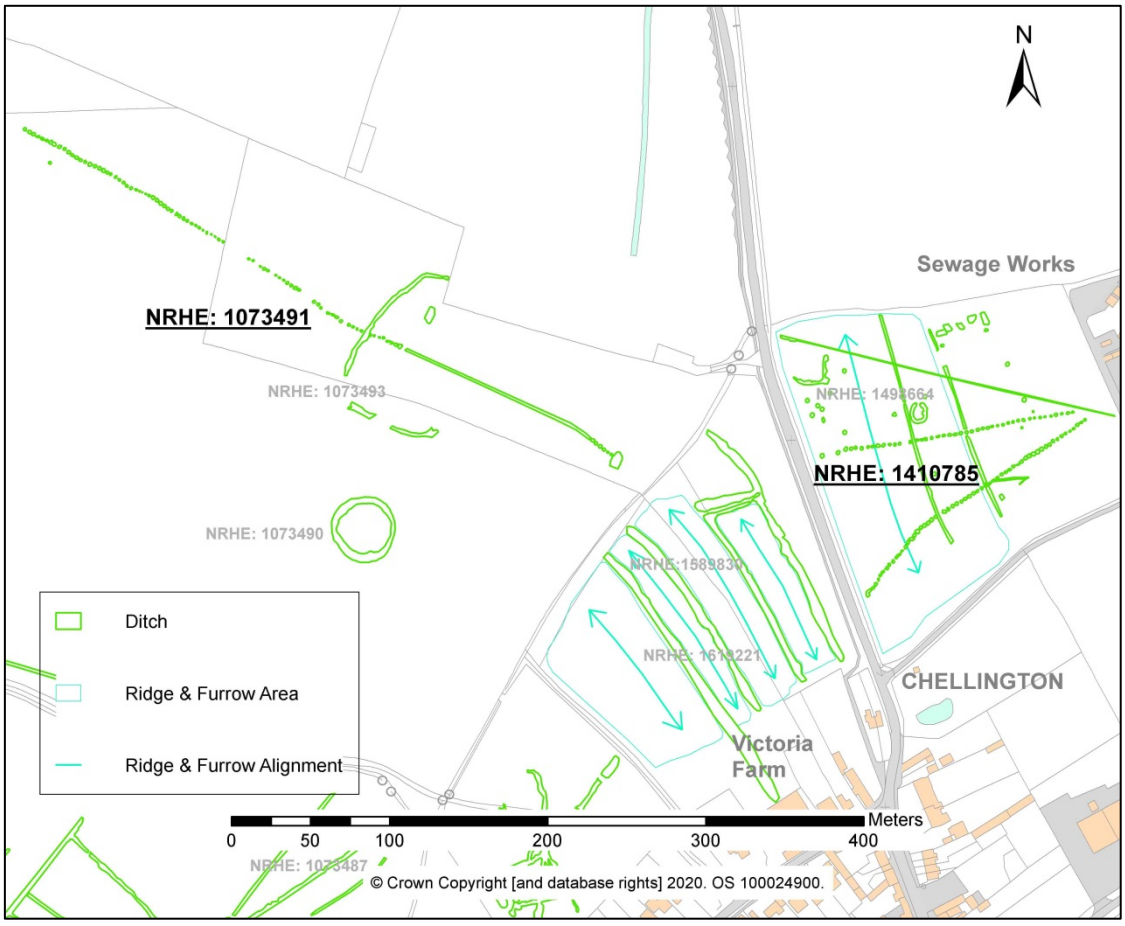

Figure 38 Pit alignments at Harrold. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Other pit alignments appear to define single linear boundaries, often perpendicular to the river, as at Harrold (NRHE 1073491) (Figure 38) and Cold Brayfield (NRHE 1609501, Figure 39). At the Biddenham loop, a pit alignment extends about 910m west to east (NRHE 966239), cutting across the land enclosed by the large bend in the River Great Ouse (Figure 40). Excavations of some of these pit alignments in advance of development revealed that most pits were sub-rectangular or sub-circular. Their shape and spacing appeared to reflect different geological areas. The more rounded pits were found in looser gravel soils spaced apart about a metre. Sub-rectangular pits were spaced 1 to 2m apart in compact sandy clays. Artefact

deposits within the pit alignment ranged in date from the Bronze Age to the Early Iron Age (Luke 2008: 121, L148). At Odell (NRHE 965959), a pit alignment also borders a bend within the river, perhaps performing a similar function (Figure 41).

At Tempsford (NRHE 161175), the pit alignment is located a short distance away from the river and seems to relate more to the Roman settlement and trackway (Figure 42). At Southfields Farm Cottage (NRHE 346990), a short section of linear pits is associated with other linear ditches and not far to the north similar short sections of mapped linear pits seem to separate areas comprising other archaeological features, possibly bounding and separating earlier prehistoric monuments (Figure 43).

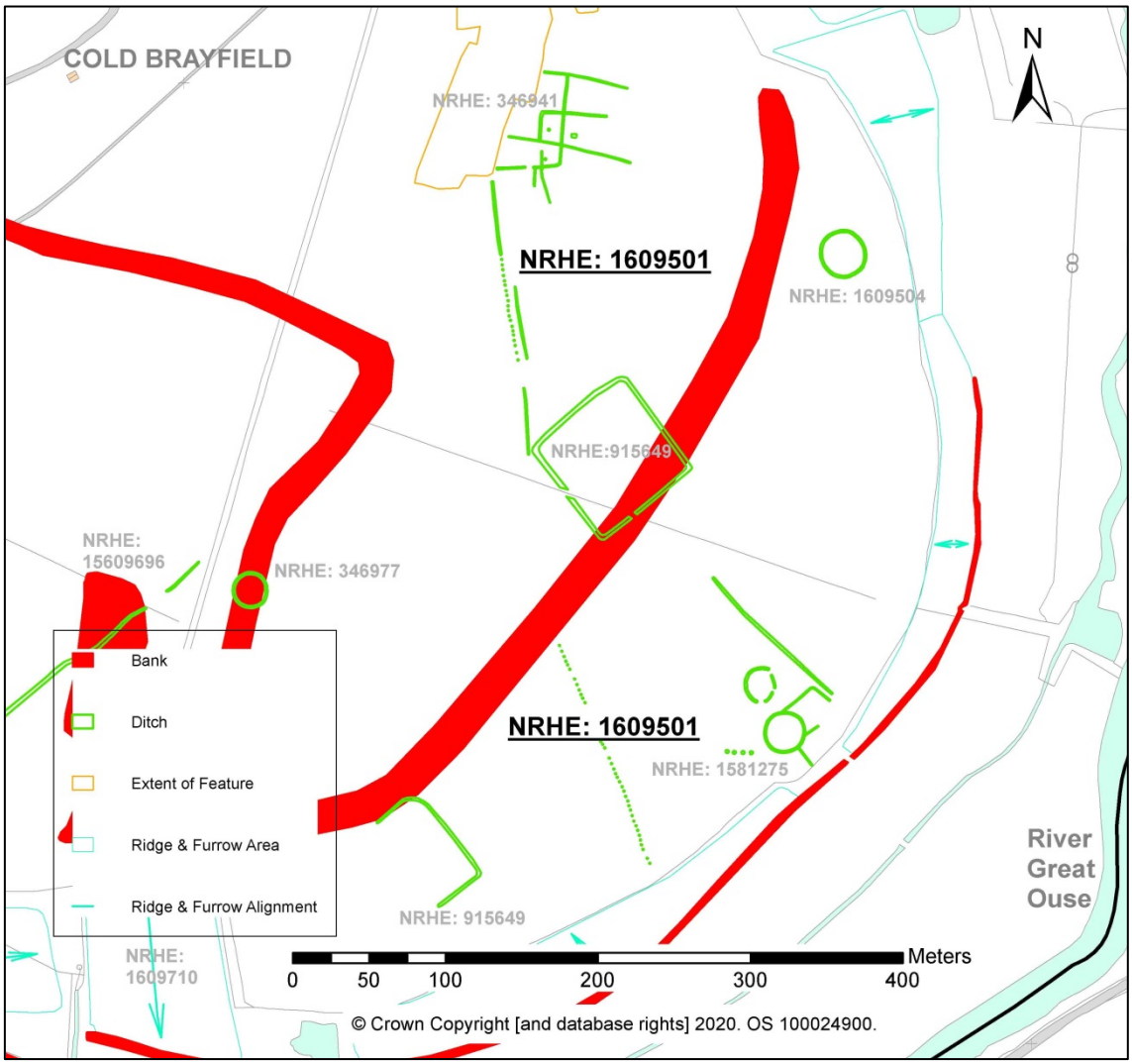

Figure 39 Pit alignments at Cold Brayfield. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

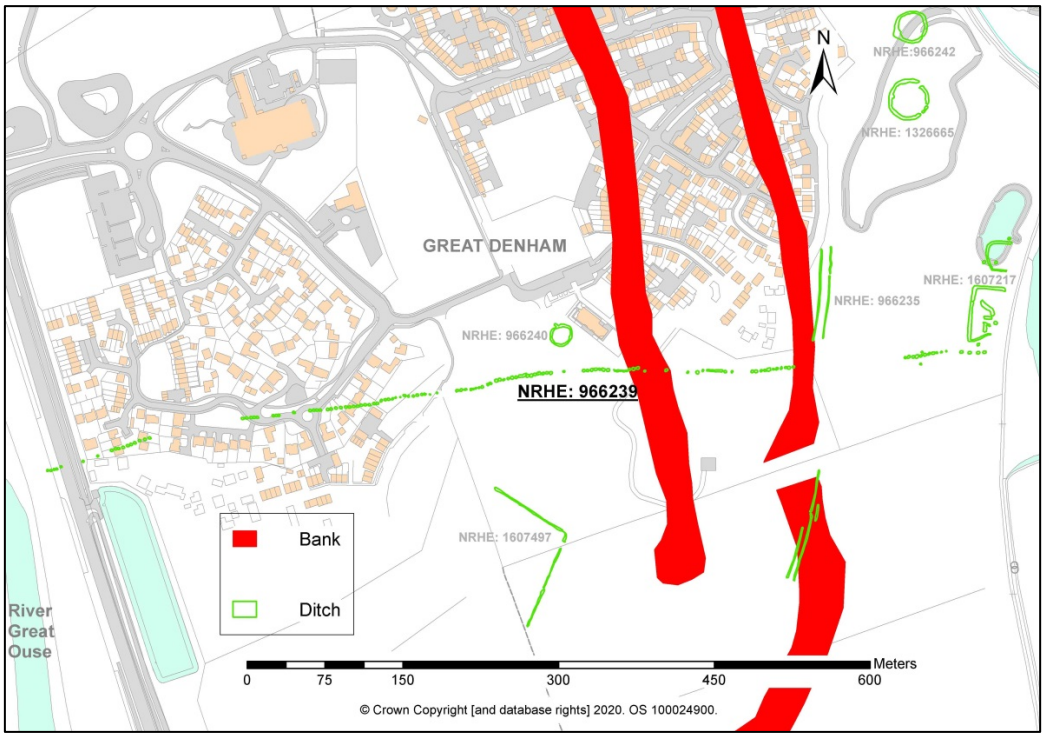

Figure 40. Pit alignments at Biddenham. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

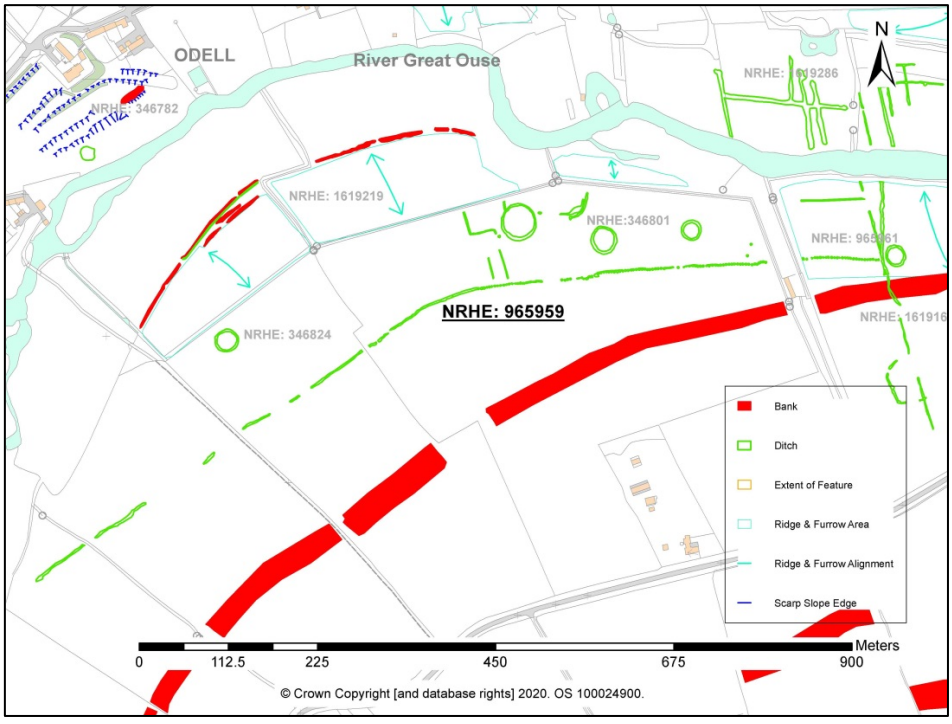

Figure 41 Pit alignments at Odell. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

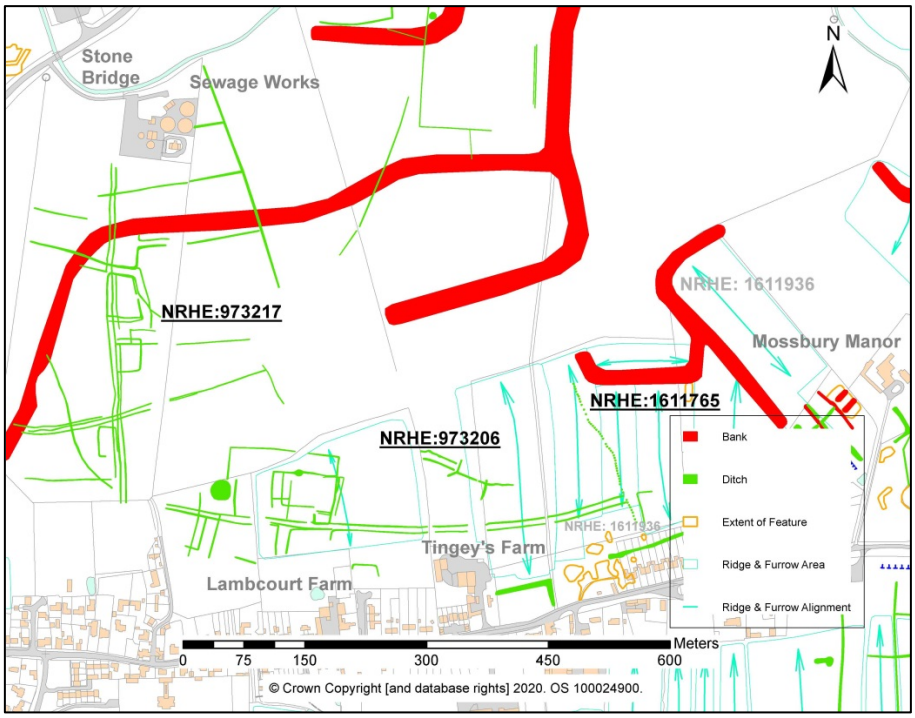

Figure 42 Pit alignment at Tempsford (NRHE 1611765). Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

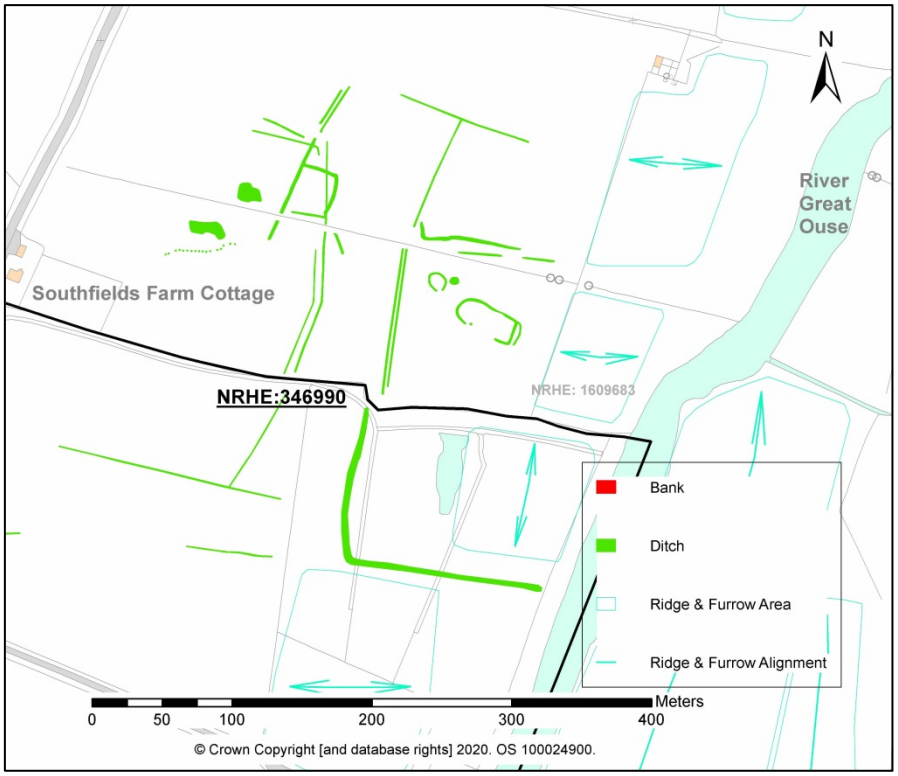

Figure 43 Pit alignment at Southfield Farm Court, Turvey. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Roman Villas

Within the Bedford Borough project area there are only three positively identified Roman villas. A further nine were interpreted as villas based on their form and pottery finds. This contrasts to Northamptonshire where 93 villas are recorded (Deegan & Foard 2001: 113). The NRHE database also records 188 Roman villa sites in Lincolnshire and 41 in Cambridgeshire including the excavated example at Great Staughton (NRHE 363484) (Greenfield 1995). The lower number recorded in the Bedford Borough project area could reflect a difference settlement during the Roman period. Simco (1984: 19) suggested the area was not a significant part of the Roman province of Britain and that the social hierarchy during the Roman period was still firmly rooted in the Iron Age, and that Roman influence was less than elsewhere. Further work is required to establish if this is the case. Possible villas were identified based on the form of the associated ditched enclosures, such as at Great Barford (NRHE 972027, Figure 44) and Milton Ernest (NRHE 360453, Figure 45), both located on the banks of the River Great Ouse.

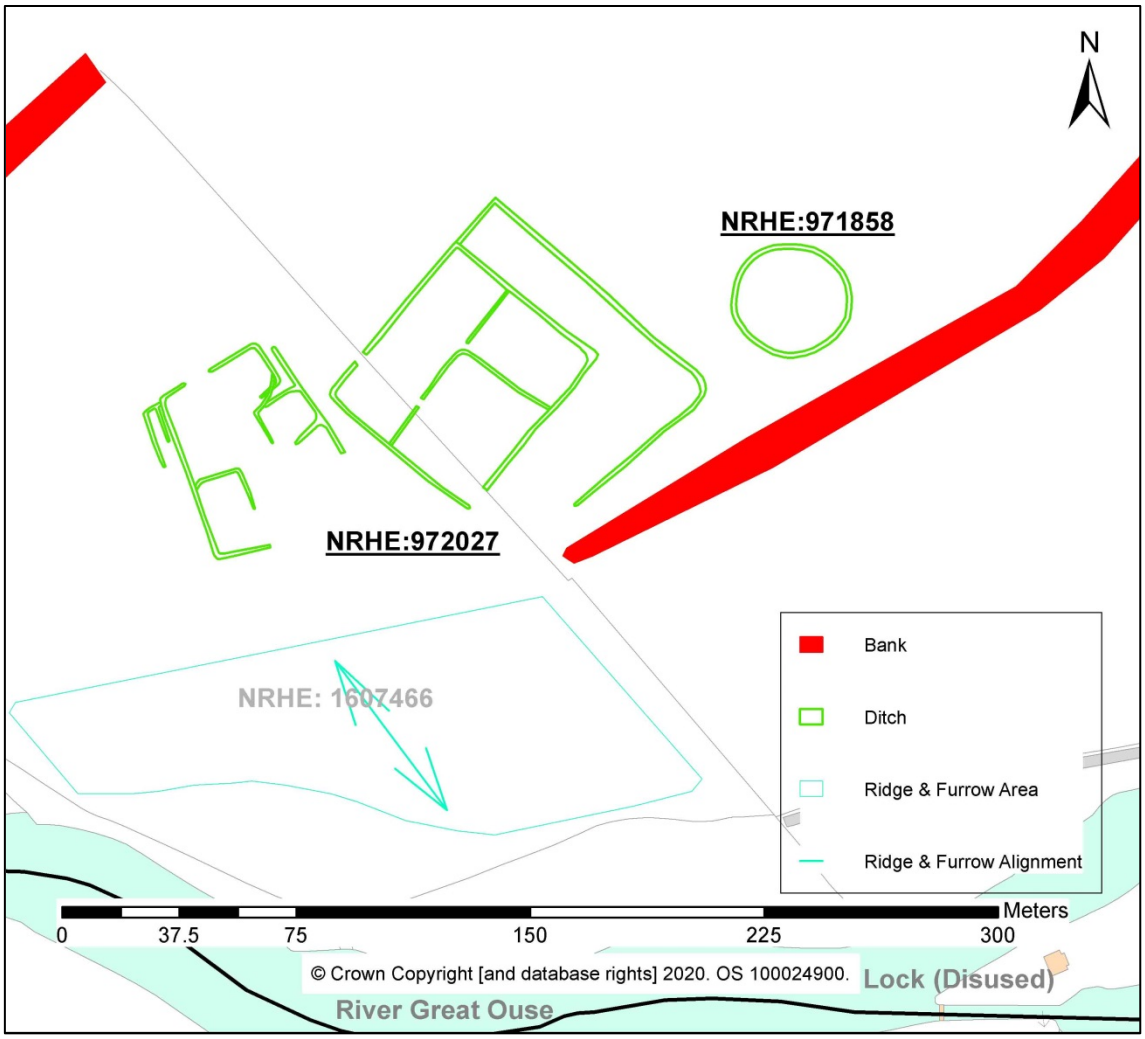

Figure 44 Possible Roman villa at Great Barford. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Figure 45 Possible Roman villa at Milton Ernest. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Near Bletsoe, a Roman temple (NRHE 1410831) and a neighbouring rectilinear enclosure, possibly the site of a villa (NRHE 1410832) seems to indicate an important Roman site (Figure 46). The possible temple is visible as a near square enclosure measuring about 36m across internally, with a gap in the southeast side that may be an entrance. Within there is a circular enclosure about 25m in diameter that appears to cut or overlie an internal square enclosure rather than completely enclose it, suggesting they are not contemporaneous. Within the circular and square enclosure are possibly further features which resemble conjoined ring ditches, but they are too indistinct to interpret.

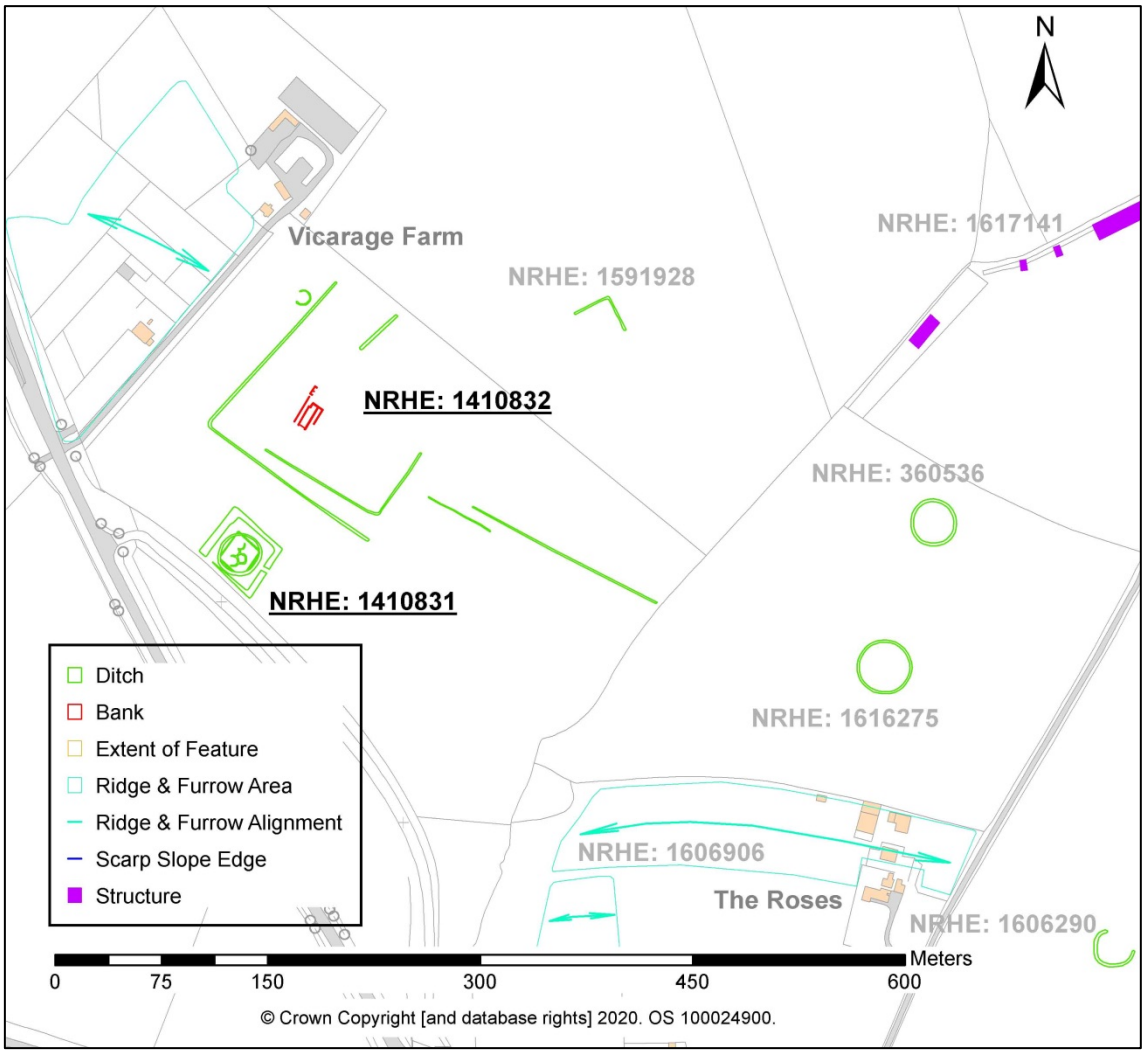

Figure 46 A possible Roman temple and villa at Bletsoe. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Roman towns

Prior to this project, there were two recorded larger Roman settlements within the project area, at Higham Ferrers and Irchester, known from aerial photographs and excavations. The paucity of recorded towns or substantial Roman dated settlements within the project area might suggest that, in that period, this area was largely rural in nature, with mainly small population centres.

However, the important discovery of a large probable Roman settlement may warrant a reappraisal of this suggestion (NRHE 1593753). It is situated near Great Staughton adjacent the River Kym and was first identified from Historic England aerial reconnaissance photography taken in 2011. The site has a linear layout and covers just over 1 kilometre extending southeast from Stoughton Manor to Rushey Farm (Figure 47).

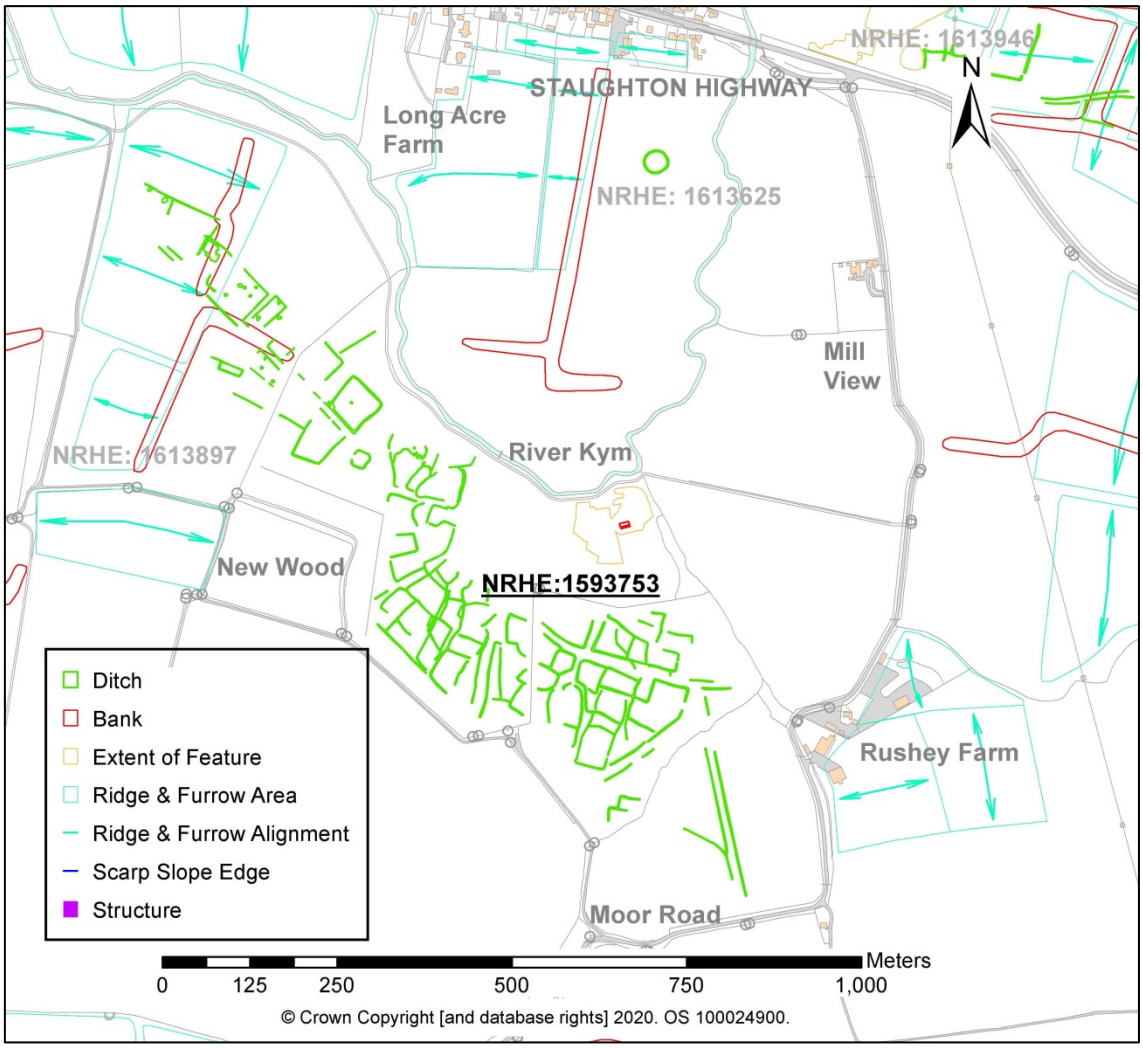

Figure 47 A Roman town at Great Staughton adjacent the River Kym. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

To the south of the town, across Moor Road, is a scheduled 4th century AD villa and bath-house (NHLE 1006866), which post-dates an earlier Roman building and earlier Iron Age activity (Greenfield 1995). To the north of Moor Road there appears to be a ditch-lined road, 9m wide and 285m long, aligned roughly north to south. This appears to form a junction with a road at the south end of the settlement. The road to the south could be part of the highly speculative route of a suggested Dorchester-on-Thames to Alconbury Roman road (NRHE 992825). From this junction, the settlement road curves northwest, connecting with further junctions on both sides of the road that connect to further minor roads. Bordering these are a series of contiguous rectilinear and sub-rectangular ditched enclosures. The north-west part of the settlement appears to have a straight southeast-northwest aligned main road, flanked by large, square and rectilinear ditched enclosures. It is notable that the northwest of the settlement appears to be more regular in layout, becoming more accreted in appearance in the southeast. This perhaps represents expansion or shift, as occurred at Higham Ferrars. This large

settlement does not appear to have been excavated or studied in-depth and it is strongly recommended that it be subject to further research, especially in context with the wider Roman landscape.

In contrast, at Irchester (NRHE 347066) there is a multi-phase Roman walled town located on the southern banks of the River Great Ouse (Figure 48). Excavations in the 1960s suggested occupation of the town from the 2nd to 4th centuries AD, perhaps starting as an auxiliary fort (Knight 1967, Burnham and Wacher 1990). Cropmarks on aerial photographs taken prior to 1990 show the layout of roads and many of the buildings within an earthwork rampart. Fieldwork suggested that the settlement extends south of the A45 (Butler 2004).

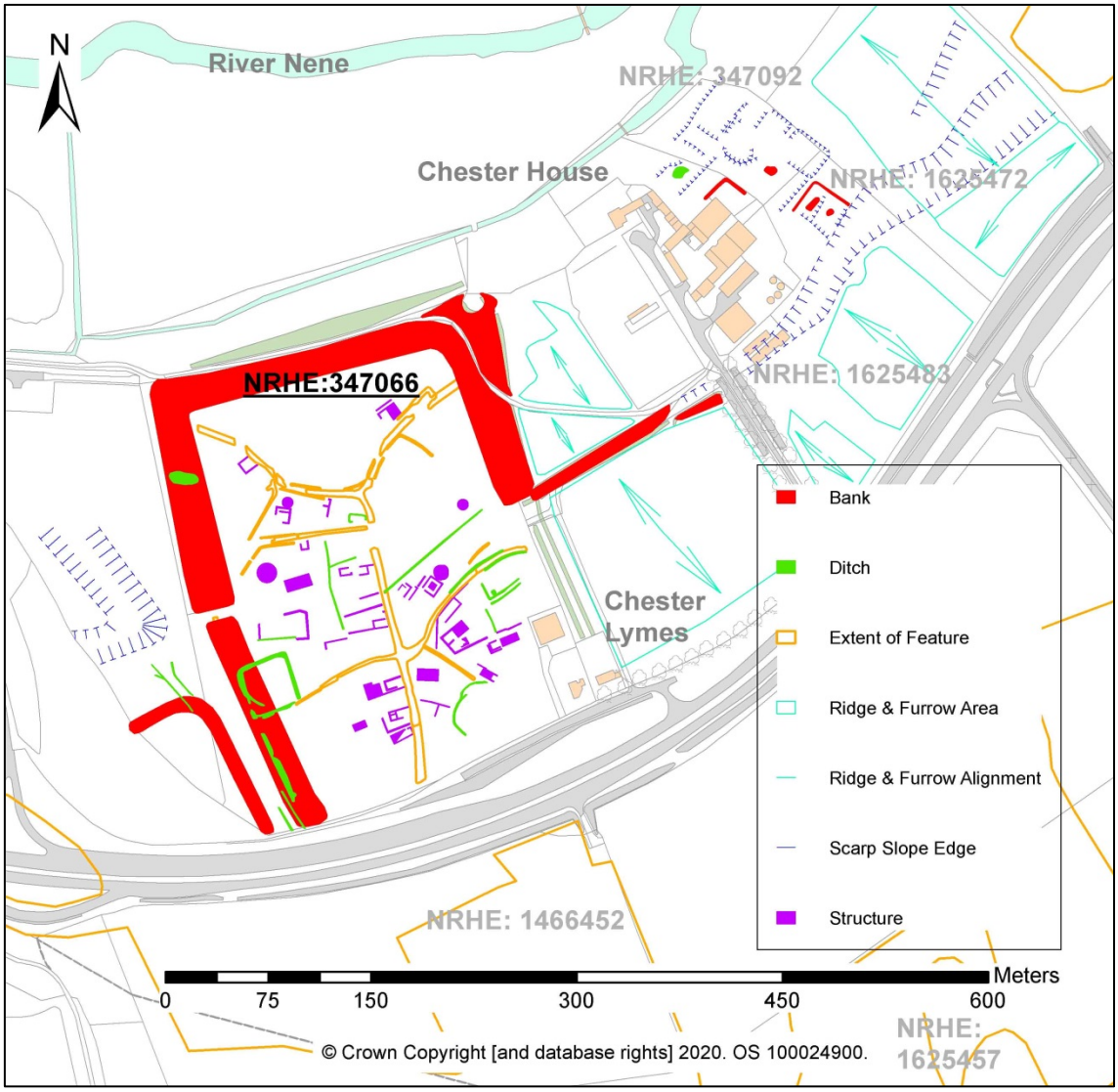

Figure 48 The Roman town at Irchester. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2019. All rights reserved. Ordnance Survey Licence number 100024900.

Not too distant from Irchester there was a Roman roadside town or large roadside village at Higham Ferrars (NRHE 965115), established in the 2nd century AD and abandoned in the 4th century. The area was extensively surveyed by geophysics and later excavated in advance of a new housing development from 2001-2003. The settlement may cover an area of around 4 hectares. Excavated evidence suggests the settlement originated in the early 2nd century AD, with a north-south aligned road along the western side of the settlement and a cluster of circular houses at the southern end. This layout was replaced in the 3rd century with newly-built domestic rectangular buildings set out along the length of the road, each plot enclosed by rectangular boundary ditches. There was also a temple site constructed in the village (Smith et al. 2009). Not all aerial photographs of this site were available during the Bedford Borough project and therefore some features were not mapped but it was mapped for the Northamptonshire NMP project (Northamptonshire HER 3200).

It is possible there are other roadside settlements within the project area, such as at Tempsford (NRHE 973206 and 973217), where a north-south and east-west trackway is visible with linear ditches and enclosures on either side.

Early Medieval Settlement

The project mapped and recorded little evidence of early medieval activity, especially when set against the widespread settlement evidence of the Iron Age and Romano-British periods and the ubiquitous organised field systems of the medieval period. No new early medieval settlement sites were identified and knowledge of settlement distribution is still largely derived from cemeteries.

In the NAIS SW Cambridgeshire aerial investigation and mapping project area, 12 kilometres to the east of the Bedford Borough AIM project's eastern boundary, excavated evidence suggests that many of the typical Romano-British sites on clay soils continued to be occupied after the 4th century AD with occupation that was more archaeologically discrete. It is also possible that much of the early medieval settlement evidence lies beneath medieval villages, such as those identified in Domesday Book (Knight et al. 2018: 47).

Figure 49 Manor Farm, Southoe: earthworks and cropmarks indicating a possible early medieval settlement site. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

The most extensive possible early medieval recorded site in the Bedford project area is at Manor Farm, Southoe (Figure 49). Here, earthworks and cropmarks indicate the site of what is thought to be a defended or enclosed 'Late-Saxon' settlement

(NRHE: 363251). On the northwest side of a sub circular moat there is a dog-legged fosse, or ditch, that apparently served as an outer defence on that side. Excavation in the late 1930s (Lethbridge and Tebbutt 1939) uncovered, amongst other features, a pre-Conquest rectangular enclosure nearly 30m long surrounded by buildings roofed with Collyweston tiles, laid over a thick occupation layer. Historic aerial photographs taken in the 1940s suggest that the enclosure ditch was an extant but shallow earthwork at that time, but in subsequent decades it has been plough-levelled.

Other features that may possibly have origins in the early medieval period or earlier are the system of earthwork embanked boundary banks that dominate the mapping in the west, east and northwest of the project area. A comprehensive analysis of these embanked boundary systems and common-ways fall outside this highlight report, especially given the lack of positive dating evidence and their distribution over such an extensive area. Moreover, the embanked boundaries are too morphologically homogenous to be able to assign a date from aerial mapping alone.

Medieval Agriculture and Settlement

Significant medieval activity was recorded throughout the project area (Figure 50). The sites recorded were visible mainly as earthworks on historic aerial photographs dating to the mid-20th century, but a number were recorded from lidar data.

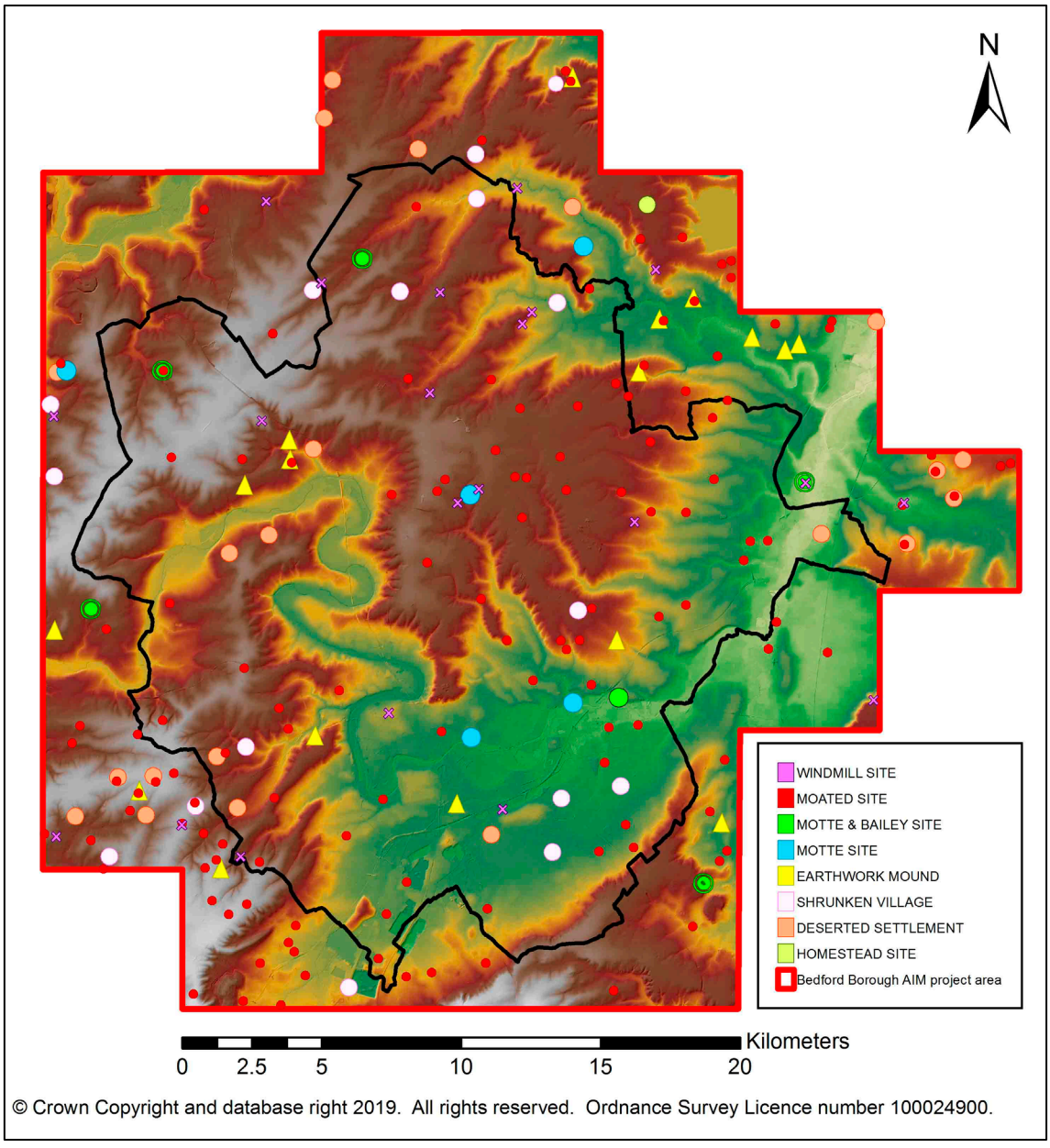

Figure 50 The distribution of key medieval sites in the project area, along with earthwork mounds of uncertain function that may be medieval in origin. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Settlement evidence includes motte and bailey castle earthworks (e.g. 12th century Bedford Castle NRHE 360158), large moated sites, smaller homestead moats, platforms and ditched enclosures associated with crofts, tofts and village abandonment or shrinkage. Other medieval evidence is widespread, from mills, mill

mounds and woodland banks, to the remnants of the former common open-field system. Swathes of contiguous ridge and furrow cultivation, furlong boundaries, field boundary banks and ditches are interspersed with an extensive system of hollow ways and trackways.

Mill sites and mounds

The significance of historic cereal production within the project area is shown by the 21 probable medieval and/or post-medieval windmill sites recorded by the project (purple crosses on Figure 50). These were seen as earthwork mounds or as cropmarks indicating buried mounds sometimes with enclosing ditches. A further 17 earthwork mounds (yellow triangles), could indicate the site of windmills.

Figure 51 Mill mound earthwork at Agden Green in 1947. Extract from RAF/CPE/UK/1925 RS 4283 16-JAN-1947 Historic England RAF Photography.

In 1552 there was a windmill recorded at Agden Green and a 1646 map depicts an extant windmill. A heavy surface scatter of fragmentary mill stones and late medieval pottery were found in the vicinity. The sub-circular earthwork platform

surrounded by a ditch was recorded on aerial photographs taken in 1947 (Figure 51). The mound appeared to have been plough-levelled by 1976 and aerial photographs taken in 2011 record cropmarks that indicate the sub-surface (and possibly surface) remains of the spread mound, surrounding ditch and central indentation which may mark the site of the base of the cross tree for the mill.

Figure 52 Cropmark indicating buried remains of a mill mound at Agden Green. 27095_012 30-JUN-2011 © Historic England.

At Manor Farm, Green End, a circular cropmark indicates a medieval and/or post-medieval mill mound (NRHE: 1459515, Figures 53-54). In the centre of the ditch surrounding the former mound, there is a cross, representing the location of the base of the central post of the windmill.

Figure 53 Mill mound at Manor Farm, Green End. 27094_024 30-JUN-2011 © Historic England.

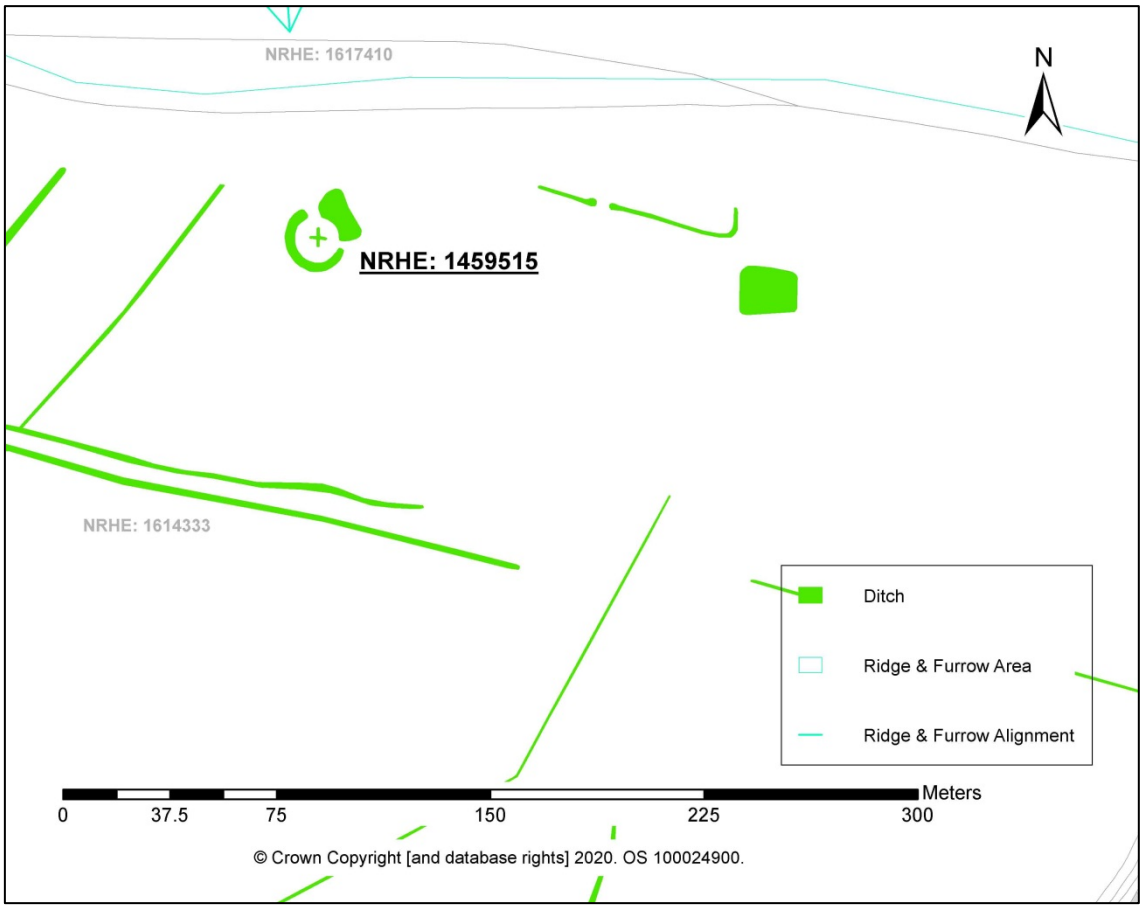

Figure 54 The medieval mill mound at Manor Farm, Green End. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Settlement Sites

Significant medieval settlement remains were recorded throughout the project area. Most are in close proximity to and associated with existing villages and were seen as earthworks on aerial photographs and lidar. The sites vary in size and apparent importance and includes 6 motte and bailey ringworks, 5 mottes, 131 moats of varying size and shape, as well as ditched enclosures or platforms associated with crofts or tofts and the abandonment or shrinking of villages (Figure 50). Some features recorded from 1940s aerial photographs have since been plough-levelled or covered by post-war residential or commercial expansion and development.

Notable amongst the newly recorded settlements is at High Park Farm near Kimbolton (Figure 55 and Figure 56). A 1673 estate map by Thomas Stirrup names a field 'The House Ground' but shows no features at that time. Aerial photographs taken in 1945 and 1947 record earthworks of a platform or moat in the corner of a trapezoidal ditched and banked enclosure (NRHE: 363192). The platform appears internally divided by two parallel banks. Other earthwork banks and ditches are within the homestead enclosure and nearby are two C-shaped ring ditches with central earthwork mounds along with a sub circular mound and a square mound

with a central pit, all of whose function and date are uncertain. Recent specialist oblique aerial photographs taken in 2011 suggest that the site has been plough-levelled and is now only visible as cropmarks.

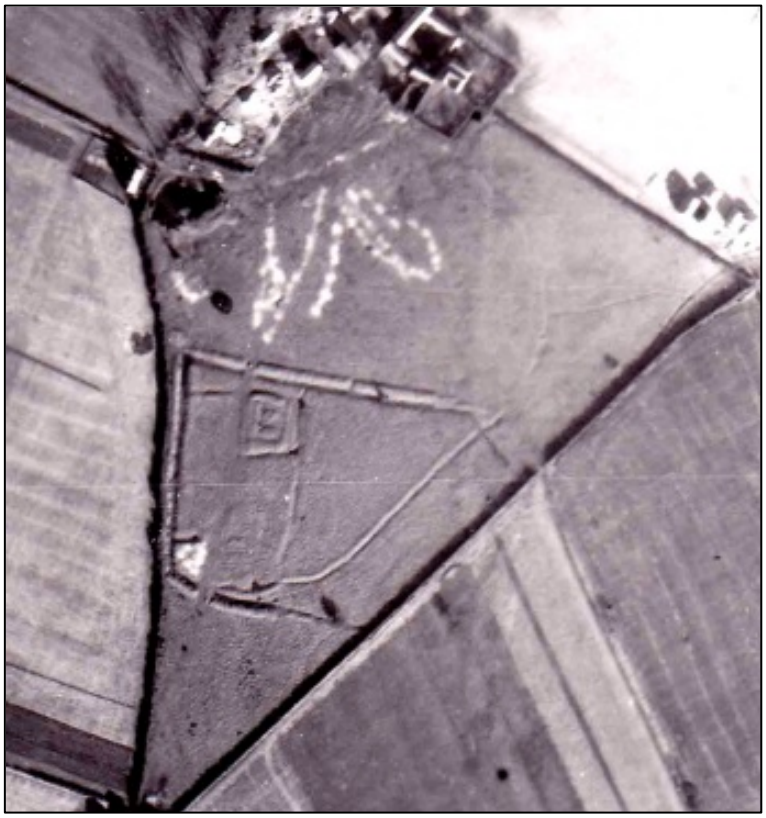

Figure 55 A medieval settlement at High Park Farm, Kimbolton. Extract from RAF/CPE/UK/1925 FS 2282 16-JAN-1947 Historic England RAF Photography.

Figure 56 Cropmarks of the former medieval homestead earthworks at High Park Farm, 27107_041 01-JUL-2011. © Historic England

Village shrinkage

Medieval village shrinkage was recorded across the project area. Most notable for survival of medieval earthworks is the village of Catworth. Recorded from both lidar and historic aerial photographs, village shrinkage occurs some considerable distance along two lanes, comprising linear earthwork banks and ditches that define rectangular and irregularly shaped platforms of possible crofts and tofts, enclosures, hollow ways and trackways, along with a possible well and numerous amorphous features (Figures 57-58). Blocks of ridge and furrow earthworks and plough headlands butt up to and respect the boundary ditches and banks, suggesting contemporaneity (NRHE: 1614537, 1614538, 1614539 and 1614587). Adjacent to the church is a medieval moat, possible fishponds and other extensive earthworks (NRHE: 360883). Meiklejohn (2016) suggests that this is the site of the former medieval manor house and gardens.

Figure 57 Mapping of Medieval settlement and cultivation earthworks around Catworth village overlain on lidar visualisation. Archaeological mapping © Historic England. LIDAR TL0772, 0873, 0972-0973, Environment Agency composite 1m DTM JAN 1998–AUG 2016. © Environment Agency copyright 2020.

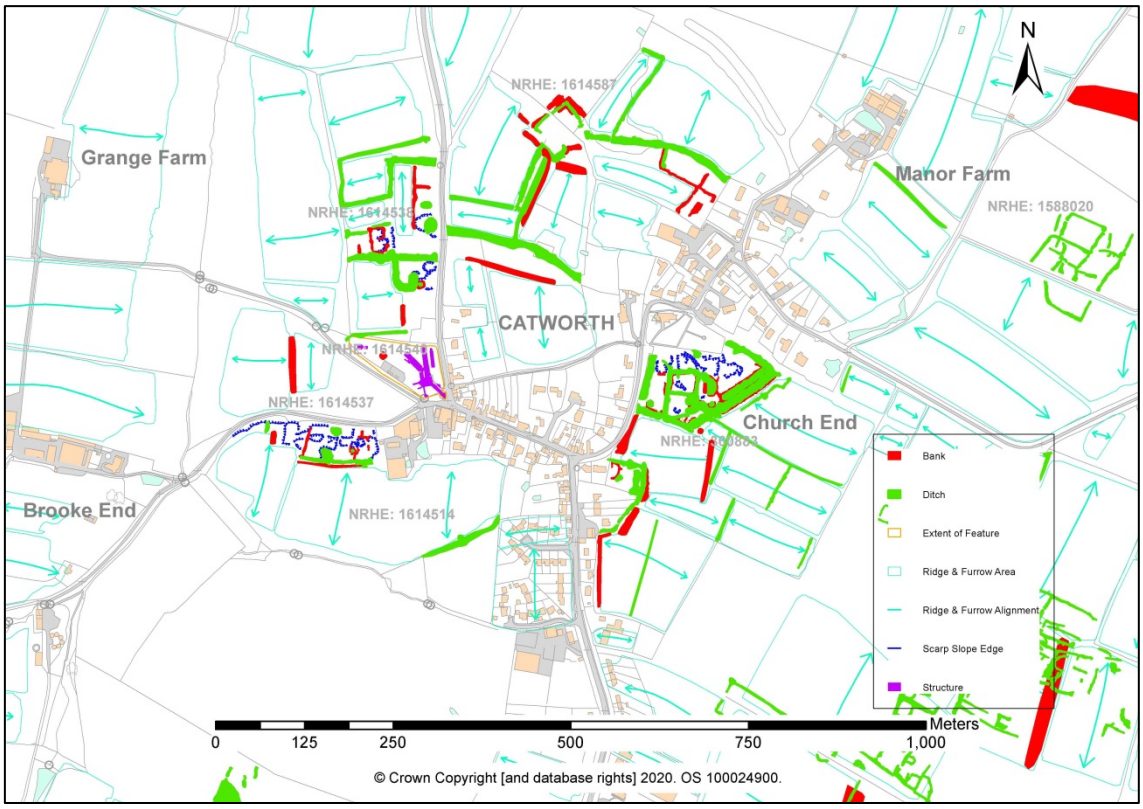

Figure 58 Mapping of earthwork remains of medieval settlement at Catworth. Archaeological mapping © Historic England. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

At Wornditch near Kimbolton, the earthworks of a likely medieval deserted settlement (NRHE: 1617453) are visible along either side of some 755m of the River Kym (Figure 59). The main settlement focus appears to be on the south side of the river, comprising a number of rectilinear ditched enclosures and platforms, pits and linear earthwork banks, with further scattered earthwork ditches and a possible irregular platform on the river's north side. The Victoria County History of Kimbolton parish (Page 1936) states that the whereabouts of the 14th century district of Werkwell (Wertwell, Qwertwell) is now unknown; it is possible that this was Werkwell.

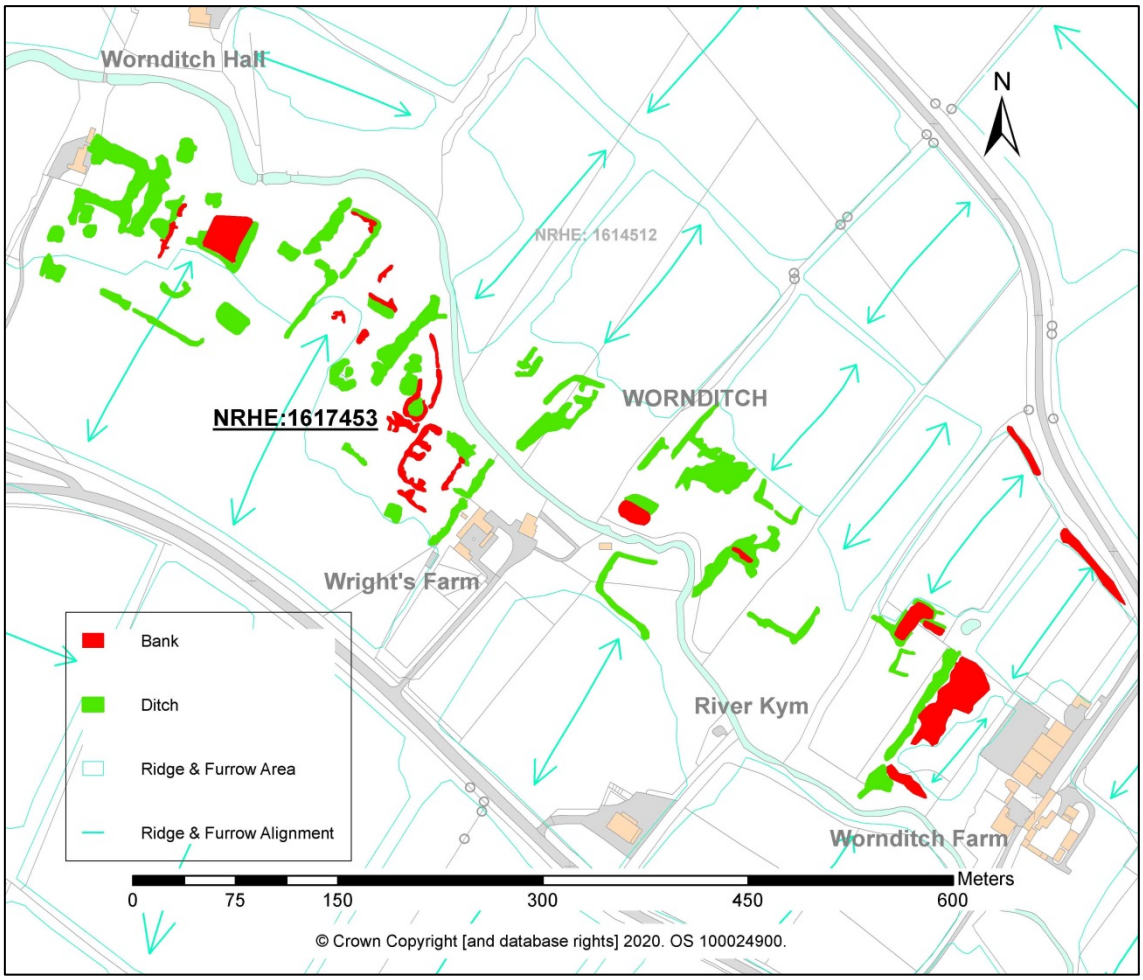

Figure 59 Mapping of earthworks of a deserted medieval settlement, possibly the previously unidentified Werkwell. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Agriculture – Open field systems and ridge and furrow

As shown in Figure 60, remnants of former medieval and post-medieval common open-field systems are widespread across the Bedford Borough project area. There are concentrations of ridge and furrow cultivation and associated earthworks on the claylands. These probably survived due to the prevalence of pasture in this area until the second half of the 20th century. In contrast there is little evidence of medieval fields on the gravel terraces of the rivers Great Ouse, Ivel and Nene, partly because these better quality soils are more free-draining and have been subject to different agricultural exploitation, removing the earthworks of medieval cultivation through plough-levelling.

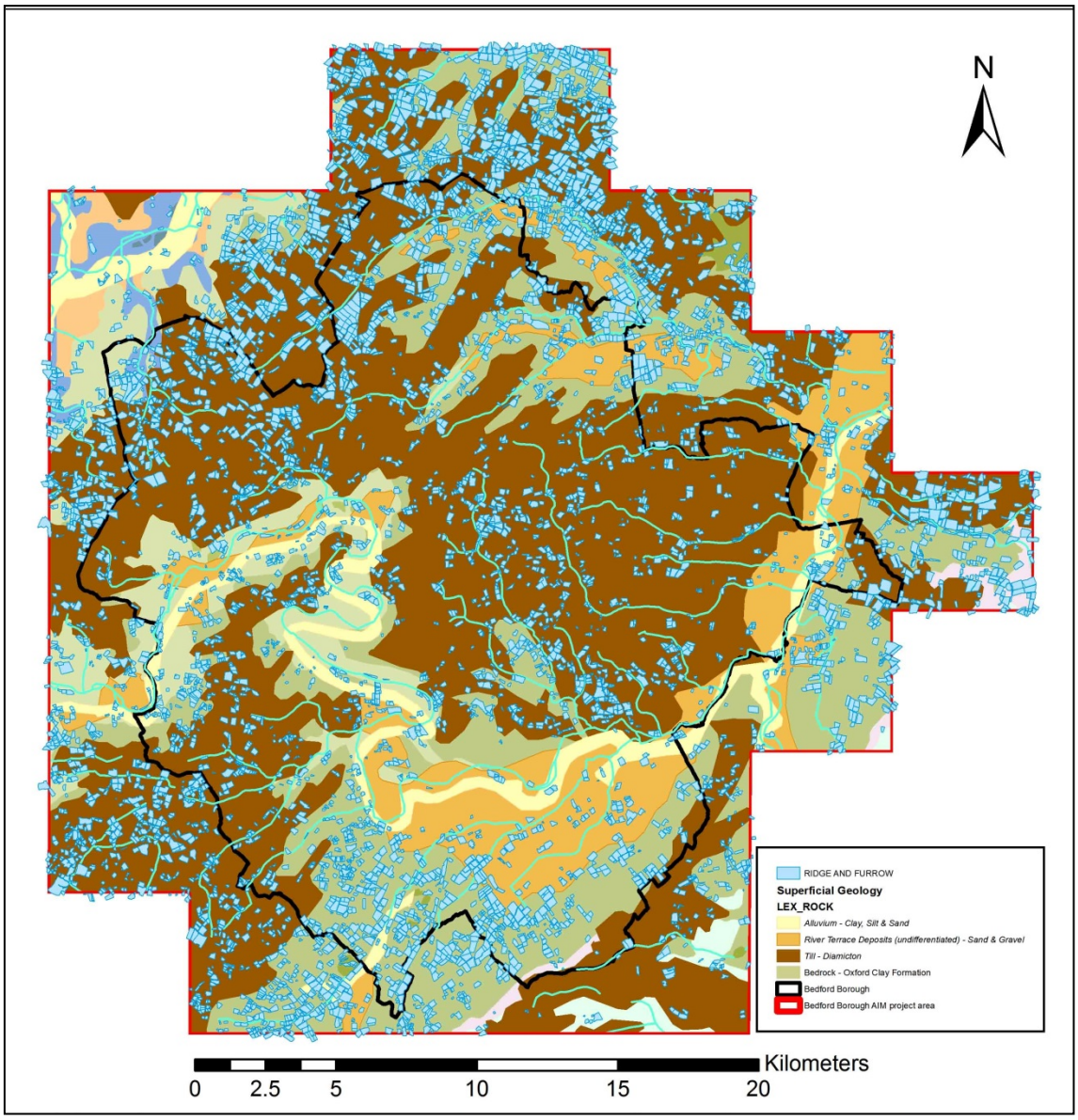

Figure 60 The distribution of medieval and/or post-medieval ridge and furrow cultivation (pale blue) against geology (clay in green and clayey-till in dark brown). Archaeological mapping © Historic England. Base map derived from © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

In the south-east of the project area, the north-facing slope of the Greensand Ridge dominates an area where the character and quantity of the ridge and furrow blocks suggest a transition from an open-field system, with its rectilinear furlongs, to one of smaller, assarted fields. Figure 61 illustrates the correlation of this transition from the National Character Areas boundaries of NCA90 Greensand Ridge (lower right) to the NCA88 Clayland (top left).

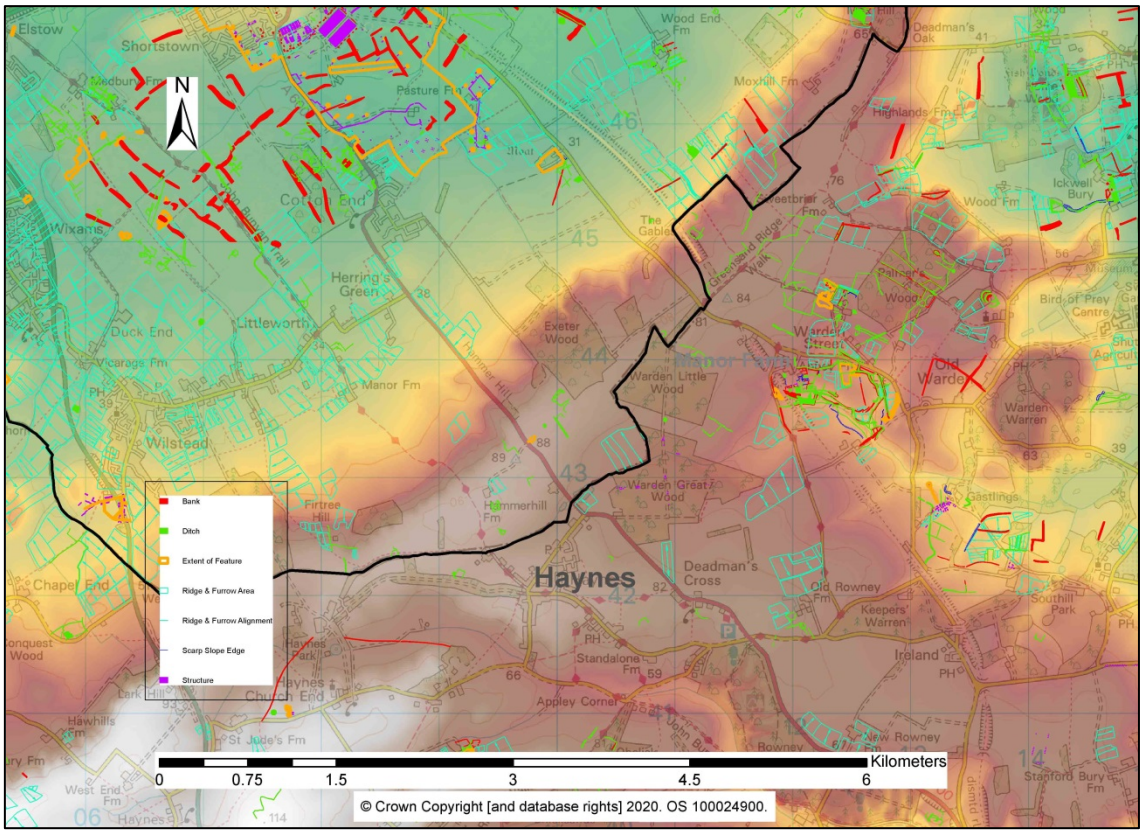

Figure 61 The transition of ridge and furrow from Claylands to the Greensand Ridge. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Irregular additions to the open field systems come from assarts that are small, irregular enclosures for cultivation or pastureland, carved out from woodland or waste (Historic England 2018h). Isolated or in small clusters, they are identified by an irregular boundary pattern, most being generally small to medium in size, from less than 0.5ha (5,000 square metres) to 2.5ha (25,000 square metres). The association between some of the assarted blocks and extant woodland suggests that the process on the Greensand Ridge may have been underway for a considerable period of time, probably starting before the 12th and 13th centuries, continuing into the post-medieval period.

Furlong boundaries and land division in north Bedfordshire

Predominantly derived from the lidar data, the project recorded a complex network of linear earthwork boundary banks or furlong boundaries (Figure 62), which Taylor (1982) refers to as 'balks'. These low, broad earthwork banks can extend in sections over several kilometres and vary in width between 16 and 43m, but many appear to average in breadth at around 25m. RAF vertical aerial photographs dated to the late 1940s show some linear banks visible as pale soilmarks about 15m wide. The visualisation of composite 1m and 2m resolution Environment Agency open

source lidar data gathered over a number of years shows those same features as low earthwork banks with a breadth about 28m, probably representing plough-spreading of the bank material. The distribution of the furlong boundary earthworks is likely to extend beyond the extent of the lidar coverage that mainly covered the river valleys. The National Archaeological Identification Survey South West Cambridgeshire recorded similar systems of earthwork 'furlong boundaries' (Knight et al. 2018:100).

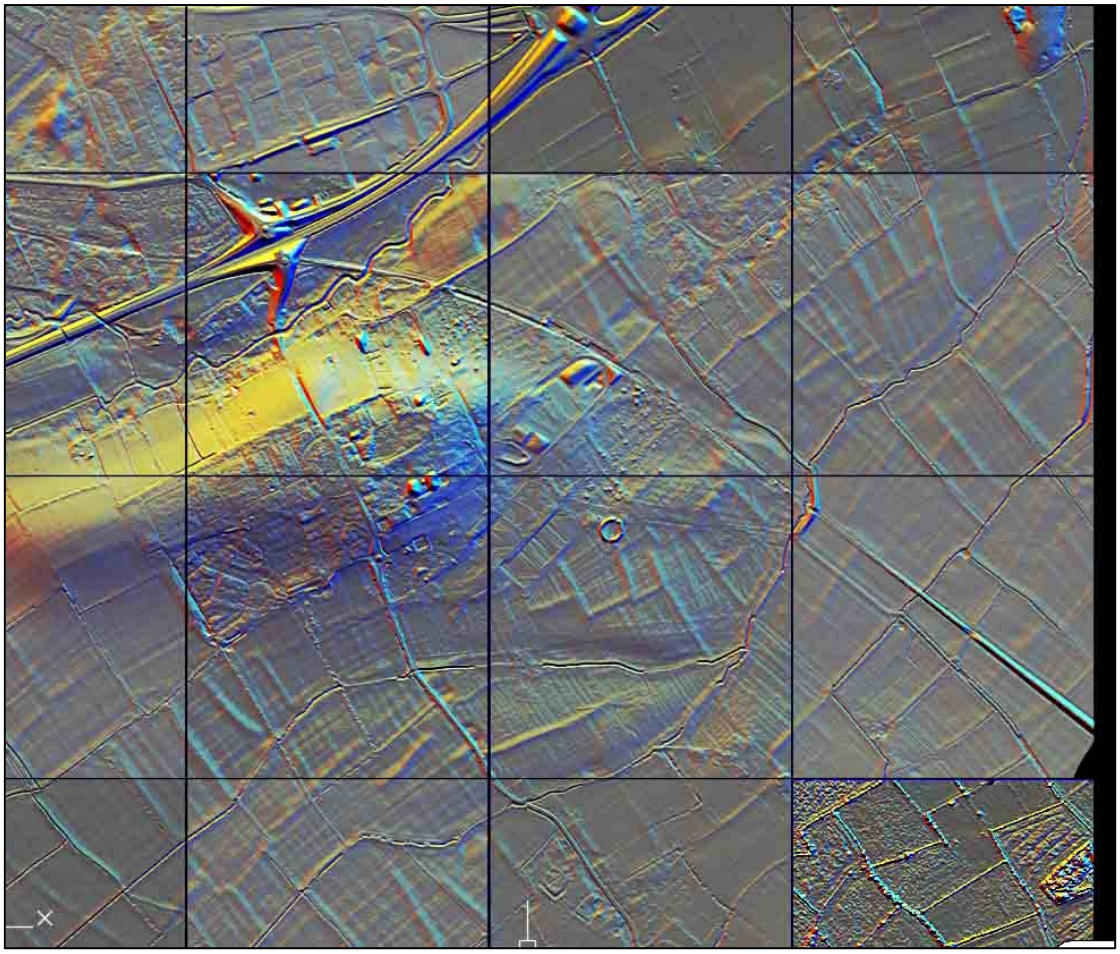

Figure 62 Lidar data revealing the remains of a system of low, earthwork furlong boundaries. LIDAR TL0645-0648, 0745-0748, 0845-0848, 0945-0948 Environment Agency composite 1m DTM JAN 1998–AUG 2016. © Environment Agency copyright 2020.

Many of the furlong boundaries are laid in out a series of parallel lines set between 125 and 200m apart, in several alignments that are roughly either W-E, NW-SE, WNW-ESE and SSW-NNE (Figure 63). Whilst many of these features probably date from the medieval period onwards, it is likely that some survive as remnants of an earlier agricultural landscape, as suggested by Oosthuizen (2003, 2005 and 2006). She describes the preservation of a pre-medieval co-axial or linear field layout within the furlong boundaries and headlands of the medieval landscape of the Bourn Valley in adjacent west Cambridgeshire. She considers that the arrangement of long furlong boundaries in that valley, many preserved as low

ridges in fields, were probably laid out between the Roman and Late Saxon periods, before the imposition of hundred boundaries in the early 10th century. Oosthuizen (ibid.) describes that the length and width of the earthwork-banked furlong boundaries within the Bourn Valley, many of which are named as 'commons' on pre-inclosure maps, functioned to provide a supplemental source of nutrients for livestock in an intensively cultivated arable field system.

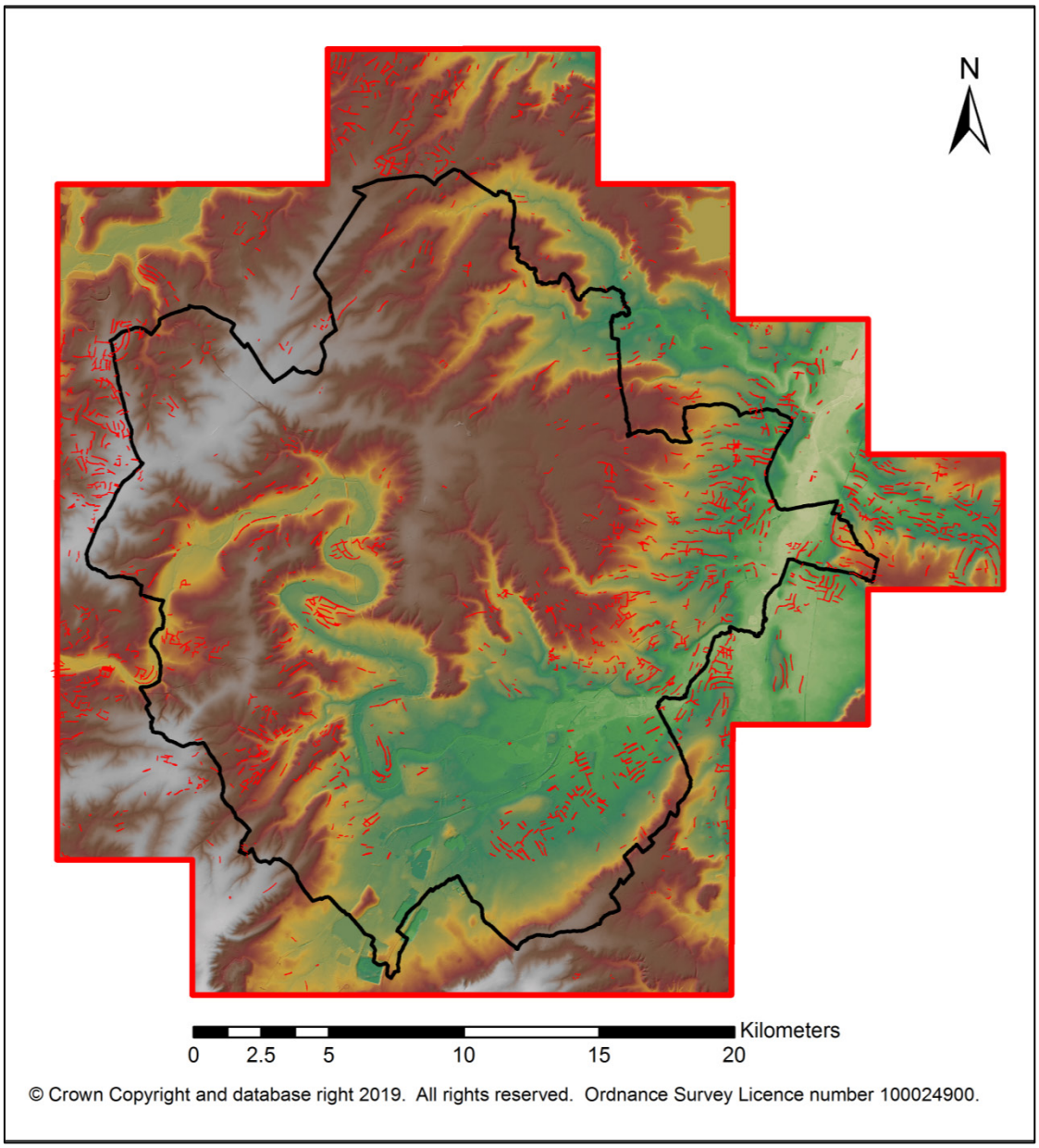

Figure 63 Mapping of system of furlong boundary banks. Archaeological mapping © Historic England. Base map derived from © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Post-medieval

The most numerous post-medieval features recorded related to the beginning of the brick-making industry, which was focussed south of Bedford and reached its zenith in the 20th century. Other intriguing features were recorded and a selection are discussed below.

Located in a flat meadow in Kempston, south of Bedford, the Cow Meadow Race Course was a flat oval course about a mile and a half round, with a two furlong run-in, first recorded in 1730 and which continued sporadically until 1873. The 1834 Original Series Ordnance Survey map depicts the course and a building or 'stand' in the southeast corner. A stand at the course is first mentioned in sources for the 1753 races and this was followed by a permanent stand, with a slate roof, constructed about 1826, when it was described as a 'betting stand'. In 1854 a company was formed to build a Race Stand on the site of the earlier stands, which was constructed of brick and wood, with an outside enclosure and including a refreshment room.

Figure 64 Buried remains of the Cow Meadow Racecourse pavilion and refreshment enclosure visible as cropmarks in 2009. Earth.google.com © 2021 Infoterra & Bluesky

Cropmarks indicate the buried remains of a building that matches the known dimensions of the 1854 building almost precisely, along with the rectangular enclosure immediately to the east of the stand. The building can be seen as an amorphous white soil mark on 1940s vertical aerial photographs and Google Earth aerial photographs record the building outline and internal divisions in 2009 and 2020 (Figure 64). A 488m long and 2.2m wide curvilinear ditch represents the

inside perimeter of the racecourse around the northern end of the course, which was likely destroyed with the construction of a retail park (Figure 65).

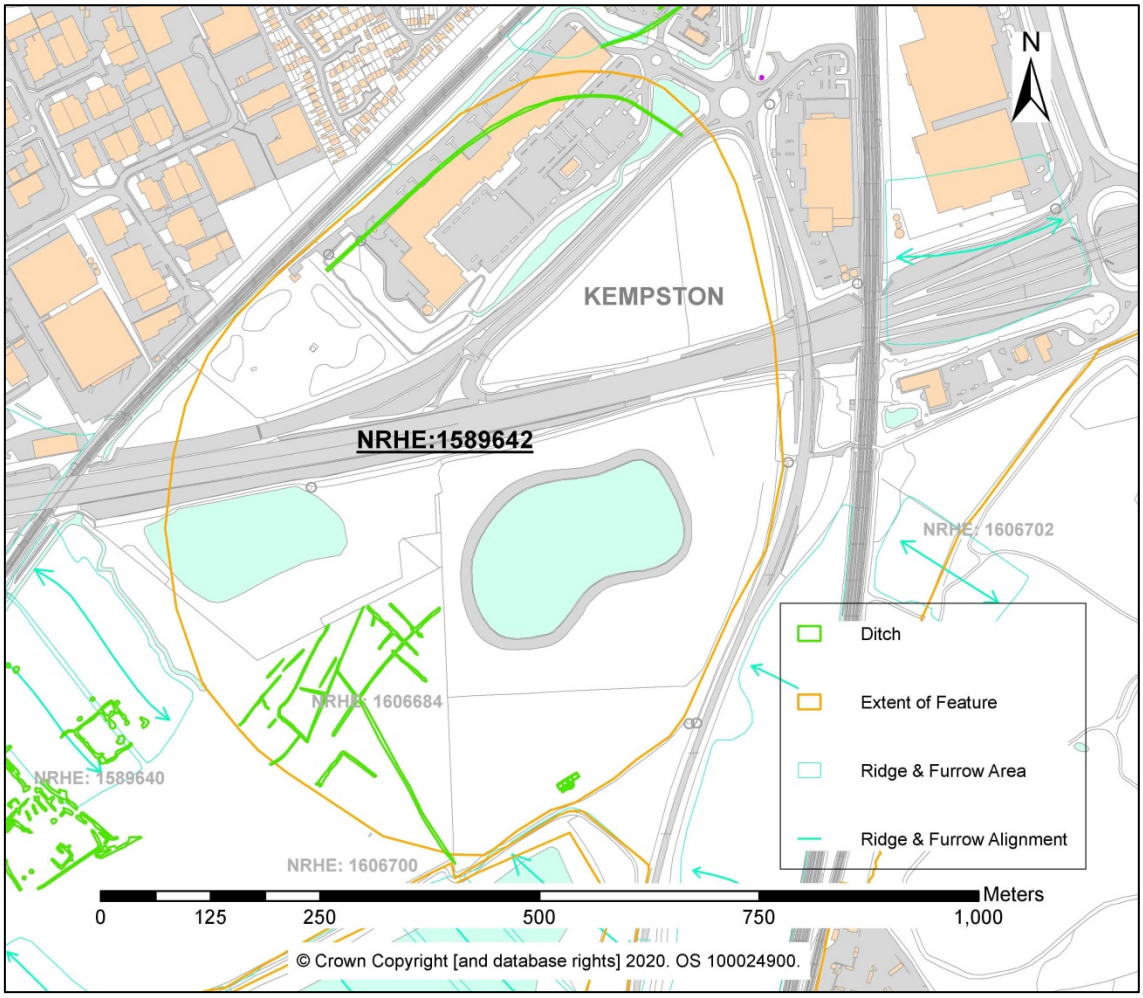

Figure 65 The racing pavilion and a fragment of the former race course. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

A surprising 19th century survival is a grass 'velodrome' cycling track (NRHE 1613408), at each end of which is a semi-circular embanked earthwork arc that remains as an earthwork within the public Priory Hill Park, near St Neots. The features were recorded from both RAF vertical aerial photographs taken in 1945 and 1 metre resolution composite 2016 lidar data (Figures 66-67). St Neots Cycling Club claims to be one of the oldest surviving cycling clubs in the world, so this surviving grass velodrome may have some historical significance. The velodrome was formerly sited in the grounds of Priory Park, of which the land and Priory Hill House (now demolished) was owned at that time by the Rowley family. The velodrome appears on an Ordnance Survey map dated 1901 and remains on subsequent editions of the OS maps before being removed between the 1968 and 1974 editions.

Figure 66 The grass cycle velodrome at St Neots. Extract from RAF/106G/UK/635 RP 3453-3456 10-AUG-1945. Historic England RAF Photography.

Figure 67 Lidar visualisation showing the curved earthwork banks at either end of the velodrome. LIDAR TL 1861-1961 Environment Agency composite 1metre DTM 01-JAN-1998–23-AUG-2016. © Environment Agency copyright 2019. All rights reserved.

The Wartime Military Presence in North Bedfordshire

Twentieth century conflict has greatly affected the Bedford Borough project area, the Second World War being particularly affecting, with numerous large military installations located across the clayland plateau landscape. The impact of military sites and bases upon the landscape and agriculture is understudied, so the results of the project may contribute considerable new information to this research theme.

First World War

There were notable examples of evidence for First World War activity, relating to both the ground war and air war. In the project, the largest structure recorded is the airship shed at the former Royal Air Force station Cardington.

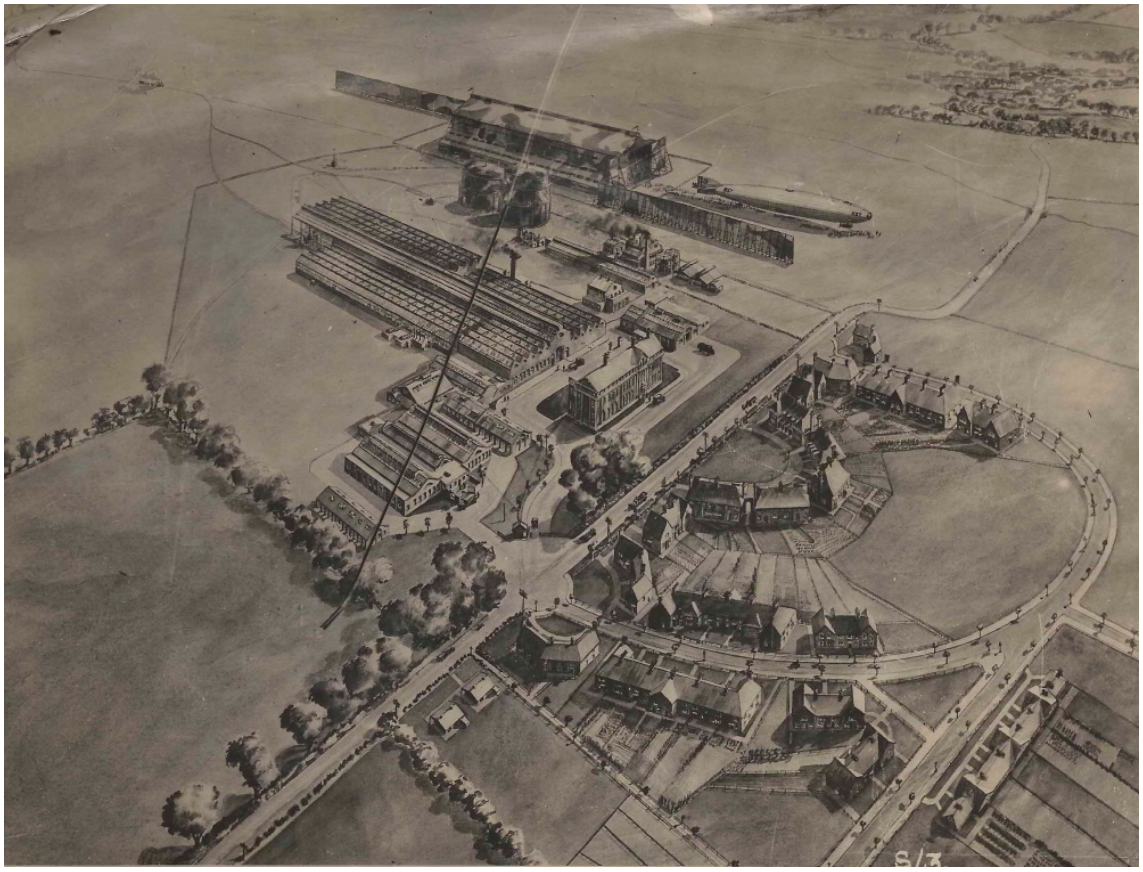

*Figure 68 A 1916 depiction of Cardington and its first airship shed (top of image), with the two protective wind screens. Reproduced with kind permission of the Airship Heritage Trust (*http://www.airshipsonline.com/*).*

Built by Short Brothers for the Admiralty in 1916 (NRHE 360178), the huge cantilevered shed hangar was designed to provide space for 2 airships, which were being developed as a response to the successful German military zeppelins. At each end of the shed, huge steel linear screens acted as windbreaks as airships emerged from or were returned the sheds (Figure 68).

Figure 69 Mapping of the military remains at Cardington including the concrete bases of the First World War wind screens adjacent to the original airship shed. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Concrete bases from First World War airship wind screens are visible at the Royal Navy Air Service (RNAS) Airship Station at Cardington on historic aerial photographs. These concrete plinths/bases for the metal girder framework supporting the wind screen panels extended along either end of Shed No 1. The wind screen bases at the western end had been demolished by 1947(Figure 70), but aerial photographs taken in 2009 show that those at the eastern end of the shed remain.

An area of First World War practice or training trenches were mapped within the recreation ground and adjacent fields of Queen's Park, Bedford (Figure 52). In 1915, amongst the many Scottish regiments stationed for training in Bedford prior to departure for France, the Gordon Infantry Brigade (1/4th, 1/5th, 1/6th and 1/7th Gordon Highlanders) were billeted in Queen's Park and practice trenches were recorded as being dug at various nearby locations (Galley 2009). Within the recreation ground, the section of practice trenches is a classic example of a WW1 British army trench layout, with two parallel trench lines, connected by a number of perpendicular communication trenches.

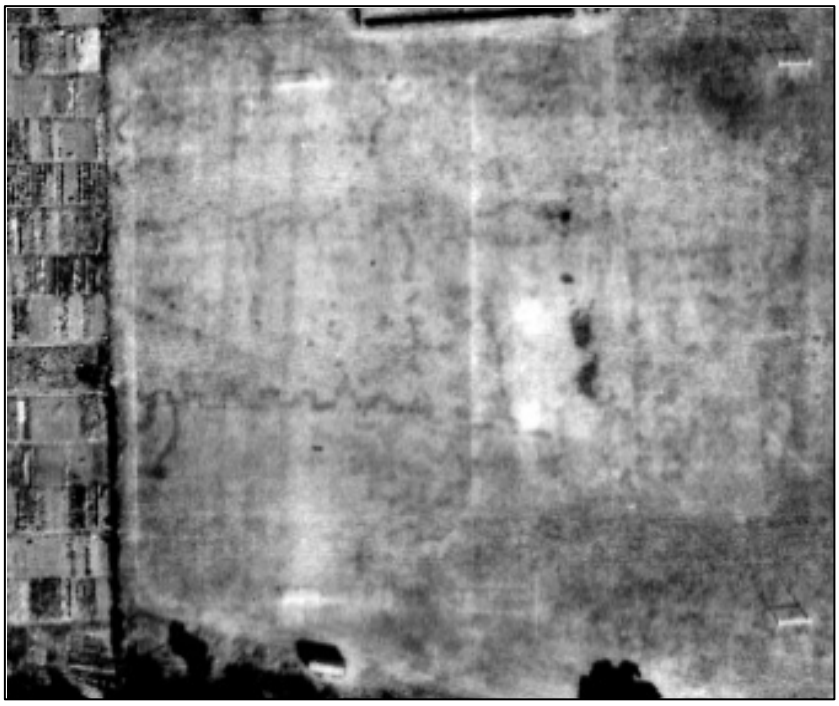

Figure 70 Cropmarks indicating buried First World War practice trenches. They were probably dug in 1915 by Scottish regiments, in Queens Park, Bedford. Extract from RAF/CPE/2299 V 5125 07-SEP-1947 Historic England RAF Photography.

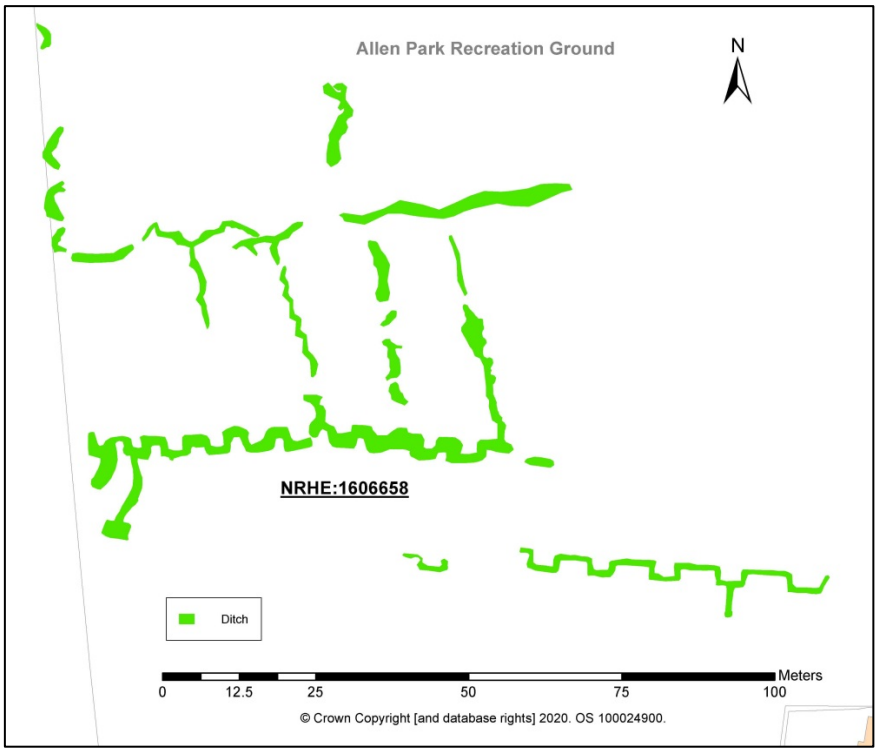

Figure 71 Mapping of First World War practice or training trenches at Queens Park (NRHE 1606658). Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

In the War Office's 1916 publication, 'Notes for Infantry Officers in Trench Warfare' (State Library Victoria 2019), the classic trench layout is explained: the front line generally consists of two parts, the fire trench and the command or supervision trench. The fire trench is a series of fire bays to give protection from enfilade fire and localise the effects of shell burst. The communication trenches join the supervising trench that accommodates the supports for the troops in the front line. Connected by more communication trenches to the rear of the supervising support trench is the reserve line trench, accommodating reserve troops. This layout is clearly visible in the mapping (Figure 71).

Other training trenches were identified as cropmarks on aerial photographs in nearby Kempston and as earthworks on lidar within woodland at Stagsden (Figure 72).

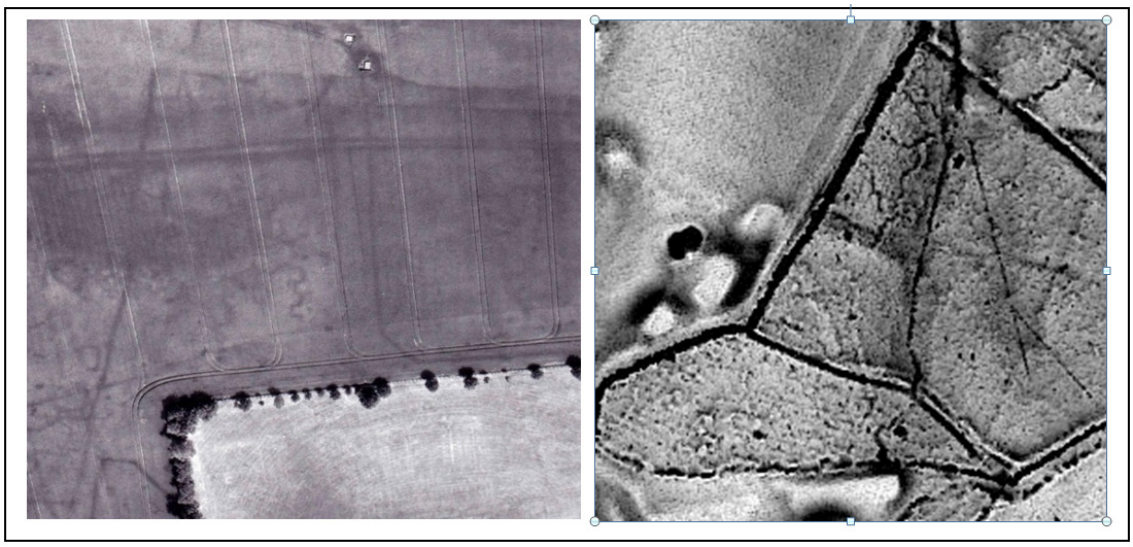

Figure 72 Cropmarks of First World War practice trenches amongst other buried archaeological features at Kempston (left) NMR 21678/13 04-JUL-2002. Earthworks of trenches in woodland at Stagsden (right) LIDAR SP9949 Environment Agency 1m DTM JAN-1998–SEP-2014. © Environment Agency copyright 2020. All rights reserved.

Second World War

There was a significant military presence across the whole project area in the Second World War (Figure 73). Large Royal Air Force (RAF) operational and training airfields dominate, hosting British and then, in some cases, United States Army Air Force (USAAF) units. The USAAF operated bomber groups out of RAF airfields at Podington, Kimbolton, Chelveston and Thurleigh, the latter having been photographed at low level in 1942 (Figure 74).

Royal Air Force Tempsford served an entirely different, but equally vital, purpose. Opened in 1941 with three concrete runways, aircraft from 3 Group RAF Bomber Command and 110 Operational Training Unit operated there until 1942, when it

then became one of the main airfields supporting covert resistance against the Axis powers in occupied Europe, particularly in France, Norway and Poland (NRHE 1412791). Specially selected aircrews with above average pilot rating flew various RAF Special Duties (SD) Service aircraft types from 138 and 161 Squadrons, operating at night as the 'Tempsford Taxis' to pick up and drop agents such as Violette Szabo, and supply resistance movement groups. Within the airfield, Gibraltar Farm Barn was a building disguised to look like an ordinary farm building, used to house and provision SOE agents, known as 'Joes', immediately prior to their journey into occupied Europe. The airfield reverted to agricultural use in 1963 (Figure 75).

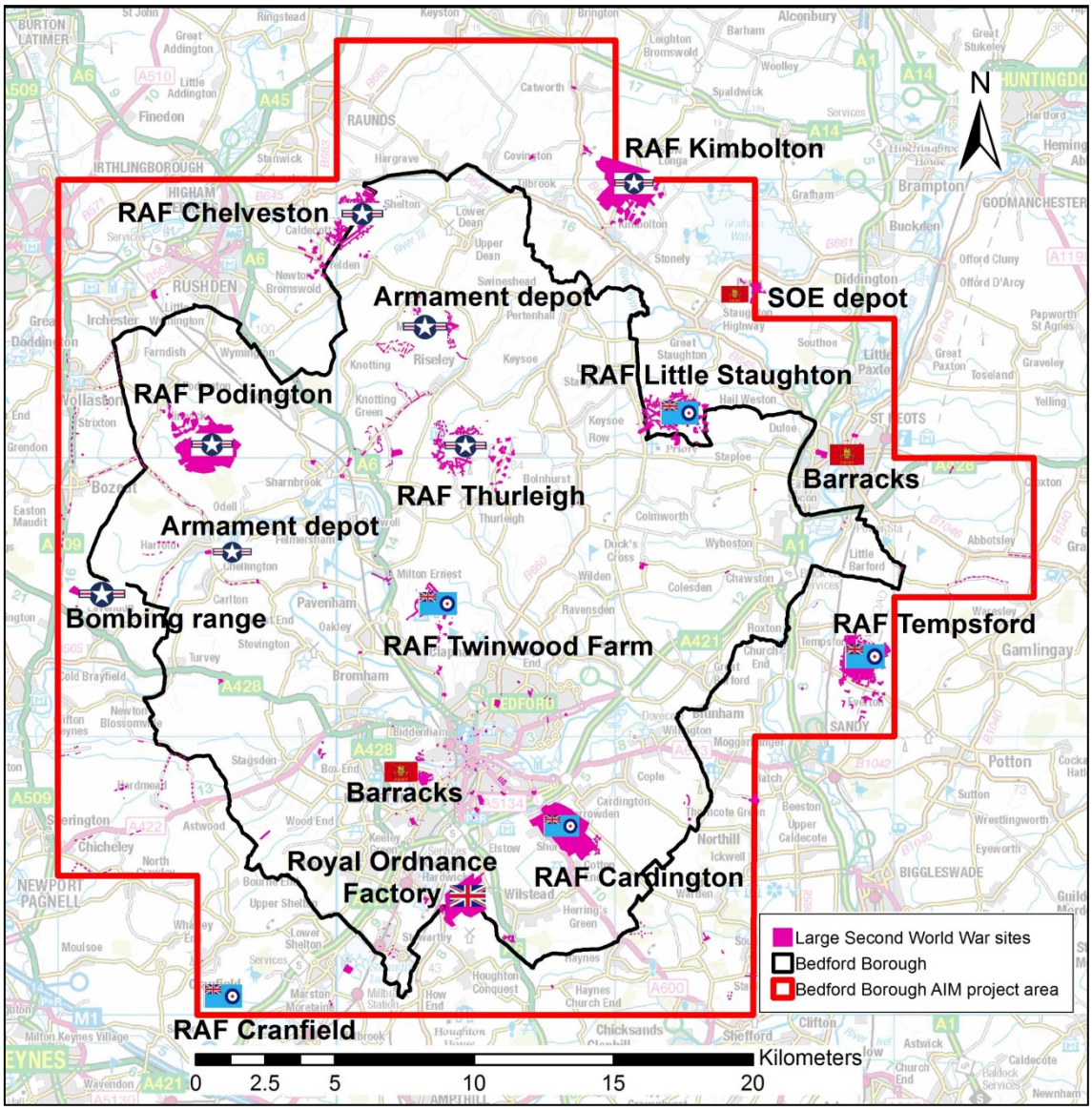

Figure 73 Main Second World War military sites in the project area. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

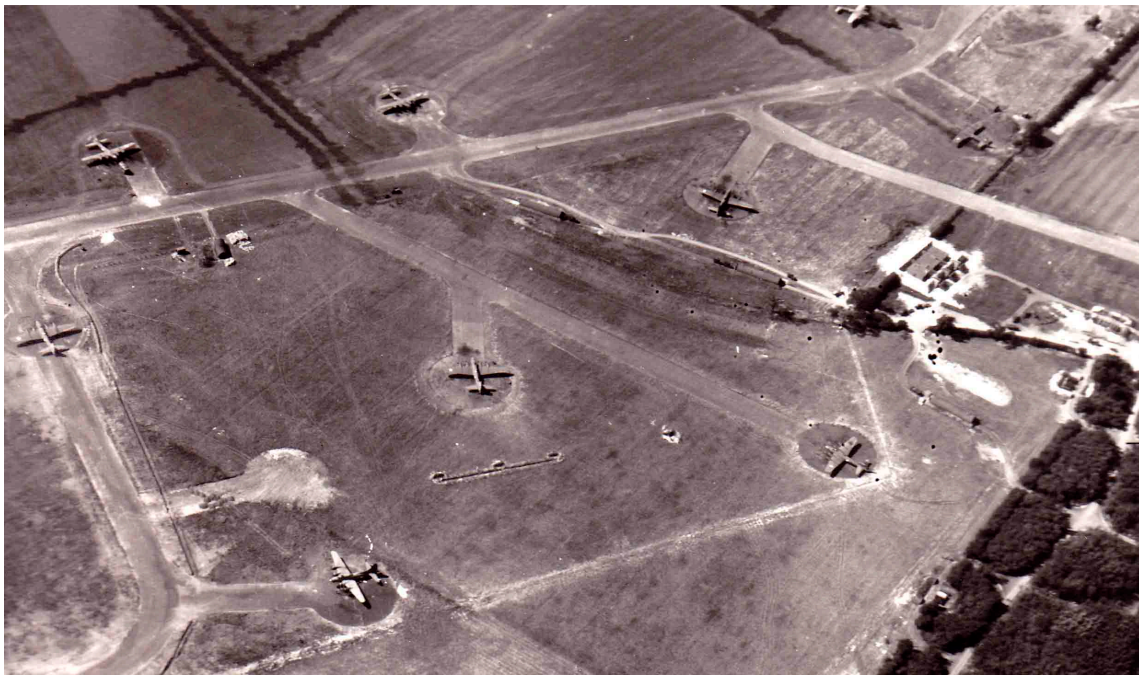

Figure 74 USAAF B-17 'Flying Fortress' bombers on dispersal pads at RAF Thurleigh in 1942 Extract from MSO 8/OUT/FNO/141 SO-3007 08-SEP-1942 Historic England RAF Photography.

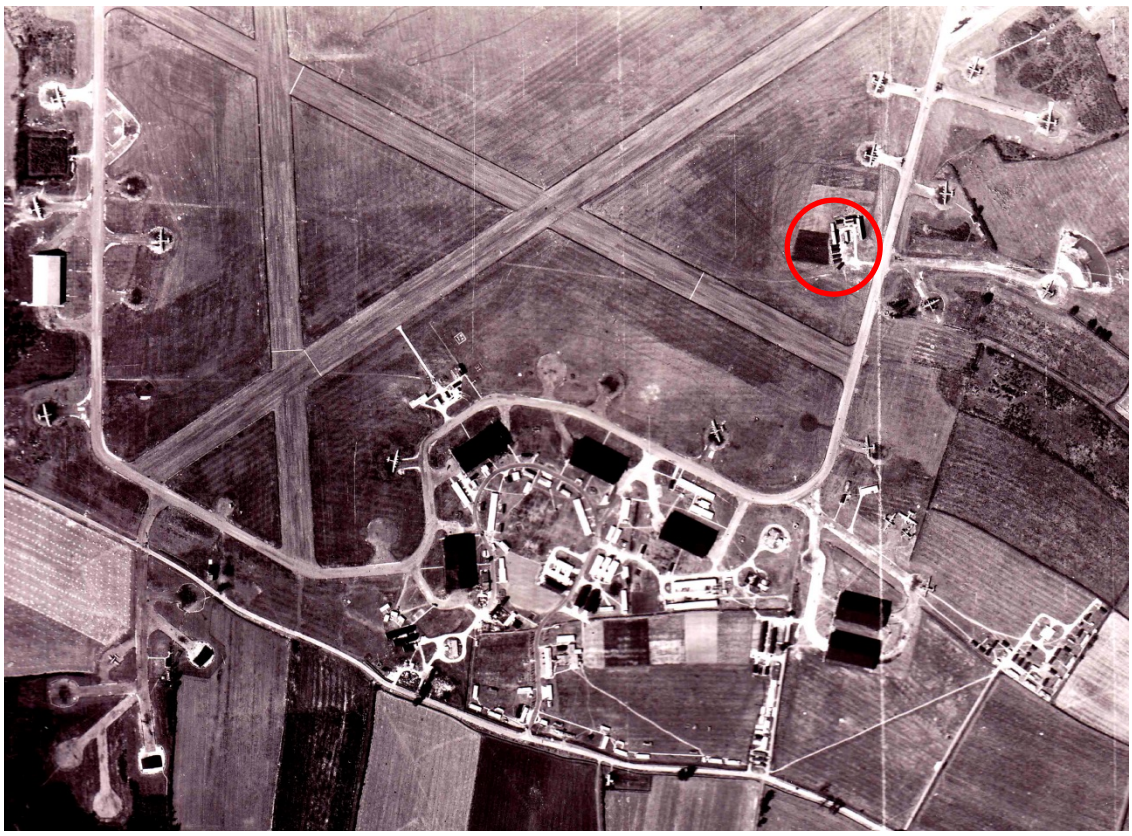

Figure 75 Various RAF Special Duties (SD) Service aircraft types at RAF Tempsford, with Gibraltar Farm Barn (ringed in red). Extract from RAF/106G/UK/635 RP 3431 10-AUG-1945 Historic England RAF Photography.

Experimental 'Field 99'

The former London Brick Company brickworks at Stewartby included an unusual wartime site. Known as 'Field 99', this was an experimental facility to test the effectiveness of air raid shelters and the potential effects of bomb blasts on their human occupants, through the use of unfortunate livestock and other animals. Notable in this vertical aerial photograph is the ring of air raid shelters, startlingly reminiscent of Stonehenge, and the numerous bomb craters around the field (Figure 76).

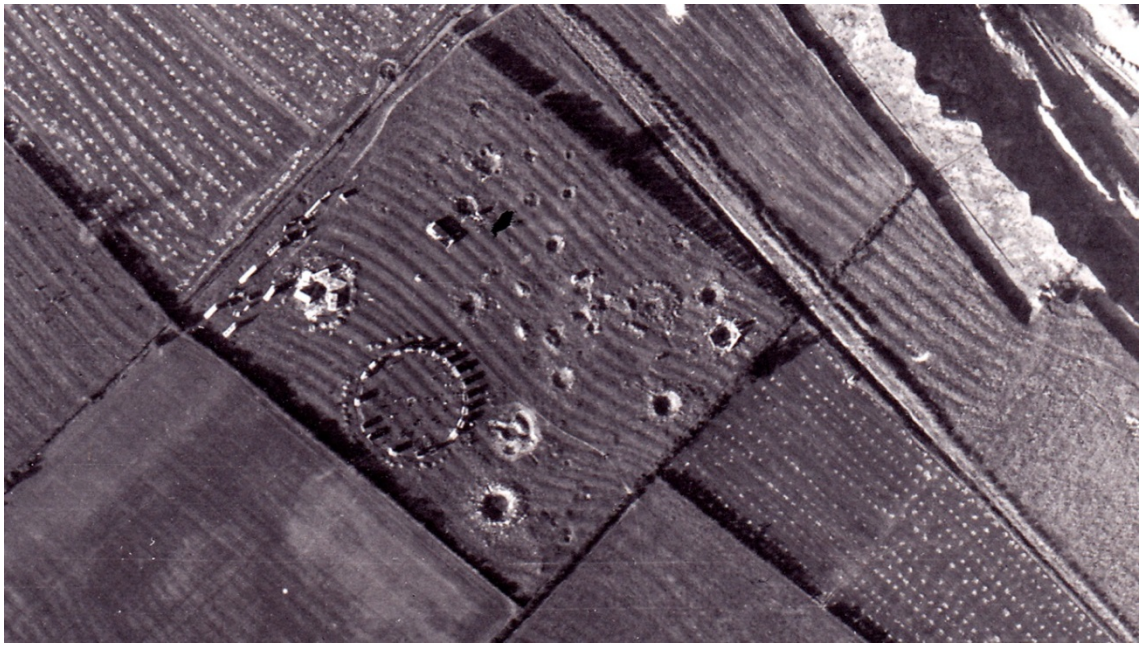

Figure 76 The experimental 'Field 99' with its circle of air raid shelters and nearby bomb craters, adjacent to the LBC brickworks, Stewartby. Extract from RAF/CPE/UK/1792 RP 3033 11-OCT-1946. Historic England RAF Photography.

The noted war artist John Piper captured these same rather dramatic experiments in his 1943 watercolour 'shelter experiments near Woburn, Bedfordshire', now held in the Imperial War Museum, London (https://www.iwm.org.uk/collections/item/object/21808) (Figure 77). The watercolour portrays a rather more brooding and sombre location than the sunny peacetime RAF aerial photograph suggests.

Figure 77 Watercolour painting of Field 99 in 1943 as portrayed by war artist John Piper, looking southeast towards Marston Martine church tower (visible in the background). © IWM (Art.IWM ART LD 3859).

Located both within and adjacent to Gaynes' Hall, south of Perry Village, Special Operations Executive (SOE) Training Station (STS) 61 was opened in 1941 when SOE relocated their packing section to Gaynes Hall (NRHE 1617476). The supply depot had six large packing sheds, two magazines, one assembly-shed, two container stores and an accommodation camp east of the house, serviced by a road network that include a sewage works (Figure 78). The Hall itself was also used as the 'Joes' Hotel', where SOE espionage agents were accommodated in isolation immediately prior to being flown on missions to occupied Europe from nearby RAF Tempsford. To the west of the house, a track leads to an area in the parkland of 4 or 5 bomb or exploded ordnance craters, likely to have been the results of SOE agent training. The SOE site was closed in July 1945 and whilst Gaynes' Hall remains extant, the supply depot site has been cleared and HM Prison Littlehey constructed on it.

Figure 78 Gaynes' Hall, SOE Training Station 61 and supply depot. Extract from RAF/106G/UK/635 RP 3342 10-AUG-1945 Historic England RAF Photography.

Armament Depots and Factories

One of the more unusual sites mapped is an ordnance depot and chemical weapons store (NRHE 1620651) at Melchbourne Park, near Rushden. The ammunition dump and chemical stores were located within woodland, in rectangular clearings alongside trackways (Figure 79). Recent lidar imagery shows that many of the rectangular clearings remain extant.

Figure 79 A Second World War chemical weapons store and ordnance depot at Melchbourne Park, near Rushden. Extract from RAF/541/483 RS 4212 07-APR-1950 Historic England RAF Photography.

Ordnance Depot (USAAF Station 572) was also a mustard gas Forward Filling Depot (FFD 2), or Advanced Chemical Park), with storage for 495,000 gallons of mustard gas (9000 tanks of 55 gallons). To dispose of the mustard gas, burning pits were located in the wood. There were also three large tanks (pots), an empties store, charging buildings and bonding stores, as well as administrative buildings and a 200 tented accommodation camp. All of these buildings except the three tanks and a decontamination store are still visible on recent aerial photographs. Some areas

within the wood used for the burning and disposal of the mustard gas still have restricted access due to potential contamination (Figure 80).

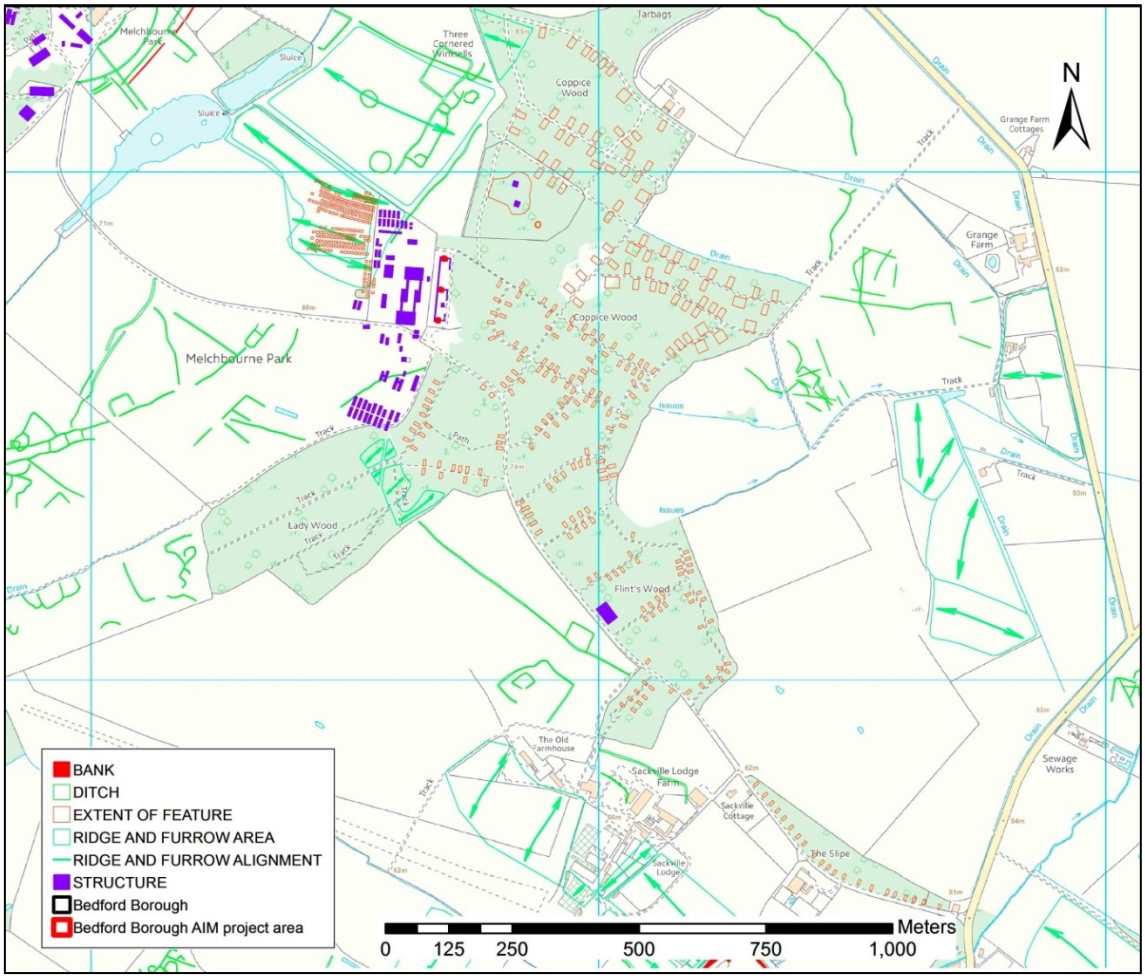

Figure 80 Melchbourne Park, a Second World War Ordnance Depot & mustard gas Forward Filling Depot. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

A feature seen on wartime and immediate post-war aerial photography is the roadside armament and bomb dumps. These typically comprised small groups of rectangular military buildings or covered ammunition stands, of which the project recorded nearly 1,650, set out along the rural roads. These were constructed as storage areas for both the Melchbourne Park depot and the Sharnbrook Forward Ammunition Supply Depot (AAF-583) (NRHE 1619112), supplying nearby operational bomber airbases occupied by the 1st Air Division of the US 8th Air Force. Military stores were delivered by rail, whereupon they were then deposited into storage areas dispersed alongside rural public roads (Figure 81). By 1949, most of these structures had been removed and all had been demolished by the early 1950s.

Figure 81 A cluster of Second World War roadside ordnance dumps. Extract from RAF/CPE/UK/1994 FS 2202 13-APR-1947 Historic England RAF Photography.

A research aim of the regional Eastern Counties Research Framework (Glazebrook 1997, Brown and Glazebrook 2000, Medlycott 2011) is to acquire more information on the identification of crashed aircraft, present in large numbers in the region and important for local and national history, which have been poorly recovered in an archaeological context. Located in a field about 300m NE of Red Gables Farm, Bozeat, the project has identified the probable crash site of an American B-17G Bomber (serial number 44-8275) of the USAAF's 379th Heavy Bomber Group which set out from RAF Kimbolton on 16th December 1944 to attack Stuttgart's railway network (NRHE 1624504). Piloted by 22-year-old 2nd Lieut. John Joseph Ahern, Jr., U.S. Army Air Corps, the bomber suffered engine failure. Ahern directed his crew to bail out, saying he would follow them when the plane was past Bozeat village. He did not follow his crew as he attempted to steer the aircraft away from the village and was killed when the bomber crashed in a field just behind Red Gables Farm. Bombs detonated over the fields. The farm buildings were damaged by the blasts, but the farmer's family were unharmed. The B-17's probable crash site is visible as a pale spread of material in the field some 60m in diameter (Figure 82). There is a memorial window of the event in Bozeat church and Lt Ahern is still remembered each year on Remembrance Sunday by the village.

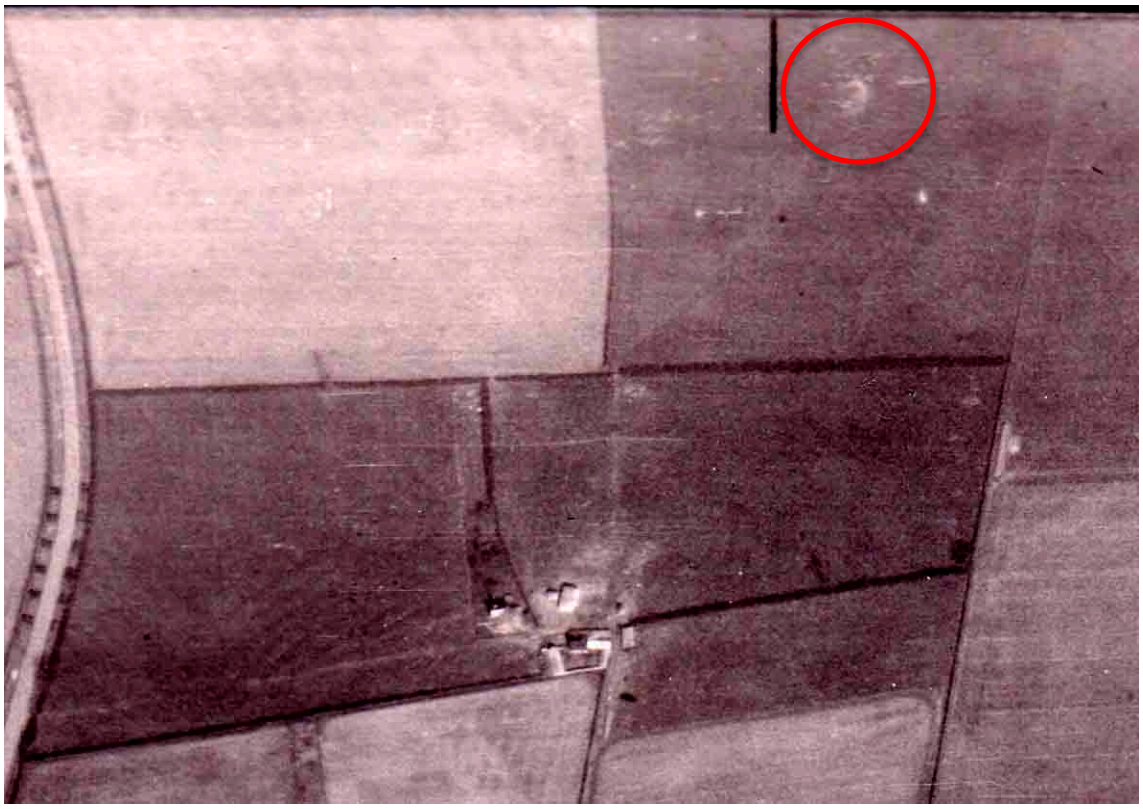

Figure 82 A Second World War USAAF B-17 bomber aircraft crash site (ringed in red) at Red Gables Farm, Bozeat. Extract from RAF/CPE/UK/1994 RP 3191 13-APR-1947 Historic England RAF Photography.

REVIEW OF SCHEDULED MONUMENTS

There are 117 Scheduled Monuments for the whole of the Bedford Borough project area, of which 37 are Old County Number (OCN) Scheduled Monuments (Adams & Crowther 2016).

Of the Scheduled Monuments that were suitable for assessment from aerial photographs and lidar, the Bedford Borough AIM survey has provided a basic assessment of changes in agricultural or management regime and any damage that appears to have occurred since the last Heritage at Risk visit. An assessment was also made of the accuracy of the current Scheduled Monument mapping. Details are summarised in Appendix A. Structures and other monuments obscured by dense vegetation on available images were not assessed.

Modern digital mapping techniques can provide more accurate information on the location and extent of archaeological features. For example, Figure 83 shows the extent National Heritage List for England (NHLE) site 1005390 near Bedford. The new AIM mapping showing that the site, including a Neolithic causewayed (NRHE 360151) extends beyond the current scheduled area. The mapping can therefore be used to inform any reassessment of the site.

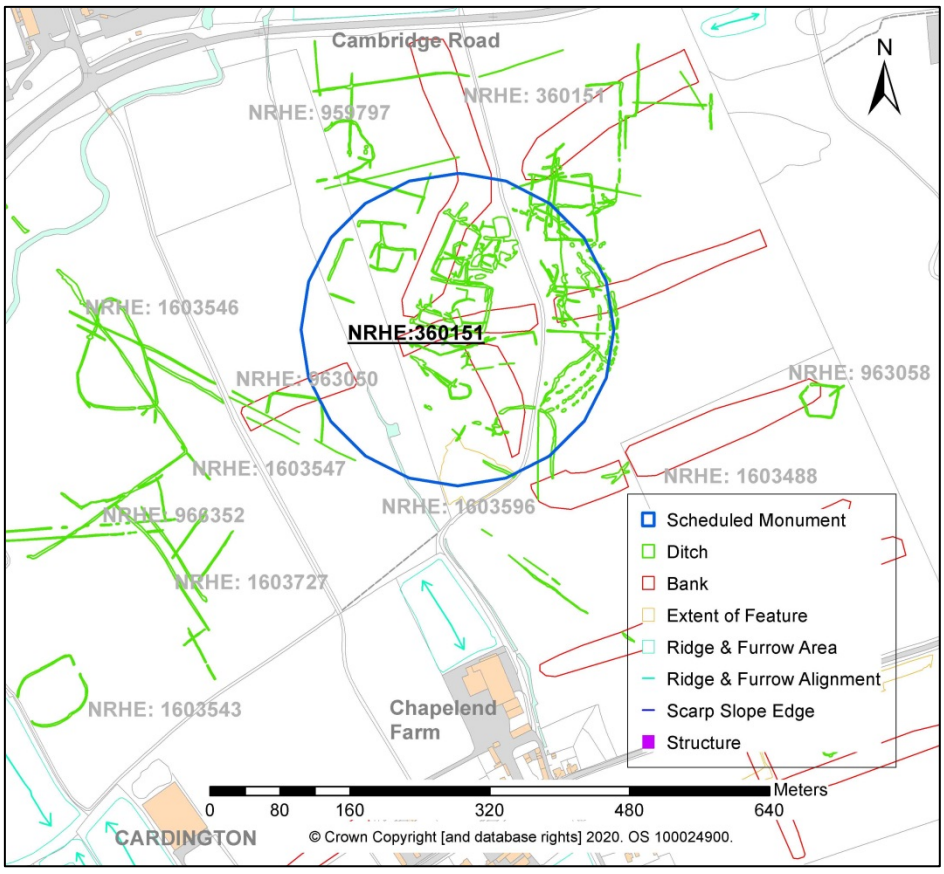

Figure 83 Scheduled settlement site N of Chapel End Farm (NHLE 1005390) at Cardington. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Similarly, AIM mapping shows that some of the scheduled monument areas are not completely accurate in extent (e.g. NHLE 1007322, 1007329) as outlined in blue in Figure 84. It is suggested that these areas be reviewed. It is reported by Bedford Borough HER that one of the scheduled ring ditches west of Octagon Farm (NHLE 1007329) may have been truncated by sand and gravel extraction because of the incorrect location information for the scheduled monument polygon (G. Saunders, 2020, pers.comm., January 28).

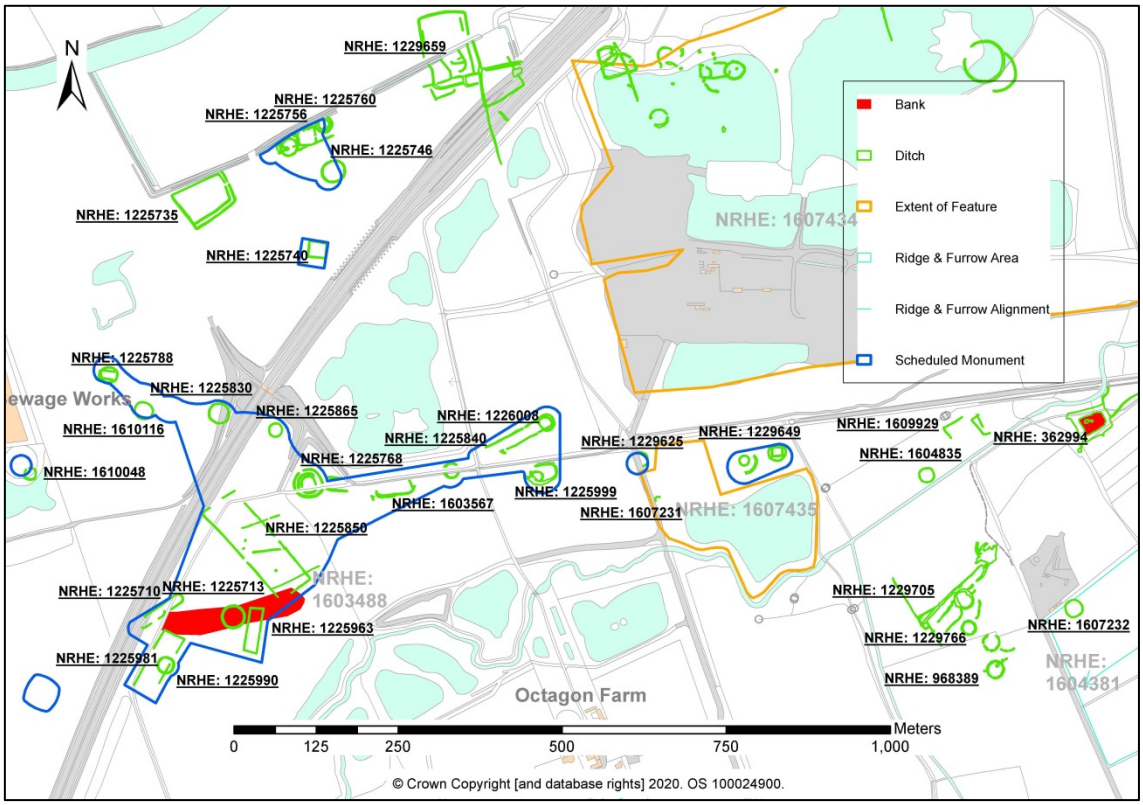

Figure 84 Mapping from cropmarks at Octagon Farm, near Bedford, showing the AIM mapping and current extent of the scheduled designated areas (in blue). Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Changes in archaeological knowledge can also lead to reappraisal of certain sites. For example, at Houghton Conquest, the earthwork mound NHLE 1012317 (and possibly also NHLE 1012318), is scheduled as a Neolithic long barrow, but recent reinterpretation suggests that this should be reviewed. The monument (NRHE 360270) was reinterpreted as a medieval or post-medieval pillow mound (accommodation for rabbits) by Williamson (2007), a view also supported by the Central Bedfordshire Council HER (S. Coleman, 2020, pers.comm., 28 January). The aerial photographs available to the AIM project show an earthwork with the typical appearance of a rectangular pillow mound, with clearly defined sides and rounded corners. A shallow trench down the length of the mound might suggest a

collapsed internal tunnel run or perhaps excavation at some time in the past (Figure 85). An adjacent scheduled monument, a round barrow, was not visible on any aerial photographs available to the project, but it is possible that this was a round pillow mound of medieval date, associated with the same rabbit warren as NHLE 1012317.

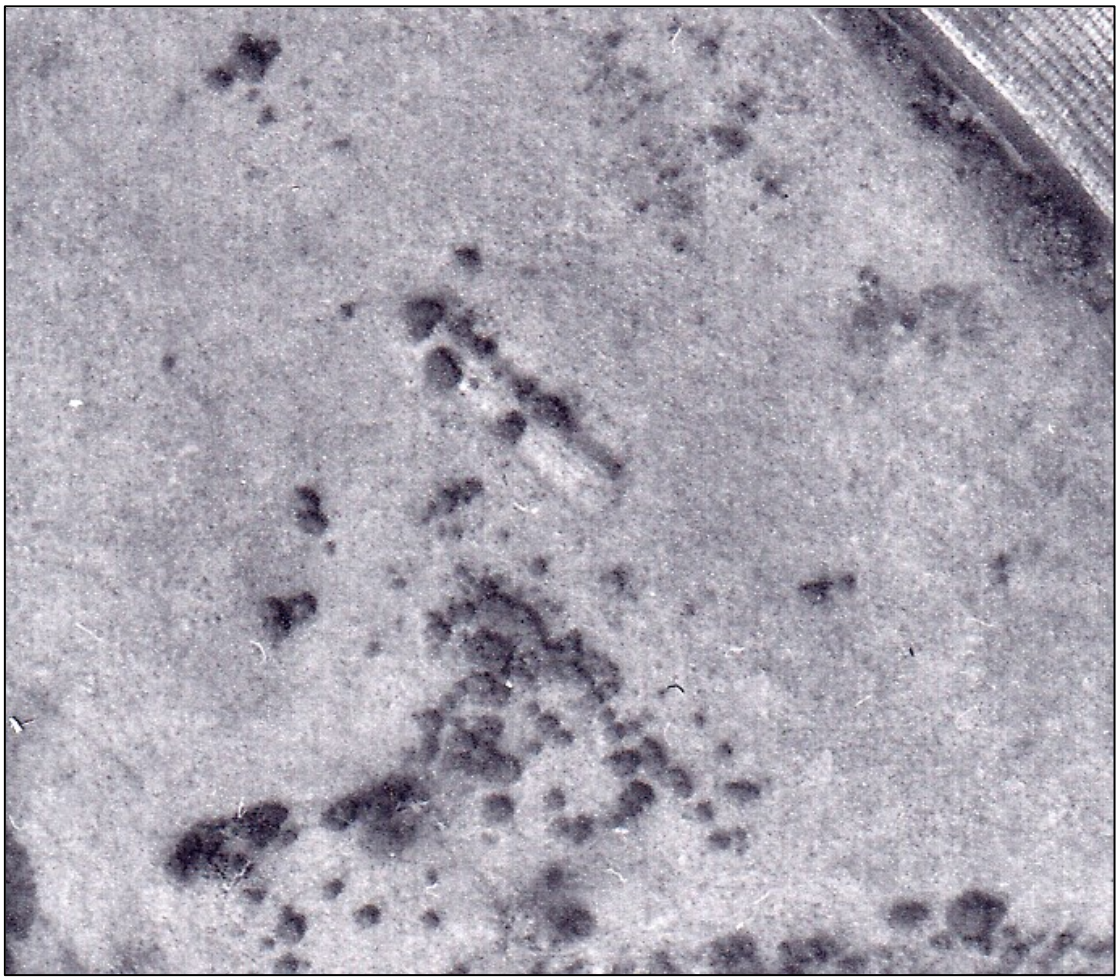

Figure 85 The long earthwork mound, probably a pillow mound for rabbits, at Houghton Conquest. Extract from OS/72417 V 491 06-OCT-1972. © Crown copyright. Ordnance Survey

Review of Archaeological Significance

During the aerial survey project, archaeological features, sites and monuments were briefly assessed in terms of potential national or local significance (DCMS 2010). The Bedford Borough AIM project design (Adams & Crowther 2016, para 9.1.4) states that the project aims to contribute to the work of Historic England's Listing Group (formerly the Designation Department) by producing some monument recommendations for further assessment, with a view to potential designation.

Of the 117 current scheduled monuments that fall within the project area, only 19 are known from cropmarks. An understandable historic trend of designating monuments visible as earthworks has resulted in a pattern of scheduled monuments biased toward the medieval landscape, as features from this era are what tend to survive as earthworks in the region, with most being moated sites. Assessment of the results of the Bedford Borough project including the high proportion prehistoric and Roman settlements, with associated field systems, tracks and boundary ditches, may go some way to redress this imbalance. Such buried features, if deemed of national significance, may warrant further statutory protection through the scheduling process.

Those sites set out below are presented with a view to potential designation and have been identified by applying the criteria set out in the various Historic England Scheduling Selection Guides (SSGs) and following discussions with the relevant HERs. It should be noted that this is only an initial identification of possible significance and it is recognised that further assessment by the regional Listing Team would be required to determine potential qualification for designation.

Olney

As previously briefly described, the likely Neolithic to Bronze Age ceremonial and funerary landscape on the southern side of the River Great Ouse, near Olney, may prove as significant as the mortuary complexes at Biddenham Loop or those at Octagon Farm, Cople. At Olney, the project recorded two possible Neolithic 'mortuary' enclosures and a possible Neolithic cursus, along with five ring ditches, interpreted as Bronze Age barrows (Figures 86-87).

The results of the project informed Historic England's Aerial Reconnaissance programme in 2018 by providing accurate mapping of existing sites and highlighting areas with potential for archaeological cropmarks. The area north of Clifton Reynes was identified and the resultant aerial photographs recorded significant additional details. A possible cursus monument was found adjacent to an already mapped cursus. This is underlying a probable medieval furlong or field boundary that may have previously masked its presence, but became visible when the 2018 drought conditions were exceptionally conducive to cropmark formation (Figure 87). The newly discovered features were not mapped by the Bedford Borough AIM project as the 2018 aerial photographs were not catalogued and available before the end of the mapping phase of the project; nor did funding for the project allow for mapping of additional aerial photography above those collections identified in the project design (Adams and Crowther 2016).

This discovery featured widely in national news media (BBC 2018, ITV 2018, The Guardian 2018, The Telegraph 2018, Historic England 2018f). Historic England scheduling selection guidance on religious and ritual sites pre-AD 410 (Historic England. 2018d: 21) states that 'as a very rare Neolithic monument type, all cursus monuments are likely to be of national importance'. Accordingly, this monument group may benefit from further assessment and consideration.

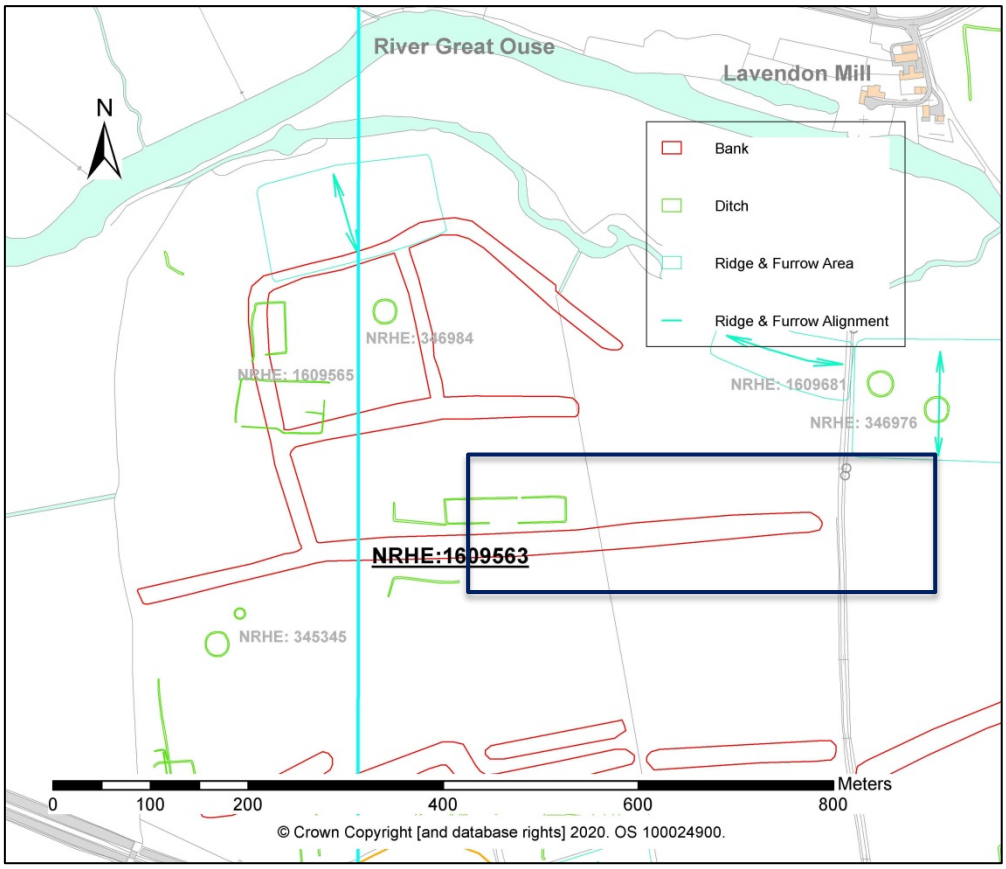

Figure 86 Cropmarks at Olney, with the additional newly discovered (unmapped) monuments located within the rectangular area outlined in dark blue. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Figure 87 Newly identified cursus(right hand side) and associated features at Olney. 33506_031 04-JUL-2018 © Historic England.

Church End ring ditches

At Church End, near Tempsford, within a loop of the River Ivel, is a newly identified barrow cemetery where cropmarks indicate buried remains of eleven barrows and an Iron Age boundary ditch, with evidence of a pit alignment, possibly representing an earlier phase (Figure 88). This lies 690m to the south of a barrow cemetery excavated in advance of gravel extraction and now destroyed, that comprised five barrows along with a later Iron Age boundary ditch and field system. Historic England scheduling selection guidance (Historic England. 2018e: 21) states that 'where a barrow forms part of a wider grouping or cemetery, its significance will be considerably enhanced.' No barrows within this area are currently scheduled and so this discrete group may benefit from further assessment.

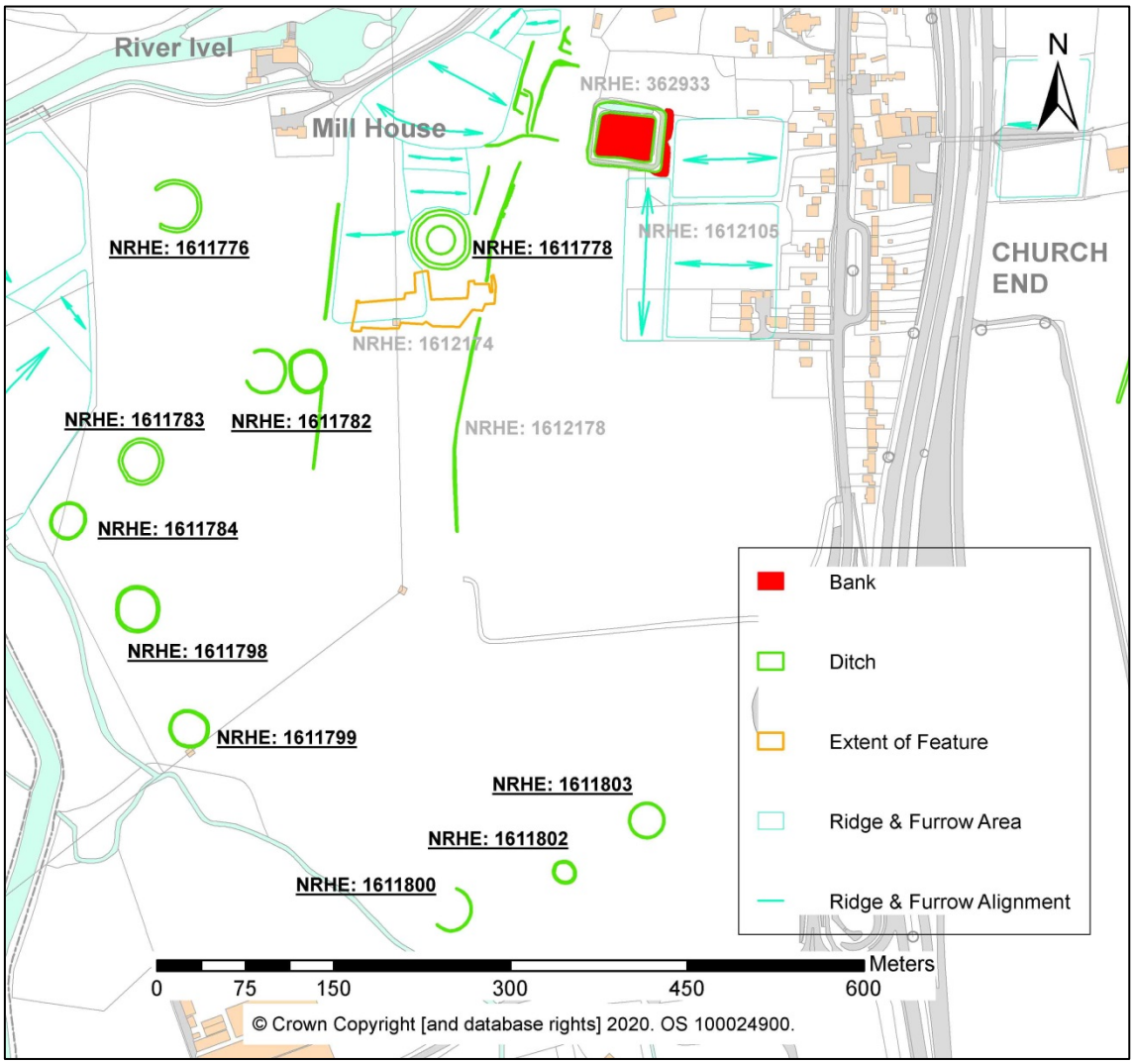

Figure 88 The cluster of ring ditches at Church End, near Tempsford. Archaeological mapping © Historic England. Base map. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Odell pit alignment and ring ditches

In the fields south of Odell, cropmarks indicate an alignment of five ring ditches of various sizes (NRHE 346824, 346801 & 965961), with a curving pit alignment (NRHE 965959) extending about 1,200m across a bend in the River Great Ouse and terminating on the east side at a ring ditch, forming a boundary between the ring ditches and the river, though the features may not be contemporaneous (Figure 89).

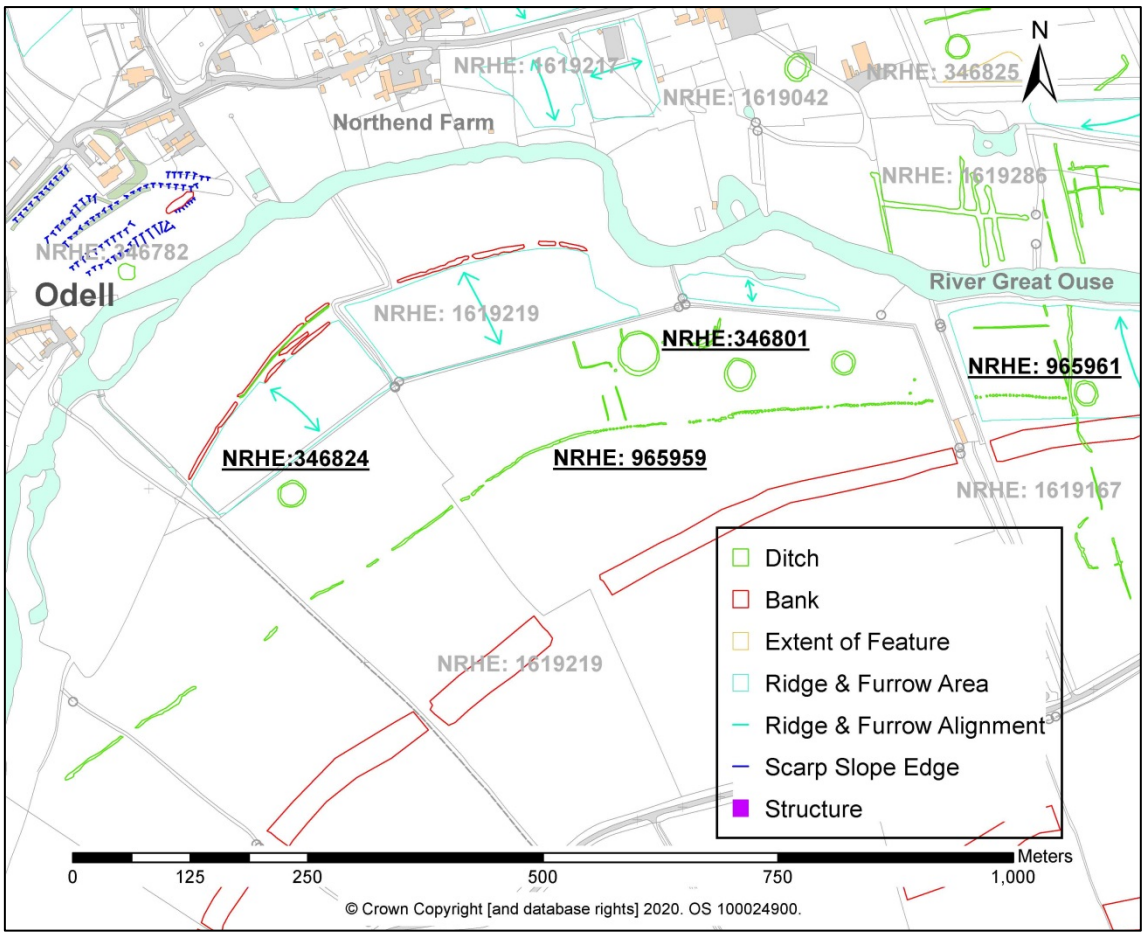

Figure 89 The cluster of probable barrows and pit alignment at Odell. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Historic England scheduling selection guidance (Historic England. 2018e: 21) states that 'where a barrow forms part of a wider grouping or cemetery, its significance will be considerably enhanced.' Therefore the barrows and pit alignment may benefit from further assessment.

Willington Iron Age triple-ditch/pit alignment

At Willington, an Iron Age parallel triple-ditched boundary (NRHE 1607257) is visible as cropmarks east of Willington, with the middle and eastern ditches extending NW from Barford Road for about 440m, meeting the River Great Ouse. The western boundary is only visible as a pit alignment, but is not visible at the north and south ends (Figure 90). A trench was excavated across the triple boundary during the construction of the Huntingdon to Willington pipeline in 2001, which identified broadly contemporary parallel ditches and pit alignments of Iron Age date. The tripe-ditch/pit alignment is co-located with other prehistoric remains in the area, such as the Iron Age linear boundary ditches (NRHE 1607420) and ring ditch (NRHE 9684136) just to the south.

Pit alignments sometimes occur as part of more complex linear earthworks including linear ditches. Little is known about their function and significance, but these linear boundaries may be associated with the division of the agricultural and political landscape in the Iron Age and as such are important for understanding land use. It is suggested that these features may benefit for further assessment with a view to scheduling.

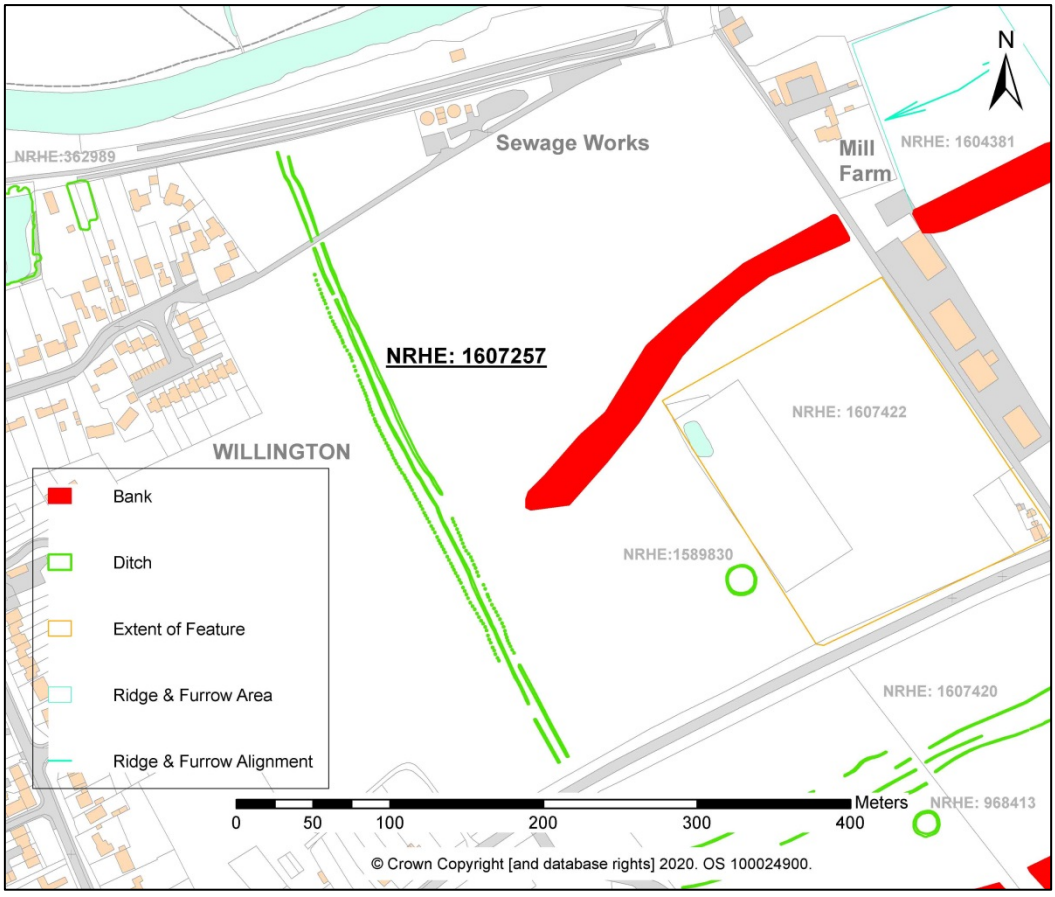

Figure 90 The linear triple pit alignment at Willington. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Willington Iron Age and/or Roman settlement cropmarks

Historic England's Scheduling Selection Guide (2018i: 28) identify that many Iron Age farmsteads are likely to be assessed as nationally significant. However, in recommendations for scheduling, considerations such as condition, group value and potential will be evaluated. Similarly, where Roman settlement sites retain reasonable archaeological potential, they may have national importance.

Between Cople and Willington, cropmarks indicate the buried remains of an extensive complex of settlement of Iron Age and/or Roman date (Figure 91). The diverse features range from clusters of accreted curvilinear ditched enclosures to contiguous rectilinear enclosures, linear field boundaries, and a double-ditched road section, suggesting a possible movement of settlement foci over time. Historic England's Scheduling Guidance states that 'complex sites demonstrating different phases of development, perhaps over a long period, may be favoured for designation' (Historic England. 2018i: 22). It is suggested that this area of settlement activity be further assessed with a view to its potential for scheduling.

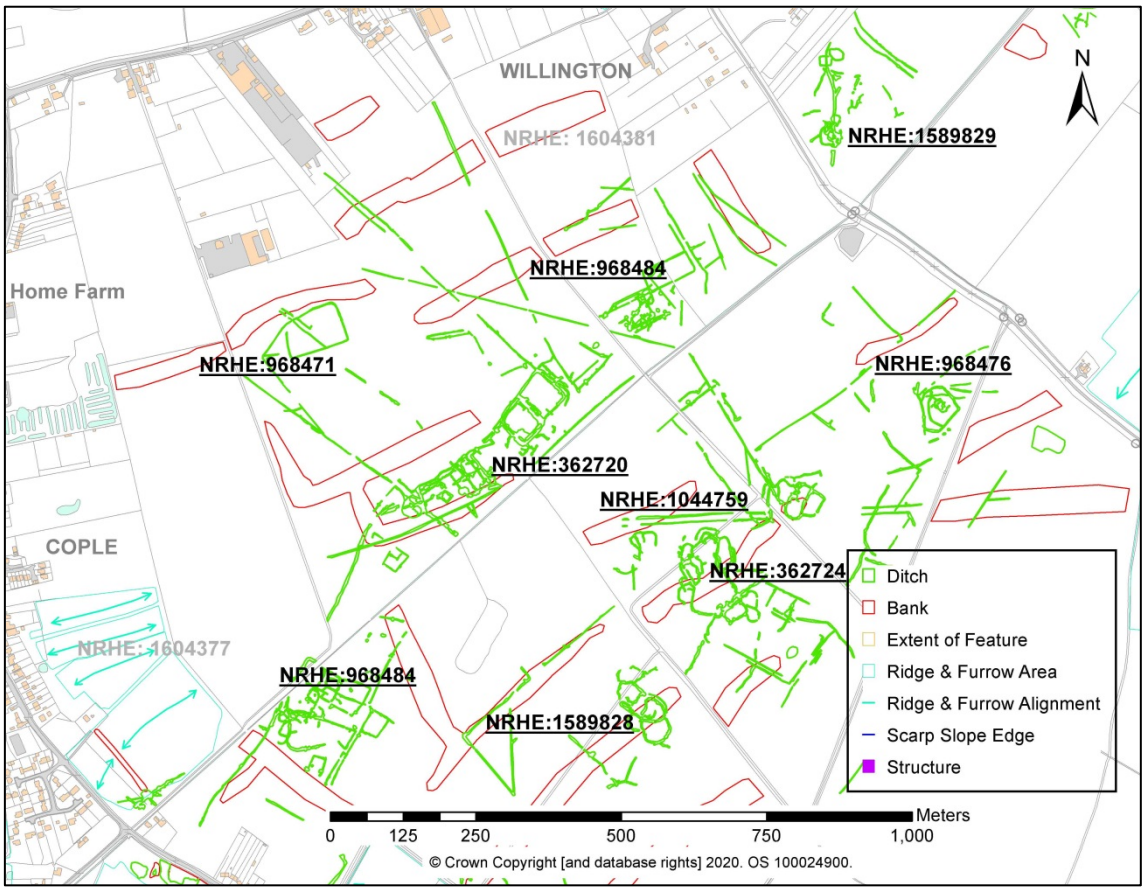

Figure 91 The extensive Iron Age and/or Roman settlement cropmarks at Cople and Willington. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Roman town, Great Staughton

The new discovery of a large probable Roman settlement at Great Staughton, possibly represents a rare minor town in a region where Late Iron Age to Roman small-scale rural settlements dominate (Figure 92). The settlement is also interesting in that there is a clear difference in the form of the settlement from its northwest to its southeast end. One can speculate that perhaps this reflects an increase in population, status or shift in foci or maybe just demarcates a difference in land use. The visible layout of the settlement suggests it has potential to extend beyond the currently mapped area. No studies could be found of this settlement, although a nearby scheduled villa has been excavated and dated to the 1st-4th centuries AD, with earlier Iron Age activity.

Historic England scheduling selection guidance (2018i: 26) states that 'where they retain reasonable archaeological potential, Roman settlement sites will be deemed to have national importance'. Furthermore, it states that 'complex sites demonstrating different phases of development, perhaps over a long period, may be favoured for designation – by reason of their greater archaeological potential – over those which have simplicity of form perhaps indicating relatively short-term occupation' (Historic England. 2018i: 22). It is therefore suggested these features may benefit from further assessment.

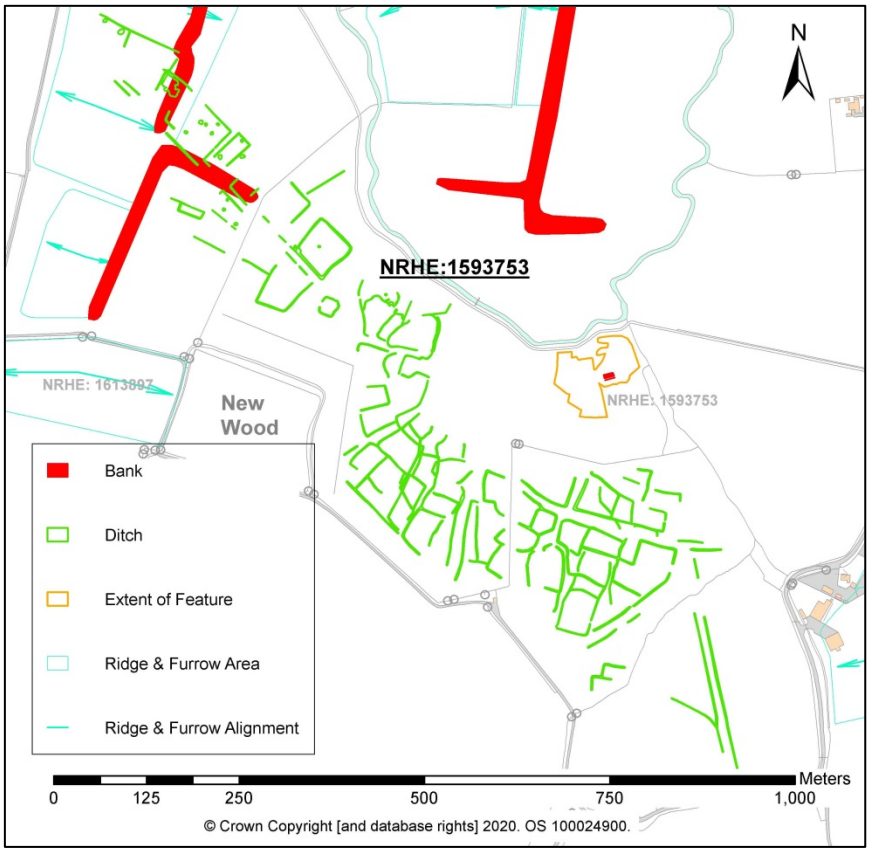

Figure 92 A probable Roman town at Great Staughton. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Roman temple and villa, Bletsoe

At Bletsoe, cropmarks indicate the buried remains of a possible Late Iron Age or Romano-British temple site (NRHE 1410832), comprising a near-square enclosure up to 43m across, within which there is a circular enclosure defined by a narrower ditch (Figure 93). About 25m in diameter, this appears to cut or overlie an internal square enclosure rather than completely enclose it, suggesting multiple phases. Within the circular and square enclosure are possibly further features that resemble conjoined ring ditches, but are indistinct and require further investigation.

Adjacent are cropmarks of a possible Roman villa (NRHE 1410831), siting within a rectangular enclosure measuring about 120m by 130m. The villa building measures about 31m by 13m and faint parallel and perpendicular lines on either side suggest it is in fact a larger building. To the northwest side of the rectangular enclosure is a possible ring ditch about 10m in diameter.

Historic England's scheduling selection guidance states that Romano-Celtic temples 'are rare nationally with only about 150 sites recorded in England. In view of this rarity and their importance in contributing to the complete picture of Roman religious practice, including its continuity from Iron Age practice, all Romano-Celtic temples with surviving archaeological potential are considered to be of national importance' (Historic England. 2018d: 22). It is therefore suggested these features may benefit from further assessment.

Figure 93 The possible Roman temple and villa at Vicarage Farm, Bletsoe. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Medieval settlements, North End (Stagsden), North End (Bletsoe) and Cotton End

The following three sites of medieval settlement remains at Cotton End, North End (Stagsden) and North End (Bletsoe) have been identified by the project, in consultation with Bedford Borough Council HER, as having potential for designation assessment.

Historic England's scheduling selection guidance states that 'factors which may favour designation include good quality earthworks; the demonstrable or likely survival of medieval archaeological deposits; the presence of listed medieval buildings within the moat; diversity of features, such as the presence of fishponds; contemporary (that is, medieval) documentation – although this should not be expected, as many sites were occupied by freeholders who generally did not make records; and where a site stands within a wider, contemporary (medieval), landscape, say of associated ridge and furrow (where this adjoins the moated site some may appropriately be included within the scheduled area)'. (Historic England. 2018i: 26). It is suggested that these earthworks may be suitable for further assessment.

North End, Stagsden

The earthworks remains of a medieval moated manor (NRHE: 346700) are located within Upend Wood. The site comprises a moat and adjacent to the earthworks of a deserted village at North End, with house platforms, tofts, trackway and possible pond, extending over 450m (NRHE 346701). From the east end of the village, a hollow way leads uphill past a former field enclosure in which are three parallel terraces (Figure 94).

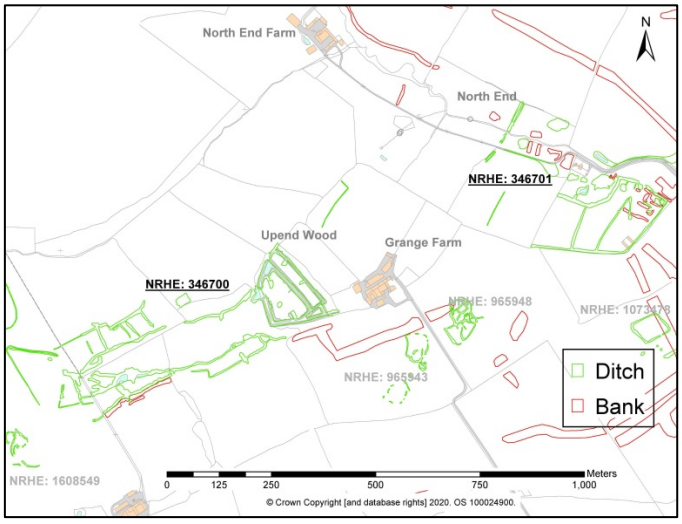

Figure 94 Manorial earthworks and medieval settlement at North End, near Stagsden. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Deserted Medieval Village, North End, Bletsoe

The earthwork remains of a probable deserted medieval settlement are located to the west of the road, south of North End Farm (NRHE: 1605236). The earthworks comprise rectangular platforms, hollows, ditches, ridge and furrow cultivation and an eroded hollow way that runs N-S parallel to the present road, but appears to have been eroded or quarried away. Field walking to the east of the road retrieved pottery dating to the 12th-14th centuries, as well as Roman material (Figure 95).

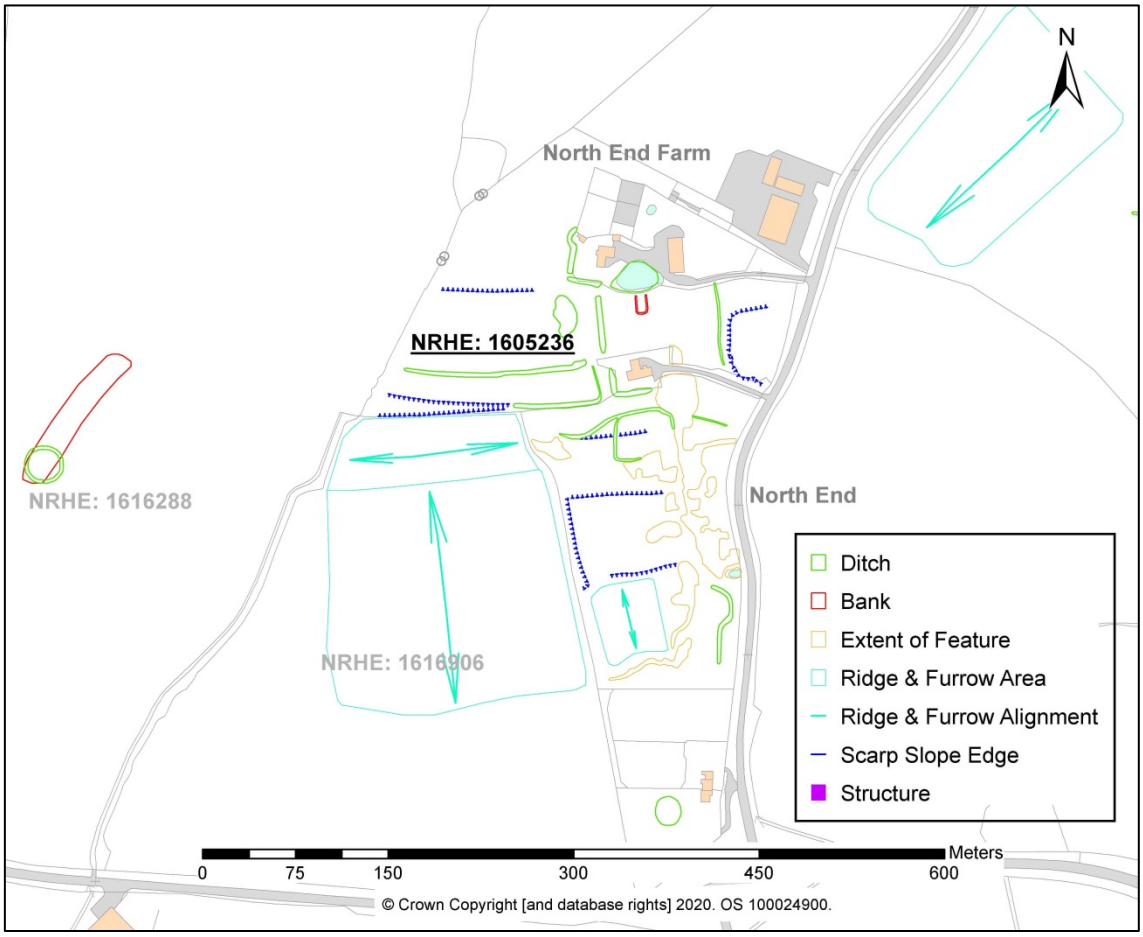

Figure 95 The deserted medieval settlement at North End, near Bletsoe. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Deserted Medieval Village, Cotton End

A probable medieval moated site and shrunken settlement are is visible as earthworks, located in a field adjacent Rookery Farm, Cotton End (NRHE: 1603557). To the southeast of the moat is a rectangular enclosure. A linear boundary ditch or hollow way extends parallel to High Road, enclosing an area that was probably formerly cottage plots. A hollow way runs south of the moat ditch (Figures 96 and 97).

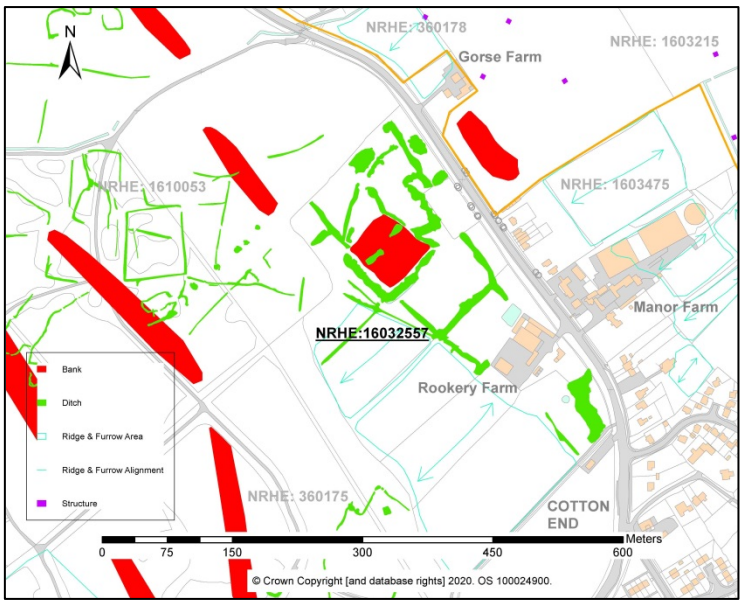

Figure 96 Medieval settlement at Cotton End, near Bedford. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

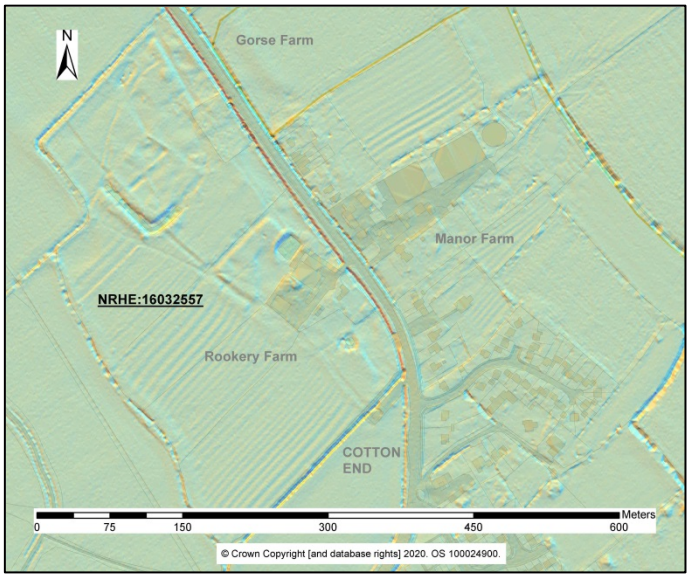

Figure 97 Lidar visualisation of the medieval settlement at Cotton End, near Bedford. LIDAR TL0845 Environment Agency composite 1m DTM JAN 1998–AUG 2016. © Environment Agency copyright 2020. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Moated site, Catworth, Cambridgeshire

At Catworth, a probable medieval moat (NRHE 360883), fishponds and other extensive earthworks are located in the paddock immediately south of St Leonard's church, extending over 200m W-E and 130m N-S (Figure 98). Two adjacent rectangular platforms are bounded by a continuous ditch about 5m in diameter, which is linked on its S side by possible linear fishponds 6m wide and about 85m long. The main enclosure platform is about 26.5 by 35.5m with an adjacent ditch enclosed platform to the south about 25 by 31.5m aligned WNW-ESE. Centred about 50m to the west is a linear ditch that may have been a fishpond, about 8m wide and 64m long aligned along the boundary with Church Road. East of the two enclosures is a rectangular platform about 15 by 5m, to the east of which is two parallel ditches with flanking banks aligned SW-NE. The outer ditch is about 9m wide and a reversed L-shape, being about 139m SW-NE and 86m SE-NW. The inner SW-NE aligned ditch is about 7m wide and 70m long. Within the area enclosed by the ditches are irregular earthworks. Outside the linear ditches is a circular earthwork mound about 7m in diameter of uncertain date and function, but possibly contemporary with the moat. The features remain extant on aerial photographs taken in 2013.

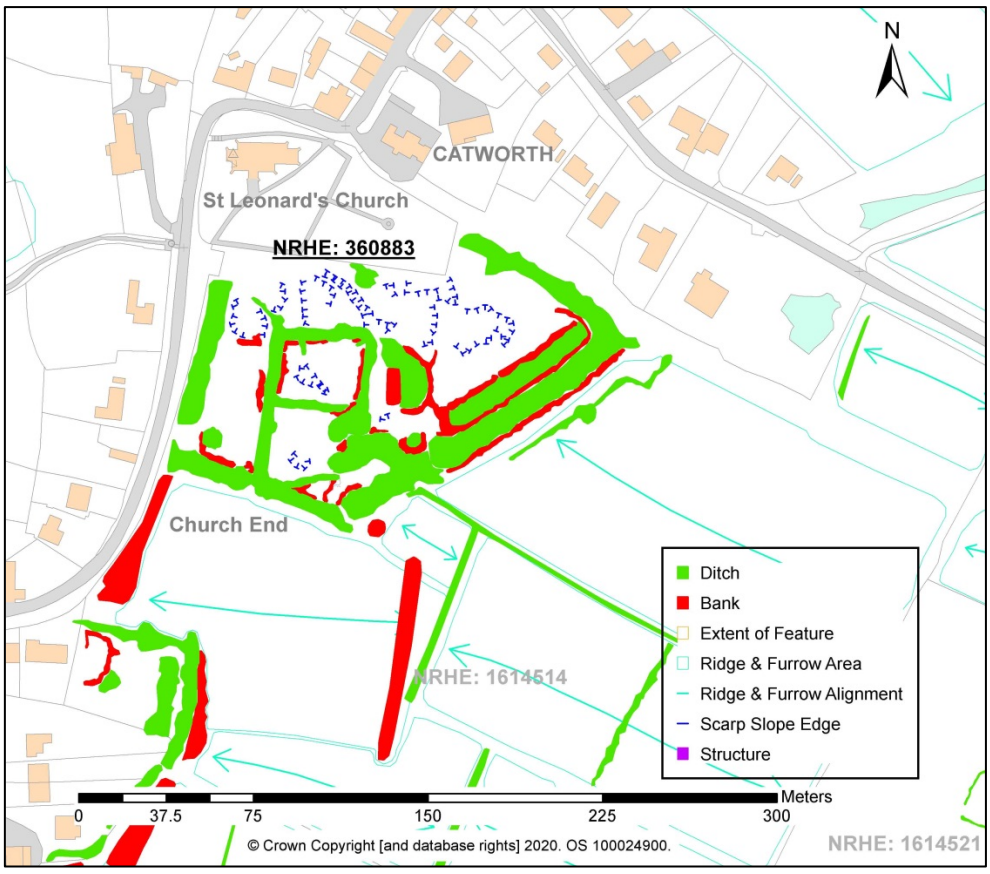

Figure 98 The probable medieval earthworks at Church End, Catworth. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

Priory Hill Park Velodrome

As described previously, the late 19th century grass 'velodrome' cycling track remains as earthworks within Priory Hill Park, St Neots and may be related to one of the world's oldest surviving cycling groups, St Neots Cycling Club, and it seems to have been still in use in 1945 (Figure 99).

Historic England's scheduling selection guidance (Historic England. 2018g: 10) states that 'it is very rare for nineteenth-century and later structures associated with culture, entertainment and sport to be designated through scheduling. Listing has been, and remains, the principal means of protection for such structures possessing special interest'. The earthworks of the velodrome would benefit from further assessment to establish if they have national importance.

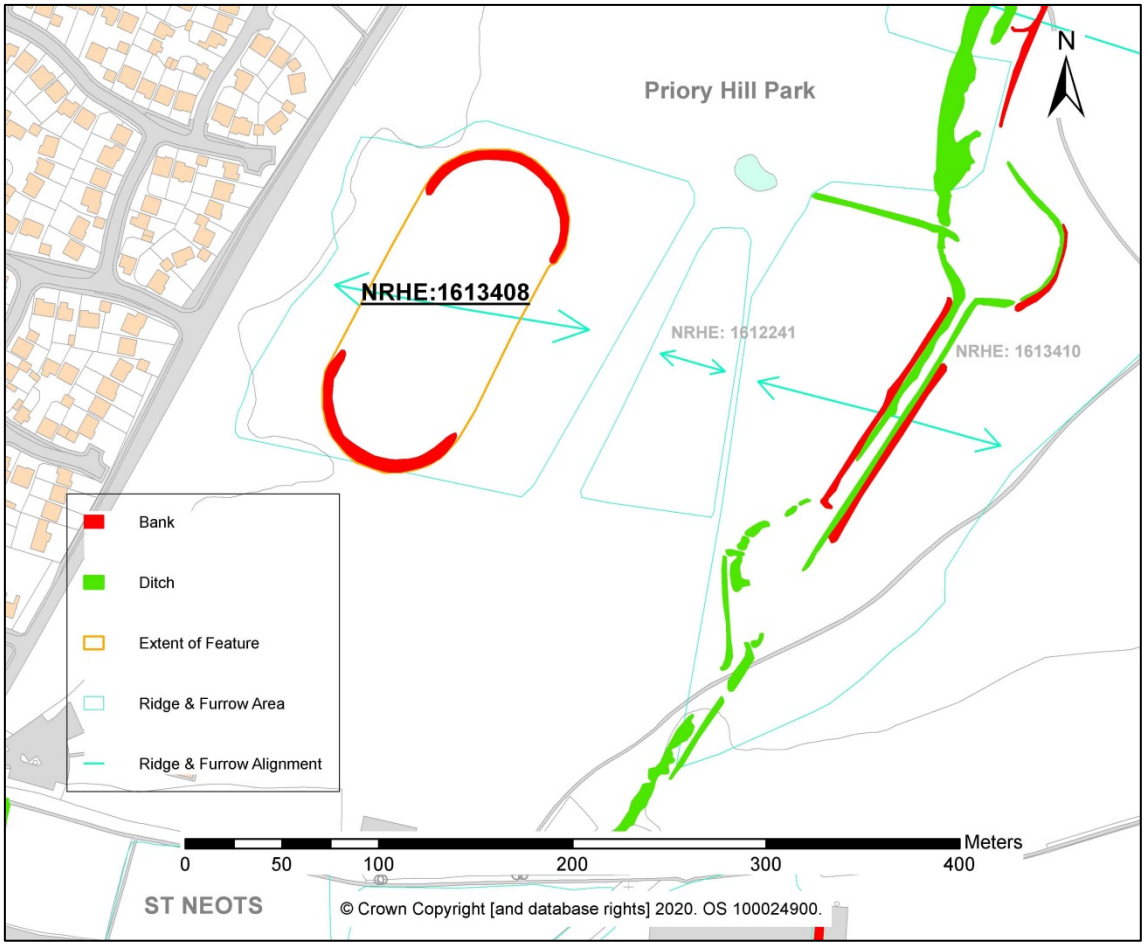

Figure 99 Possibly one of the oldest surviving velodromes in the country. © Crown Copyright and database right 2020. All rights reserved. Ordnance Survey Licence number 100024900.

USE OF AIM PROJECT DATA FOR PLANNING AND RESEARCH

Since completion of the mapping in May 2019, all stakeholder HERs (Bedford Borough Council, Milton Keynes Council, Central Bedfordshire Council and Cambridgeshire County Council) have been provided with the AIM GIS (digital mapping layers and monument records) relevant to their areas. The introduction of Historic England's Heritage Information Access Strategy (HIAS) programme has now provided for integration from the NRHE into the relevant HERs of the AIM project's new and updated monument records.

Bedford Borough Council's HER has been using the AIM digital mapping and records provided to them in phases since 2017 and have provided feedback to the project team of its practical application. The AIM data is being used by the HER's Planning Services for archaeological mitigation in advance of development applications and to date has proved itself 'entirely reliable' (G. Saunders, 2020, pers.comm., 28 January). For example, the AIM mapping was used for refining the excavation strategy at a proposed development site at Marston Vale Business Park, following which a geophysical evaluation was undertaken. The AIM mapping proved itself to be broadly comparable with the geophysical survey results. Similarly, the AIM mapping has been used in the consideration of new Environmental Stewardship applications within the borough (G. Saunders, 2020, pers.comm., 28 January).

It was noted that the inclusion with the AIM mapping of a Monument Polygon layer, which define individual archaeological monument records, greatly assist the HER Planning Services in the preparation of planning responses. Prior to access to the AIM mapping, many extant HER records within areas of archaeological complexity were encompassed by single, large monument polygons. The AIM project Monument Polygon layer breaks down these complex landscapes into more discrete and better-defined areas, which has significantly aided the refinement of strategic planning in response to potential landscape change or threat (G. Saunders, 2020, pers.comm., 28 January).

The AIM mapping is also currently being used for academic research. Matthew Tuohy, an HER Officer at Bedford Borough Council, is also a PhD student with the University of Leicester, his research tracing the origins of rural settlement morphology and landscape character within the Hundred of Willey, Bedfordshire. Using AIM project digital data as well as other source materials, Matt Tuohy is reconstructing the medieval field patterns, ridge and furrow cultivation blocks, plough headlands, boundary banks and ditches, trackways and hollow ways, as well as settlements within his study area. He has found the digital mapping invaluable, providing data for some areas not available from any other source (M. Tuohy, 2020, pers.comm., 28 January).

RECOMMENDATIONS FOR FURTHER STUDY

Recommendations are made for further archaeological study throughout the report, not just of the archaeological monuments and sites described, but also in improving the scheduled records where they lack up-to-date information.

The abundance of new monuments mapped by the project team within the Bedford Borough survey area warrants further detailed archaeological study, particularly on Iron Age and Roman sites. Whilst some of the mapped features can be attributed to specific periods with a high degree of confidence by morphological signature (e.g. Roman villas and Iron Age hillforts), much of the settlement evidence has been attributed both an Iron Age and a Roman date. Further investigation is suggested to provide more secure dating. This would greatly enhance our understanding of the landscape during those periods and the social organisation of communities within it, research themes identified in the Eastern Counties Research Framework (Glazebrook 1997, Brown and Glazebrook 2000, Medlycott 2011), and the Bedfordshire Archaeology Resource Assessment, Research Agenda and Strategy (Oake et al. 2007).

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APPENDIX A. SCHEDULED MONUMENT ASSESSMENTS

NHLE UID	Old County Number or Legacy ID	NRHE UID	HER UID	NHLE Site Name	Type	Latest evidence/notes
1012207	11559	346700	2556	Upend Wood moated site, outer enclosure and fishpond, Stagsden	Earthwork	The earthworks are within woodland and only visible on lidar.LIDAR SP9649 Environment Agency 1M DTM Jan 1998 - Sep 2014. The current SAM polygon does not appear to fully capture the surviving earthworks which forms part of a larger ditch system visible as earthworks in agricultural; fields SW of the wood.
1002936	BD38	362760		Warden Abbey	Earthwork	Earthworks were mapped and correspond well to RCHME 1978 survey, though new earthworks were visible. Slight change to northern boundary would seem necessary to include possible precint boundary bank. Most earthworks in pasture, though fields to west of railway line and east of Abbey Farm are under the plough. Another is partly used as vineyard.
1004502	BD10		995	Willington stables	Building	Not suitable for AP interpretation.
1004503	BD 10 A		435	Willington dovecot	Building	Not suitable for AP interpretation.
1004505	BD 25	363053	996	Barford Bridge	Structure	Not suitable for AP interpretation
1004507	BD30	360217		Moot Hall	Building	Not suitable for AP interpretation. Also Listed Grade II*
1005390	BD 78	360151	585	Settlement site N of Chapel End Farm	Cropmark	AP interpretation suggest cropmark features extend beyond current designated area. In arable cultivation 2009.
1005391	BD79	360153	14043	Site of Newnham Priory	Earthwork	Railway (now dismantled) has truncated earthwork features (still visible on lidar)
1005394	BD86	360196		Medieval lime kiln off Castle Lane		Not suitable for AP interpretation
1005397	BD 89	360583	1722	Oakley Bridge	Structure	Not suitable for AP interpretation
1005399	BD91	360189		Bedford Bridge	Structure	Not suitable for AP interpretation
1005405	BD45	360218	262	Elstow Manor House (Remains of)	Earthwork	Also Listed Grade I (Hillarsdon Mansion). Earthworks mapped by APs and lidar (LIDAR TL0447, 0547 Environment Agency 1m DTM Jan 1998–Sep 2014) extend beyond current designated area
1005408	BD 51	360584	988	Oakley churchyard cross	Structure	Not suitable for AP interpretation
1005411	BD 63	360576	998	Bromham Bridge	Structure	Not suitable for AP interpretation
1005412	BD64		814	Paved ford 400yds (366m) SE of Kempston Church	Structure?	Not suitable for AP interpretation.
1005413	BD 67	360180	584	Home Farm, Cardington- Site discovered by aerial photography S of village	Cropmark	AP interpretation suggest features extend beyond current designated area. In arable cultivation 2009.
1006919	MK 128	346710		Wood Farm moat	Earthwork	The earthworks are visible on lidar (LIDAR SP9349 Environment Agency 2m DTM JAN-1998–SEP-2014). The earthworks remain extant and visible on aerial photographs taken in 2012 (Next Perspectives APGB Imagery SP9349 07-SEP-2012)
1007322	20748	1225756	1480	Three barrows and a rectilinear enclosure 1000m NNW of Octagon Farm: part of a Neotlithic and Bronze Age mortuary complex	Cropmarks	AP mapping suggests that the monument features may extend further beyond the current designated extent? Some features may have been destroyed by sand/gravel extraction
1007324	20749	1225740	1480	Mortuary enclosure 900m NNW of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmarks	AP mapping suggests that the monument features extend beyond the current designated extent? Monument surrounded by sand/gravel extraction
1007326	20750		1480	Mortuary enclosure 1200m north-west of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmarks	Monument surrounded by sand/gravel extraction

1007327	20751	1029656	15009	Barrow and mortuary enclosure 1100m WNW of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmark	Status unknown. Not visible on any aerial photography available to Bedford Borough NMP project
1007329	20752	1610048	1480	A barrow 1000m NW of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmark	AP interpretation suggest cropmark features extend beyond current designated area and may have been truncated by adjacent aggregate extraction. In pasture 2009.
1007331	20753	NONE	NONE	A mortuary enclosure 800m west of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmark	Status unknown. Not visible on any aerial photography available to Bedford Borough NMP project
1008510	20746	1229649	1480	Two barrows 500m NE of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmark	AP interpretation suggest cropmark features extend beyond current designated area. In pasture 2009 with nearby sand/gravel extraction.
1008510	20746	1229649	1480	Two barrows 500m NE of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmark	Nothing to add from APs. In pasture. OS/72233 V 166-167 16-JUL-1972
1009240	20442	346742	4431	A moated site, three fishponds, two trackways and field systems at Moat Farm	Earthwork	Available APs show the moat to be densely lined by trees and vegetation and therefore not suitable for AP interpretation. No lidar available.
1009542	19063	346942	345	Lavendon Castle: a motte and bailey and associated enclosures at Castle Farm	Earthwork	Recent APs show that there is some agricultural actiivey (vehicles tracks etc) in the 'bailey' but probably hasn't caused any damage. Motte not visible. Bailey ditch tree lined. LIDAR SP9154 Environment Agency 1M DTM Jan 1998 - Sep 2014
1009588	20430	360281 and 610093		Moated site and two fishponds at The Rectory	Earthwork	Available APs show the moat to be densely lined by trees and vegetation and therefore not suitable for AP interpretation. No lidar available. However recent aerial photographs taken in 2007 show sections of the moat, which still corresponds to how it's shown on the 1892 OS map. Although it appears to now be drained, there was some water in the ditch on the southern side. NMR 24561/37 16-MAR-2007
1009592	20438	346692		Moated site at Ivy Hall	Earthwork	Boundary of monument polygon does not enclose all of eastern arm of moat visible on 1946 AP (RAF/CPE/UK/1792 RP 3097 11-OCT-1946), apparently now no longer extant. On aerial photographs taken in 2012 (Next Perspectives APGB Imagery SP9645 07-SEP-2012) the density of tree cover over the monument means that its condition at that date is not visible from the air.
1009594	20437	346691	42	Moated site at Astwood Road, 200m east of Boxhedge Farm	Earthwork	Edges of the moated site is tree-lined on all APs available - 1946 to 2012 (Next Perspectives APGB Imagery SP9645 07-SEP-2012), so condition assessment of surviving earthworks not possible. No lidar available.
1009627	20441	362997	2806	Howbury ringwork and medieval trackway	Earthwork	Northeast side, east and centre of ringwork is tree covered on recent APs and shows best on lidar. LIDAR TL1051 Environment Agency 1M DTM Jan 1998 - Sep 2014
1009777	20747	1229625	1480	A barrow 400m north of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmark	AP interpretation suggest cropmark features extend beyond current designated area. In arable cultivation 2009.
1009777	20747	1229625	1480	A barrow 400m north of Octagon Farm: part of a Neolithic and Bronze Age mortuary complex	Cropmark	Nothing to add from APs. In ploughed field. OS/72233 V 166-167 16-JUL-1972
1010112	11547	346746	16939	Moat Farm moated enclosure and associated settlement earthworks	Earthwork	Available APs show the moat to be well managed, maintaned though, it is tree lined for most of it. The house witin the moat is still in use. Next Perspectives APGB Imagery SP9941 02-JUN-2009
1010365	20411	362766	972	Quince Hill ringwork, Old Warden	Earthwork	Available APs show the ringwork, suriving as earthworks, to be densely covered by trees and vegetation. However lidar was availlable. Levlled earthworks on the southeastern side of the ringwork were viisble as

						cropmarks and will be part of the orginal monment, and is currently not described or included in the Scheduled area.
1010366	BD49/ 20412	360158		Bedford Castle	Earthwork	Appears to be intact. Lidar does not suggest any damage
1010864	11532	362966	817	Birchfield Farm moated site and associated fishponds and leats	Earthwork	The earthworks are most clear on lidar. East side is obscued by tree cover. LIDAR TL1253/TL1254 Environment Agency 1M DTM Jan 1998 - Sep 2014
1010948	11536	362970	816	Palaceyard Wood medieval moated enclosure and associated enclosures, woodland bank and cultivation earthworks	Earthwork	The earthworks are within woodland and only visible on lidar.LIDAR TL1354 Environment Agency 1M DTM Jan 1998 - Sep 2014
1011295	19088	346981		The Bury: a ringwork and associated earthworks 100m north of Lavendon Church	Earthwork	No evidence of the ringwork referred to. Can see MD field boundary/Ridge n Furrow/trackway etc but no ring work. Dubious interpretation. This SAM needs reinterpreting.LIDAR SP9153 Environment Agency 1M DTM Jan 1998 - Sep 2014
1011296	19089	346719	MMK126	Moated site and fishponds 200m north-west of Up End	Earthwork	The earthworks are visible on lidar (LIDAR SP9145-9146 Environment Agency 2m DTM JAN-1998–SEP-2014). Moat platform visible in pasture in 1946 AP (RAF/CPE/UK/1792 RP 3102 11-OCT-1946), but this area now completely covered by woodland on 2012 AP (Next Perspectives APGB Imagery SP9145-9146 07-SEP-2012) and monument condition unknown.
1011305	19086	346947	138	Moated site and associated enclosure at Uphoe Manor Farm 700m east of Lavendon Church.	Earthwork	The earthworks are most clear on lidar. LIDAR SP9253 Environment Agency 1M DTM Jan 1998 - Sep 2014
1011309	19064	346952	147	Lavendon Abbey: the site of a Premonstratensian abbey, fishponds and field system at Lavendon Grange	Earthwork	Earthworks clear on the lidar. LIDAR SP9154 Environment Agency 1M DTM Jan 1998 - Sep 2014
1011629	20745	1225830 / 1225788 / 1226008	1480	Neolithic and Bronze Age mortuary complex 600m NW of Octagon Farm	Cropmarks	Monument surrounded by sand/gravel extraction. In pasture 2009
1012079	11535	362989	769	'The Docks' moated site and dock, Willington	Earthwork	Edges of the moated site is tree lined, so the earthworks are most clear on lidar. LIDAR TL1150 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012312	11553	360278	303	Kempston Hardwick moated site	Earthwork	The moat is not visible on recent (2002-2009) APs due to tree coverage round and inside the moat and therefore not suitable for AP interpretation. However AP HEA 29405/37 11-JUN-2015 shows it is still water filled and the moat ditches are still clearly defined as seen on recent lidar (LIDAR TL0344 Environment Agency 1M DTM Jan 1998 - Sep 2014)
1012314	11556	346987	992	Carlton Hall moated enclosure and associated outer enclosure, farm buildings, dovecote, and pond.	Earthwork	The earthworks are most clear on lidar. LIDAR SP9454 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012317	BD94A	360270		Long barrow 350m south east of Bury Farm	Earthwork	After 1972 not suitable for AP interpretation due to dense scrub covering the monument. This SAM needs reinterpreting. This is not Neolithic Long Barrow, but is a MD/PM pillow mound (rabbit warren).
1012360	20401	360138	MBD282	Cardington Manor Farm moated site	Earthwork	Available APs show the moat to be densely lined by trees and vegetation and therefore not suitable for AP interpretation. No lidar available.
1013521	27112	362907	1494	Bowl barrow, known as the `Round Hill', 440m WNW of College Farm	Earthwork	Tree covered on recent APs so best seen on lidar. May not be a BA barrow. LIDAR TL1455 Environment Agency 1M DTM Jan 1998 - Sep 2014
1013523	27116	966201	7357	Oval barrow 60m west of Ranworth Walk, 650m south west of Westfield School	Cropmarks	Excavation and AP interpretation suggest features extend beyond current designated area. APs dated 2009 indicate these features may be affected by new residential housing development

1014794	27158	346979		Roman villa 300m south east of Newton Lodge Farm	Cropmark	Not all APs were available for this monument, so it was not possible to see the exact location of The Ro villa. However the surrounding cropmarks were visible, and the SAM polygon may need to be adjusted. EARTH.GOOGLE.COM 01-JAN-2006 ACCESSED 26-JAN-2017
1015586	27181	1174955	594	Hengi-form monument 480m south of Dairy Farm	Cropmark	Nothing to add from APs. In ploughed field. NMR 203/286 20-JUN-1970
1015587	27182	1175002	594	Henge, henge type monument and bowl barrow 500m south-east of Dairy Farm	Cropmark	The SAM description needs changing as the ring ditches do not appear to be but by the gas pipelines and not sure these are henges or henge type monuemnts as all the ring ditchs appear as complete circles. In ploughed field. NMR 203/286 20-JUN-1970 and NMR 18394/23 02-JUL-1999. Next Perspectives APGB Imagery TL1150 02-JUN-2009
1015588	27192	360543	332	Mowsbury Hill: slight univallate hillfort and medieval moated site	Earthwork	The earthworks are visible on lidar (LIDAR TL0653 Environment Agency 1m DTM 01-JAN-1998 – 30-SEP-2014). The lidar suggests that the monument features may extend further beyond the current designated extent?
1015589	27193	1174298	594	Two bowl barrows 330m south of Dairy Farm	Cropmark	SAM description may need changing as the western 'bowl barrow' appears to be a pie shaped mortuary enclsoure, could be NEO in date. In ploughed field. NMR 4140-35 20-JUL-1988
1015590	27194	1174311	594	Bowl barrow 550m south-east of Dairy Farm	Cropmark	Nothing to add from APs. In ploughed field. NMR 203/286 20-JUN-1970
1018381	29402	362774	9263	Motte castle in Exeter Wood, 780m south east of Wood Farm	Earthwork	Available APs show the motte to be densely lined by trees and vegetation and therefore not suitable for AP interpretation. No lidar available. However its location is visible by a circular growth of deciduous trees, centred at TL 10026 44252 and which is surrounded by coniferous plantations.
1018726	32114	346716	MMK113	Moated site 410m south east of Maukins	Earthwork	The earthworks are visible on lidar (LIDAR SP9448 Environment Agency 2m DTM JAN-1998–SEP-2014). The earthworks remain extant and visible on aerial photographs taken in 2012 (Next Perspectives APGB Imagery SP9448 07-SEP-2012)
1021373	35359	346727	MMK7556	Site of St Martin's Chapel, Ekeney; 680m south east of Petsoe Manor Farm	Levelled earthwork	The partial remains of the chapel and a platform are visible as soilmarks on 1946 APs (RAF/106G/UK/1562 RS 4148 07-JUN-1946) and as levelled earthworks on lidar (LIDAR SP9248 Environment Agency 2m DTM JAN-1998–SEP-2014). No evidence of these features are visible on aerial photographs taken in 2012 where land is under arable crop, so condition unknown.
1018761	32103	346722		Moated site at Old Moat Farm	Earthwork	Not fully mapped due to historic tree cover in the NE corner. Part of moat visible on 2012 APs (Next Perspectives APGB IR Imagery SP9245 07-SEP-2012).
1004604	BD 31			Harrold Round House	Building	
1013277	12704	346794	711	Tri-Focal Deserted Medieval village, Chellington.	Earthwork	The earthworks of the medieval village are still clealry visible on Lidar. LIDAR TL0255/TL0256 Environment Agency 1M DTM Jan 1998 - Sep 2014
1005401	BD 99	360453		Enclosures E of East End Farm	Cropmark	No change to the cropmarks from earlier photographs. Clearly still visible in 2011. NMR 26985/45 13-JUN-2011
1009554	13613	360422	1323	Shrunken medieval village at Milton Ernest, Bedfordshire	Earthwork	Lidar shows that some blocks of ridge and furrow earthworks of the medieval village have been plough levelled. LIDAR SP9656 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012057	20457	360419	912	Yarl's Wood hermitage and moated site	Earthwork	The moat is now obscured by vegatation so not visible on recent aerial photographs and no lidar was available. RAF/541/483 RS 4079-4080 07-APR-1950
1005393	BD 84			Tempsford Bridge	Structure	Not suitable for AP interpretation
1006849	CB 164	366114		Deserted village (site of) at Weald	Earthwork	The earthworks remain visible as earthworks - LIDAR TL2259-2359 Environment Agency 1m DTM JAN-1998–SEP-2014
1006815	CB 170	366106		Deserted village at Wintringham	Cropmark	The site is visible as earthworks on historic aerial photos RAF/CPE/UK/1952 RP 3296 25-MAR-1947. However, aerial photographs taken in 2013 (Next Perspectives APGB Imagery TL2159-2259 15-JUL-2013) and remote sensing data (LIDAR TL2159-2259 Environment Agency 1M DTM Jan 1998 - Sep 2014) show that all the features have been plough levelled and are visible as cropmarks.
1010114	11555	362784	475	Chawston Manor moated site and associated fishpond	Earthwork	The earthworks remain visible as earthworks - LIDAR TL1556 Environment Agency 1m DTM JAN-1998>AUG-2016
1012076	11531	362781	474	Moated enclosure and associated building platforms, The Lane, Wyboston.	Earthwork	The earthworks remain visible as earthworks - LIDAR TL1656 Environment Agency 1m DTM JAN-1998>AUG-2016
1009629	20434	362787	19620	The Hillings, Castle Hills: a ringwork castle associated with a Saxon vill, shifted	Earthwork	The earthworks remain visible as earthworks - LIDAR TL1758 Environment Agency 1m DTM JAN-1998>AUG-2016

				medieval village and a windmill mound		
1013453	11528	362890	471	Manor Farm moated enclosure, fishponds and fowling earthworks	Earthwork	The earthworks are obscured by vegetation on recent aerial photographs but they are clealry vsible on lidar. LIDAR TL1058 Environment Agency 1M DTM Jan 1998 - Sep 2014 and NHC 2525/9A 26-JUL-1984
1010913	11526	360316	318	Mavourn moated site, with associated fishponds, enclosures and deserted settlement site	Earthwork	Also further to the northwest at TL 06977 57734, and visible as cropmarks, are what appears to be the continuation of the trackway and further boundary ditches forming enclosures. The moat is obscured by trees and vegetation on recent aerial photographs but is clearly visible on lidar. LIDAR TL0757 Environment Agency 1M DTM Jan 1998 - Sep 2014 and NMR 23659/13 29-JUL-2004
1009155	20443	360297	313	Bury Hill Camp: a motte and bailey castle with three fishponds	Earthwork	The motte, is obscured by dense vegetation on later aerial photographs and there was no lidar imagery available, so an assessment of its current state was not possible. RAF/106G/UK/635 RP 3010-3011 10-AUG-1945
1012361	20402	360401	309	Blackburn Hall moated site, associated fishponds and quarries	Earthwork	The moat, pond and quarries are obscured by vegeation on recent aerial photographs but they are clealry vsible on lidar. LIDAR TL0458 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012365	20409	360396	308	Moated site with garden earthworks at Bletsoe Castle	Earthwork	Most of the possible 16th century enclosed garden to the east of the moat, was not mapped due to a hedge which obscures the banks. Lidar imagery was not available for most of the moated site. Bedford HER 1986 Vertical georeferenced composite layer.
1006882	CB 101			St Neots Priory (site of)		NOT ASSESSED - OUTSIDE OF PROJECT AREA
1006821	CB 180			The Malting (kiln)	Earthwork	NOT ASSESSED - OUTSIDE OF PROJECT AREA
1009577	11540	360308	316	Greensbury Farm moated site	Earthwork	The moat is obscured by trees and vegetation on recent aerial photographs but is clearly visible on lidar. LIDAR TL0758/TL0759 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012066	11529	360303	315	Manor Farm Iron Age univallate hillfort and medieval moated enclosure.	Earthwork and cropmark	To the south of the road the hilfort is ploughed so the outer ditch on the west side is visible as a clear cropmark, but the inner ramp is still visible as a slight earthwork on lidar imagery.LIDAR TL0849 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012069	11527	360344	3889	Turnpike Farm moated enclosure and associated cultivation earthworks.	Earthwork	The surviving earthworks don't form clear moats, but they do form ditched enclosures north of the current farm buildings and west of the ridge and furrow. The ditches are obscured on recent aerial photographs by trees but are clearly vsible on lidar. LIDAR TL0849 Environment Agency 1M DTM Jan 1998 - Sep 2014
1013874	20403	363446	7940	Moated site known as `The Camps' and associated fishponds		The moat is obscured by trees and vegetation on recent aerial photographs but is clearly visible on lidar. LIDAR TL1160 Environment Agency 1M DTM Jan 1998 - Sep 2014
1014455	27118	363438		Bushmead Priory: an Augustinian priory 800m north east of Bushmead Cross	Earthwork	Polygon does cover all the features likley assocaited with the Priory and covered in NRHE 1499927 and 1116251. Most of the area is covered in trees and therefore the earthworks best viewed on lidar. LIDAR TL1160 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012067	11525	509776	495	Bassmead Manor Farm moated enclosure.	Earthwork	Ditch is still water filled. The moat is obscured by trees and vegetation on recent aerial photographs but is clearly visible on lidar. LIDAR TL1461 Environment Agency 1M DTM Jan 1998 - Sep 2014
1006866	CB 131	363484	458	Roman site, Rushey Farm	Cropmark	The Roman site has been excavated and now visible as a wide spread of building material as a cropmark and soilmark on recent aerial photographs. The polygons are not in the correct area. EARTH.GOOGLE.COM 01-JAN-2003 ACCESSED 21-AUG-2017
1020486	33358			Two bowl barrows 900m and 1000m east of Old Manor Farm	Earthwork	The location of the two barrows were viewed on an extensive range of aerial photographs and lidar imagery but no features were visible as either cropmarks or earthworks. The height of the barrows was slight when viewed on the ground in 1971, and are likely now levelled.
1009590	20433	363502	421	The Old Manor House, Cretingsbury: a motte castle and moated manor house	Earthwork	The earthworks are obscured by trees and vegetation on recent aerial photographs but is clearly visible on lidar. LIDAR TL1163/TL1162 Environment Agency 1M DTM Jan 1998 - Sep 2014
1012074	11530	360724	3276	College Farm moated site and associated banked enclosure and fishpond.	Earthwork	The earthworks are obscured by trees and vegetation on recent aerial photographs but is clearly visible on lidar. Bedford HER 1976 Vertical georeferenced composite layer
1012363	20404	346802	994	Moated site in Castle Close	Earthwork	The earthworks remain clearly visible as earthworks - LIDAR SP9859 Environment Agency 1m DTM JAN-1998>AUG-2016
1012327	13646	347100	2000	Great Lodge moated site,	Earthwork	The earthworks remain visible as earthworks - LIDAR SP9864 Environment Agency 1m DTM JAN-

				Higham Park		1998>AUG-2016
1013311	11543	363173		Staughton Green moated site, Great Staughton	Earthwork	The earthworks remain visible as earthworks - LIDAR TL0365 Environment Agency 1m DTM JAN-1998>AUG-2016
1015013	27171	360642	255	Motte castle in Kimbolton Park, known as Castle Hill	Earthwork	The earthworks remain visible as earthworks - LIDAR TL0967 Environment Agency 1m DTM JAN-1998>AUG-2016
1012490	11546	346876		Wold Farm moated enclosure, Odell	Earthwork	The earthworks are obscured by trees and vegetation on aerial photographs and lidar iamges were not available to the project
1013524	27117	1202533		Banjo enclosure, 330m south west of Manor Farm	Cropmark	Additional mapping from aerial photographs (NHC 2529/33 20-JUL-1984 and 1996 Bedford Borough Council held digital layer) suggest a more complex morphology and possible phases of settlement.
1006615	NN 191	347157	MNN15270	Manorial earthworks, Wollaston	Earthwork	The earthworks remain visible as earthworks - LIDAR SP9062 Environment Agency 1m DTM JAN-1998>AUG-2016
1013142	13647	347137	MNN22918	Beacon Hill motte castle, Wollaston	Earthwork	The earthworks remain visible as earthworks - LIDAR SP9062 Environment Agency 1m DTM JAN-1998>AUG-2016
1002902	NN 178	347131	MNN9873	Roman villa, Wollaston	Cropmark	The cropmarks were recorded from aerial photographs taken in 1985. Recent aerial photographs (2005, 2009, 2013, 2016 and 2017) show the site to be either ploughed or under crops, and not visible.
1003892	NN 83	347066	1641	Roman town of Irchester and preceding Iron Age settlement; including remains of the medieval hamlet of Chester on the Water	Sub Surface Deposit/Earthwork	The main focus of the Roman town within the walled ramparts is now under pasture and does not appear to have been ploughed in while. Lidar shows that there are still good earthwork remains of the Roman ramparts and the Medieval hamlet. LIDAR SP9166 Environment Agency 1M DTM 01 Oct 2014 - 31 May 2017 and LIDAR SP9166 Environment Agency 1M DTM 01 Oct 2014 - 31 May 2017
1003646	NN 65			Ditchford Bridge	Structure	Not suitable for AP interpretation
1012113	13607	347012	1679	Higham Ferrers Motte and Bailey Castle, with Ponds, Warren and Dovecote	Sub Surface Deposit/Earthwork	Most of site is sub suface (and has been excavated), but the L-shaped pond and warren area to the north is visible as an earthwork. LIDAR SP9668 Environment Agency 1M DTM 01 Oct 2014 - 31 May 2017
1016322	29716			Churchyard cross in St Mary the Virgin churchyard	Structure	Not suitable for AP interpretation
1016321	29715			Market cross 44m north of the Town Hall	Structure	Not suitable for AP interpretation
1013829	22702			'Chichele College': the remains of the medieval college of Higham Ferrers	Structure	The base of the walls are exposed and visible but well documented. Areas of paths through the site has changed but does not appear to be any damage as viewed from aerial photographs. NMR 27938/13 04-MAR-2014 and NMR 27938/3 04-MAR-2014
1010663	13645	347021		Saffron moat at Higham Ferrers	Earthwork	The moat is only visible via LIDAR due to dense tree cover. LIDAR SP9568 Environment Agency 1M DTM 01 Oct 2014 - 31 May 2017
1020176	29717			Churchyard cross in St Peter's churchyard		Not suitable for AP interpretation
1013520	27111	360674	341	Yielden Castle: a motte and bailey castle, fishponds and associated enclosures	Earthwork	The castle is now in pasture and the earthworks appear to be in a good condition though vehicle and footpath tracks across the site has cut slightly into the earthworks. The LIDAR TL0166 Environment Agency 1M DTM 01 Oct 2014 - 31 May 2017 and NMR 21051/11-12 14-NOV-2000 and NMR 26104/25-26 08-OCT-2008
1008733	20450	360737	347	Hall Close moated site, fishponds, trackway, field system and dovecote	Earthwork	LIDAR TL0463 Environment Agency 1M DTM 01 Oct 2014 - 31 May 2017

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