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East Cambridgeshire Aerial Investigation & Mapping project report

Stephen Crowther and Maggi Noke

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East Cambridgeshire: Aerial Investigation & Mapping Project Report

Stephen Crowther and Maggi Noke

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SUMMARY

The East Cambridgeshire Aerial Investigation and Mapping project combined the mapping and interpretation of vertical and specialist oblique aerial photographs, as well as airborne laser scanning data (lidar), to identify, map and record archaeological remains dating from the Neolithic to the mid-20th century. The project was carried out to provide comprehensive information from aerial sources to inform local and national planning and research.

The project covered an irregular area of 364 square kilometres and extended southwards from the City of Ely to the City of Cambridge in the southwest, Fulbourn in the south, the Suffolk market town of Newmarket in the southeast and Isleham in the east.

The 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 chalk uplands. The project also recorded widespread medieval field systems and settlements, along with significant 20th-century military airfields and camps.

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 519 new monument records to the pre-survey total of 2,932 from Cambridgeshire County Council and Suffolk County Council Historic Environment Records (HERs) and provided enhanced information for a further 458 extant monument records. This represents an increase of total HER monument records within the project area of 18% and enhances information of 16% of extant HER monument records.

CONTRIBUTORS

Digital mapping, interpretation and report writing was undertaken by aerial archaeology specialists Stephen Crowther and Maggi Noke of Skylarkeology, between June 2019 and January 2022. The project was managed by Skylarkeology, and the Project Assurance Officer was Helen Winton, Interim Head of Archaeological Investigation, Policy and Evidence Group, Historic England.

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 provided by Sally Croft, Senior Archaeologist at Cambridgeshire County Council; by Ruth Beckley, Archaeological Officer at Cambridgeshire County Council; and by Grace Campbell, Archaeological officer (HER) at Suffolk County Council. Thanks also to Andrew Dennis of the Royal Air Force Museum, Hendon for providing historic airfield plans. Grateful thanks go to the Weald and Downland Open Air Museum, Cambridge Community Archives Network and the Museum of Cambridge for their kind permission to use copyrighted images.

ARCHIVE LOCATION

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DATE OF SURVEY

June 2019- January 2022

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INTRODUCTION

The East Cambridgeshire Aerial Investigation and Mapping (AI&M) project was carried out by Skylarkeology (Aerial Archaeology Specialists) and funded by Historic England's Heritage Protection Commissions Programme. The project was undertaken to Historic England (HE) standards and was undertaken between 2019 and 2021.

The project covers an area of 364 square kilometres (sq km) that extends across a diverse landscape, from the west Cambridgeshire claylands, across fenlands to the south Cambridgeshire chalk.

Historic England's aerial investigation and mapping projects improve understanding of historic landscapes that may be subject to significant pressure from development, infrastructure or other changes or where gaps exist in current knowledge. Parts of this project area have undergone considerable development in recent years, with urban expansion to the east of Cambridge and a major area of 9,000 new houses underway on the former military airfield at Waterbeach, with future housing requirements for the period up to 2031 set out in the East Cambridgeshire Local Plan (2017) and Cambridge City and South Cambridgeshire Local Plan (South Cambridgeshire District Council 2013). These include additional significant housing allocations in the villages of Soham, Teversham, Burwell, Fordham, Isleham and the environs of Ely (Fig 1).

Concomitant with this expansion, large infrastructure developments are planned with upgrades to the A14 and A10 roads, as well as capacity increases for rail services connecting London and East Anglia. This includes the reinstatement of the former 'Varsity Line' from Oxford to Cambridge and its eastern extension onto the East Anglian coast. The project area also falls within the 'Ox-Cam Arc', a notional sweep of land between Oxford and Cambridge in which educational, research, high-tech industrial manufacturing and business development is being promoted.

This report presents background and highlights of the project, presenting some selected examples of the monuments and themes that have been recorded, along with some recommendations for possible future research.

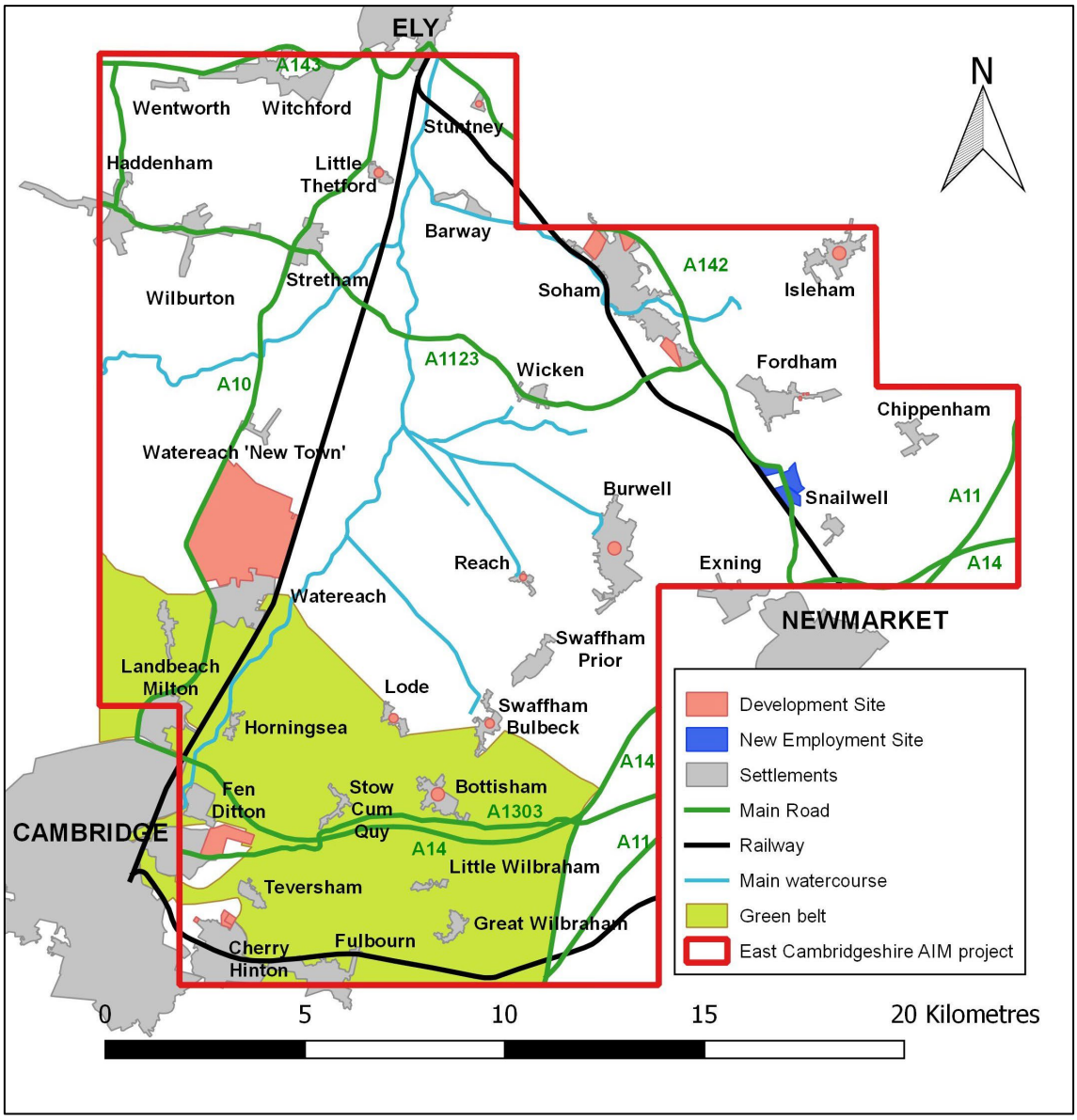

Figure 1. The East Cambridgeshire AI&M project area, with proposed developments sites. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

The AI&M project's primary product, the digital mapping and monument records, have been added into Cambridgeshire County Council's Historic Environment Record (HER) and relevant records forwarded to Suffolk County Council's HER to provide and enhance baseline evidence to better inform landscape management strategies, as well as aid regional and local research.

The 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 this project supports the contribution of Historic England's Three-Year Corporate Plan 'Building the future' (2020-2023) (Historic England 2020a) to Heritage 2020, the historic environment sector's framework for strategic priorities for England from 2015 to 2020 (Heritage Environment Forum 2015):

Tier 1 Activity – 2. Investing in knowledge creation
2.1 Create necessary new knowledge, including recording prior to loss
2.2 Clarify threats, risks, harm and response in the historic environment

Tier 1 Activity – 3. Develop our reputation in heritage policy and evidence
3.2 Provide evidence on the state on the historic environment

Tier 1 Activity – 4. Providing expert and reliable advice to inform and care and development of the historic environment
4.1 Compile, improve and promote the National Heritage List for England (NHLE)

The 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 and local researchers and enhance local distinctiveness amongst communities with its availability via online resources such as the Heritage Gateway website (https://www.heritagegateway.org.uk/gateway/), Historic England's Aerial Archaeology Mapping Explorer (https://historicengland.org.uk/research/results/aerial-archaeology-mapping-explorer/) and Aerial Photo Explorer (https://historicengland.org.uk/images-books/archive/collections/aerial-photos/).

Research Objectives

East Cambridgeshire falls within the area covered by the regional Eastern Counties Research Framework (Glazebrook 1997, Brown and Glazebrook 2000), updated and revised by Medlycott (2011).

The dataset provided by the AI&M 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;

Bronze Age

- patterns of burial practice. The landscape-scale of AI&M 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;

- field patterns and settlement, which may provide evidence that addresses issues of the region's late transition to farming in the Neolithic;

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

- sites on non-gravel locations, which may assist in identifying a signature for such Bronze Age sites.

Iron Age

- identify Early Iron Age open settlement sites 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;

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

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 AI&M 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 AI&M 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

Cambridgeshire covers 3,389 sq km and is one of the shires that make up the 'East of England' group that also comprise Norfolk, Suffolk, Hertfordshire, Essex and Bedfordshire. East Cambridgeshire is one five district council areas in the County for purposes of local government.

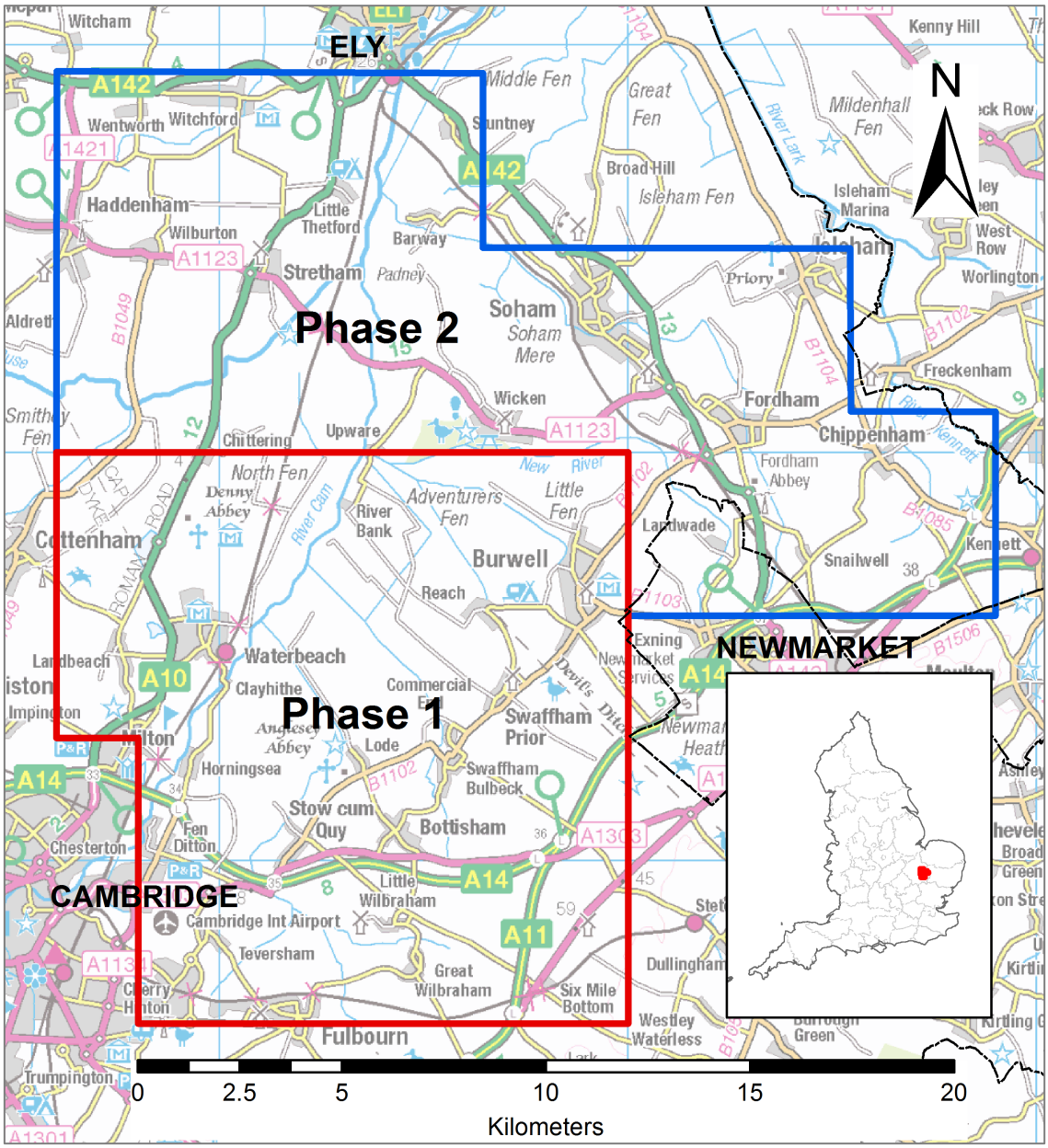

Figure 2. The phases of the East Cambridgeshire AI&M project area. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

The project comprises an area of 364 sq km, comprising about 355 sq km of Cambridgeshire, being about 10.5% of the County's total land area. Additionally, about 9 sq km of land falls within the County of Suffolk (Fig 2).

Previous Aerial Survey Projects

A number of aerial investigation and mapping surveys and other archaeological survey projects have been undertaken in the region (Fig 3).

The Cropmarks in Hertfordshire National Mapping Programme project

With project borders separated by 13 kilometres (km) to the southeast, 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 AI&M methodology and recorded cropmarks only and used manual transcription. The inked overlays are now available as georeferenced scans for use in GIS. It 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, which continue northeast into the AI&M project area.

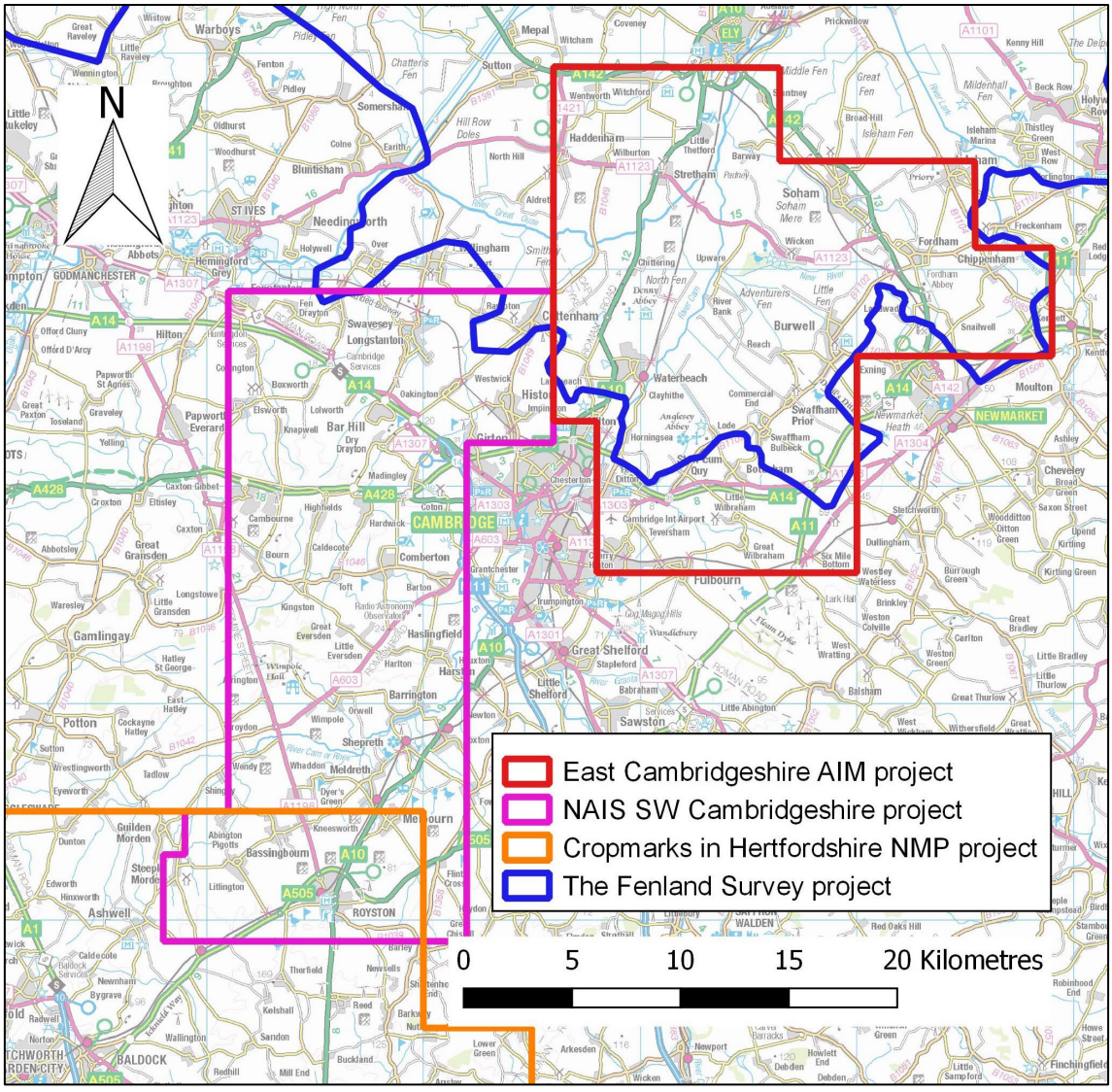

Figure 3. Previous aerial mapping projects. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

National Archaeological Identification Survey – South West Cambridgeshire

Abutting the southwest side of the East Cambridgeshire AI&M project boundary (Fig 3), the National Archaeological Identification Survey (NAIS) south-west Cambridgeshire project is a completed project of 374 sq km area that assessed the potential for using aerial survey mapping data in conjunction with developer-funded archaeology to identify significant monument sites and inform historic environment protection and management. Focusing upon an area west of Cambridge, it included areas of likely future development pressure in relation to new and expanding settlements, particularly around the city fringe and the necklace of villages that lie just outside, as well as along new and upgraded major transport routes.

The project encompassed an area west of Cambridge and south to Royston. It covered only a fraction of the fen edge, much of the project area being undulating clayland plateau or chalkland rolling hills. The project created over 1,200 new monument records within the National Record for the Historic Environment and amended a further 300. The project is complete and its report has been published (Knight *et al.* 2018). Results from developer-funded excavations in and around the project area were used to propose possible dates and functions for many sites identified.

Project results suggest a complex pattern of linear embanked boundary systems, which may range in date from the late prehistoric to medieval periods. This pattern extends across a wider regional landscape, with a similarly complex land boundary system being recorded to the west across the Bedford Borough NMP project area (Adams and Crowther 2021) and eastwards into East Cambridgeshire.

Extensive Urban Surveys, East Cambridgeshire

Part of a nation-wide reassessment of the management of the urban archaeological resource, the Cambridgeshire Extensive Urban Survey (EUS) project was an archaeological and historical assessment of the largest and most historic towns in the County that took place between 1999 and 2003. Within the East Cambridgeshire AI&M project area, the EUS project covered Ely, Soham, Isleham, Reach and Burwell (Oxford Archaeology (East) 2015a-2015e). Cambridge was not included as it was covered by an earlier Urban Archaeological Database project. These surveys and reports provide important historical and archaeological context and contain potential areas of archaeological interest in the hinterlands suited to aerial survey.

The Fenland Survey project

From 1981 until 1988, the Fenland Project was a series of Department of the Environment and English Heritage funded multi-disciplinary archaeological surveys in the Fenlands of Cambridgeshire, Lincolnshire and Norfolk, included in which was an aerial photographic survey (Hall and Coles 1994). The project

recorded over 2000 new wetland and dryland sites and updated the records of another 400, ranging from prehistoric to medieval, many of which were recorded from aerial photography. Within Cambridgeshire, the Fenland Survey area covered an area about 1,420 sq km, of which about 286 sq km (20%) lies within the East Cambridgeshire project area (Fig 3). The resulting Fenland Survey report (Hall and Coles 1994) and subsequent eleven publications in the Fenland Project report series, including Fenland Project No.10 (Cambridgeshire) (Hall 1996), are detailed accounts of the historical settlement and landscape exploitation, as well as archaeological evidence (at that time), of the Fenlands.

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 Ouse Washes Landscape Character Assessment of Bedfordshire (Shiels Flynn 2013).

Cambridgeshire lies within the East of England region, being bordered by Bedfordshire and Northamptonshire to the west, Lincolnshire to the north, Norfolk and Suffolk to the east, and Essex and Hertfordshire to the south. The AI&M project area is located in the east of the County (Fig 4).

The Ouse Washes Landscape Character Assessment covers part of the project area, to the west. Cambridgeshire County Council published 'The Cambridgeshire Landscape Guidelines: A Manual for Management and Change in the Rural landscape" (Cambridgeshire CC 1991). East Cambridgeshire's landscape has been much altered by modern agricultural practices, with significant field amalgamation and hedge-grubbing, the remainder of which are often low-cut and intermittent. Settlement pattern is a scatter of small village and hamlets (*ibid.*).

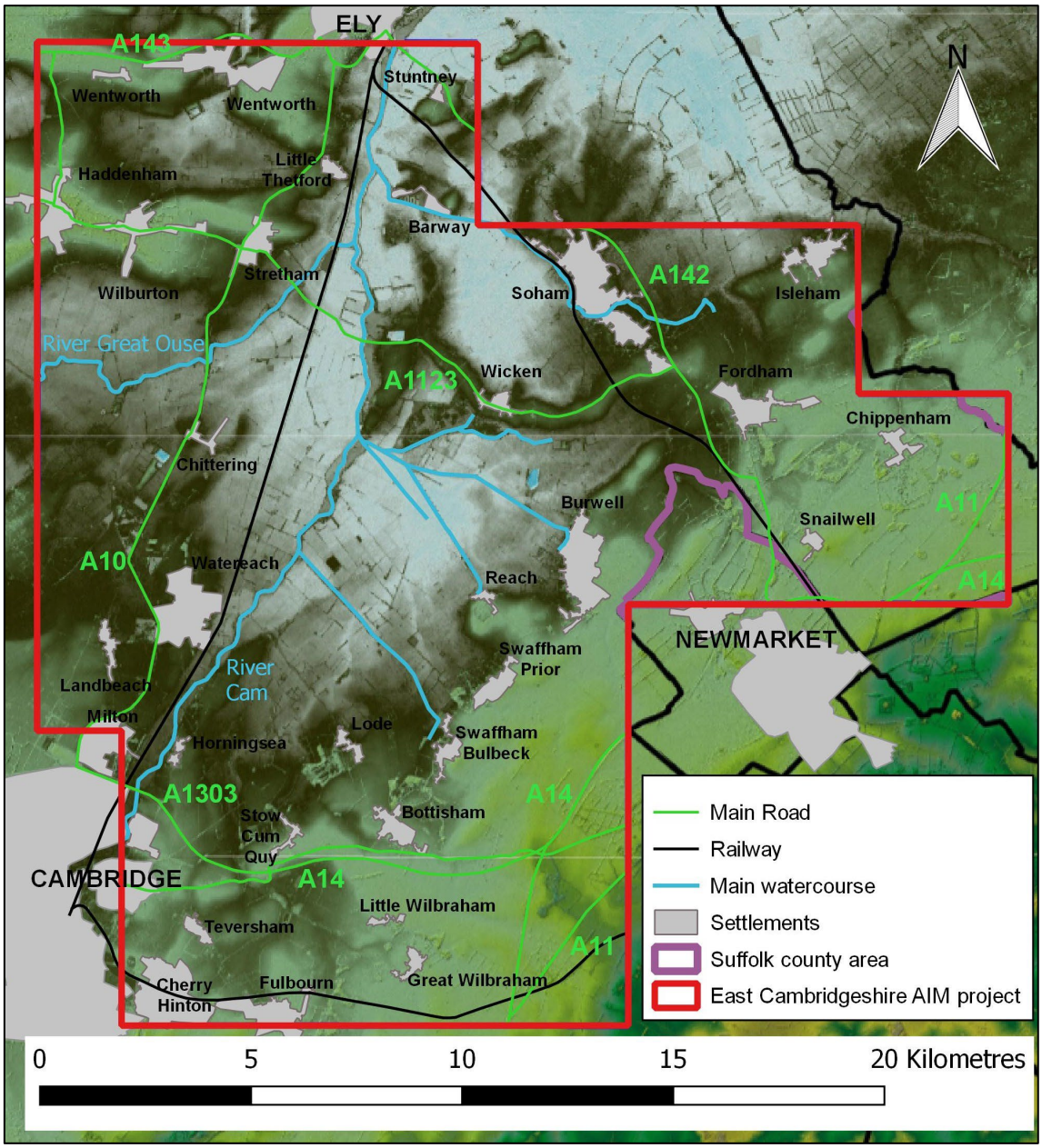

Figure 4. An AI&M project area digital elevation model shaded to illustrate topographic relief, with grey being the low-lying fenlands and the rising chalklands in green to the east. © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. DEM reproduced with permission of Cambridgeshire County Council.

Essentially, the Fenland is a flooded plain that is bounded by hard rock: to the north, south and the east is chalks: with to the west Jurassic clays and limestone (Hall and Coles 1994). The topography within the project area is divided by distinct landscape character. To the southeast is a broad-scale chalkland landscape of smooth, rolling hills, with large, geometric arable fields growing cereals, bordered by low hedges with few trees. In a discrete area to the south-west of Newmarket, the dominant and expanding horse-racing industry based in the area has created a

unique field pattern of small, tree-lined paddocks that provide the horses shelter from inclement weather (*ibid.*).

The north of the project area is dominated mostly by the fenlands, a low-lying, flat and open landscape of separate peat fens onto which has been imposed a highly organized drainage system and fields, and from which rise islands of land, no more than 20 metres (m) high, upon which are most settlement sites. There are remnant wet fens at Wicken and Chippenham, now designated wildlife reserves (*ibid.*). Drainage of the fenlands was begun by the Romans with the construction of dykes. However, the most significant change came in the 17th century, when the Dutch engineer Cornelius Vermuyden was appointed by King James I to direct the drainage of The Fens. Thereafter, the appearance of the wetlands increasingly changed from an area of flooded marshes to one of extensively farmed agricultural land.

The elevation model shaded to illustrate topographic relief (Fig 4) shows the River Cam, stretching from Cambridge in the southwest of the project area, northeast through peat fenland to join the River Great Ouse just south of Ely, going on to discharge into The Wash and the North Sea at Kings Lynn in Norfolk.

Notable are the numerous small settlements that fringe the low-lying fenland. The major routeways within and through the project area are the A10, for which there is proposed dualling upgrade plans and the upgraded A11 and A14 roads. The three railway lines form a connecting triangle between Cambridge, Newmarket and Ely. Proposals to upgrade and double the Cambridge-Newmarket line as part of the East-West Rail Consortium's 'Eastern Section' of its Oxford-Cambridge-Ipswich scheme.

Cambridgeshire Historic Landscape Character project

Although a Cambridgeshire Historic Landscape Characterisation project has taken place, unfortunately the dataset is not available (Ruth Beckley email 07-NOV-2018).

National Character Areas

The project area is a transitional zone that encompasses parts of three National Character Areas (NCAs): No.46 The Fens, No.87 East Anglian Chalk and No.88 Bedfordshire and Cambridgeshire Claylands (Fig 5).

The Fens

At 193 sq km, The Fens NCA No. 46 (Natural England 2013a) landscape represents 53% of the project area, dominating its north-western half. It is notable for its low-lying, large-scale, flat and open landscapes, with negligible woodland, numerous ditches, dykes and four main rivers that drain north into the Wash, of

which the River Cam meets the River Great Ouse at Stretham. Other watercourses such as Soham Lode, Wicken Lode, Purwell Lode, Swaffham Bulbeck Lode and Reach Lode have artificial straight canalised courses, feeding into the River Cam and provide a strong geometrical character to the fields and landscape. Whilst much of the area's topography is contained within the 10 m contour or below sea level, the clay hill that is the Isle of Ely rises above 20 m. Farming on the clay and peat soils in the Fenlands centres around arable, with wheat and root crops such as sugar beet and vegetables, as well as market gardening.

East Anglian Chalk

At 136 sq km, The East Anglian Chalk NCA No. 87 (Natural England 2013b) covers 37.3% of the project area, its northern boundary running SW-NE between Cambridge and just north of Soham. A thin surface deposit of nutrient-poor ice and river-deposited material laid down during the last ice age overlies bedrock of porous Upper Cretaceous Chalk. The area is characterized by arable farming, with large-scale cereal production in open countryside with sparse woodland on smooth, rolling, chalk downland hills, bounded by the SSW-NNE flowing River Cam valley. Villages outside Cambridge grew from commuter demand following the Second World War, with development pressure on these settlements increasing.

The Claylands

At 35 sq km, The Bedfordshire and Cambridgeshire Claylands NCA No. 88 (Natural England 2014) is only 9.7% of the project area on the western side of the project area, from Cambridge to Chittering village, including the peri-urban commuter villages of Cherry Hinton, Fen Ditton, Teversham, Milton, Landbeach and Waterbeach. Only a discrete area bounded by Chittering, Waterbeach, Milton and Cottenham remain agricultural.

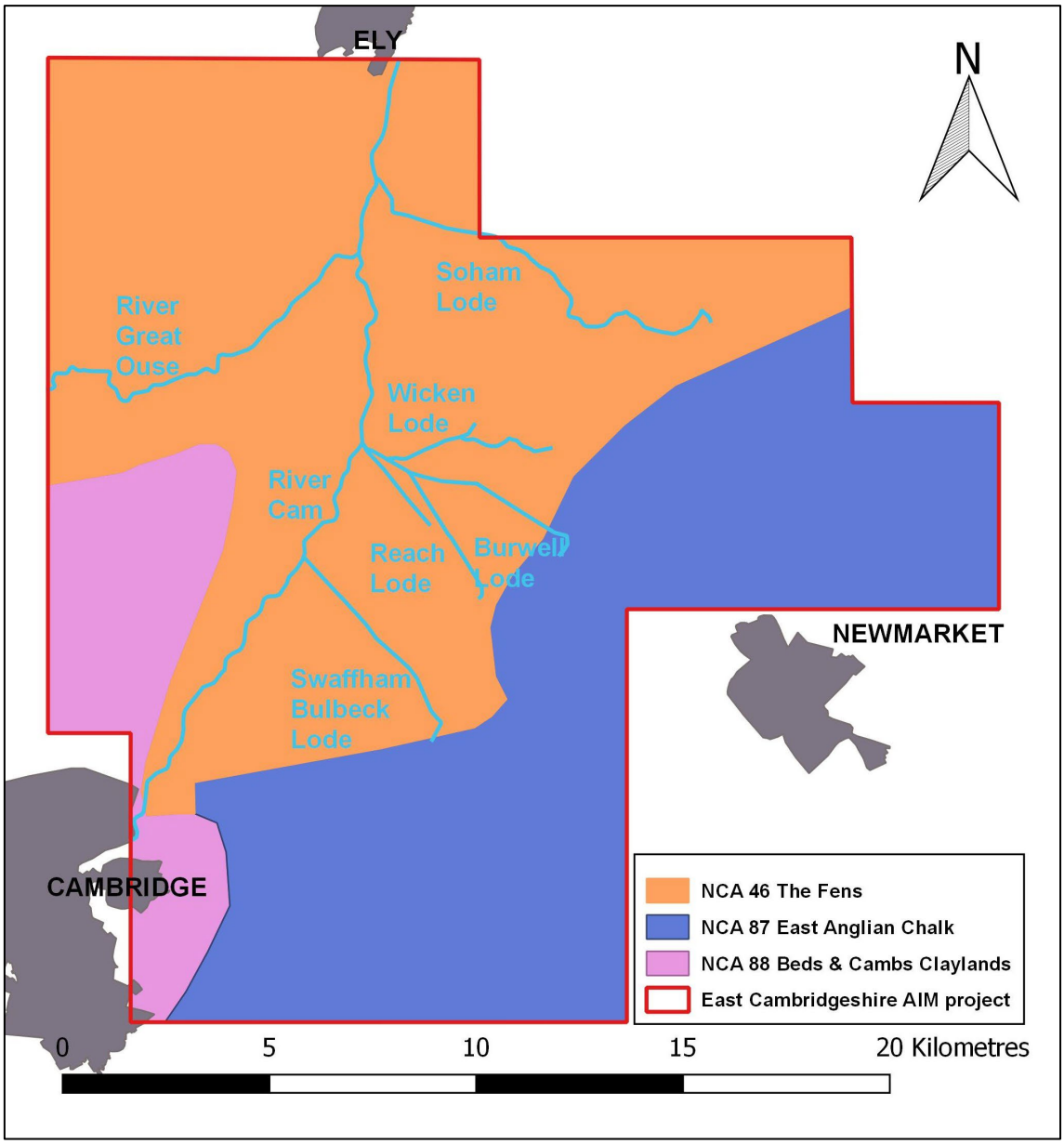

Figure 5. National Character Areas in the project area. © Natural England copyright. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

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 project area is comparatively simple and comprises five roughly parallel strata of sedimentary bedrocks composed of combinations of mudstone, siltstone, sandstone, limestone or of chalk, aligned southwest-northeast (Fig 6).

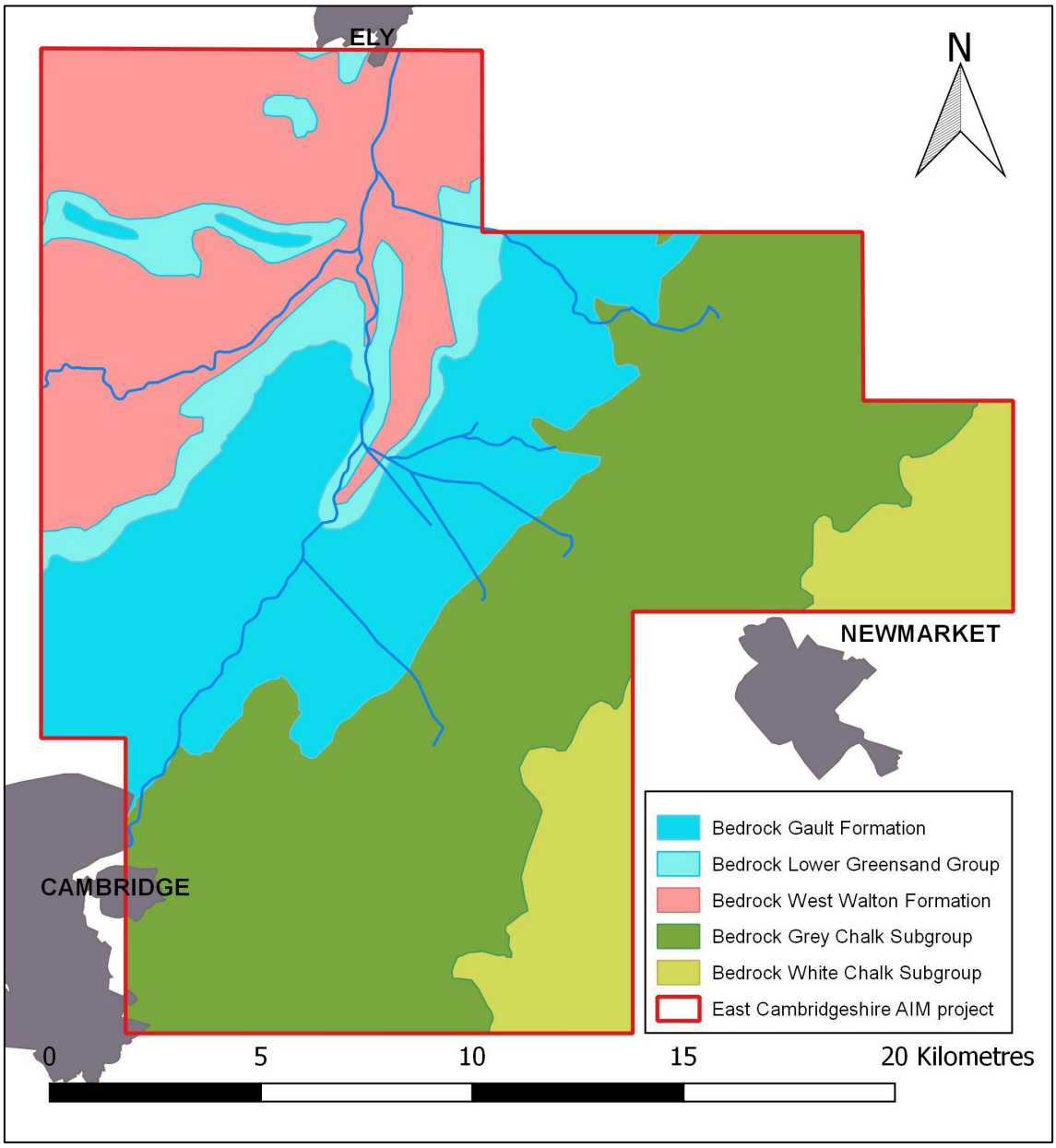

Figure 6. Bedrock geology map for the project area. Derived from 1:625,000 scale BGS Digital Data under Licence, DEFRA Affiliated Network Member reference number 2011/052 British Geological Survey. © NERC. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Sedimentary bedrocks can form as a result of erosion of rocks by ice, water or wind, the grains from which are then transported and redeposited as layers of gravel, sand, silt and clay sediments. Overlain by successive sedimentary layers, they form consolidated strata of mudstone, claystone, siltstone and sandstone. Limestone is organic sedimentary bedrock formed by the accumulation of shell, coral, algal and faecal debris, but can also be formed chemically by the precipitation of calcium carbonate from lake or ocean water. Also a form of limestone, the white and light grey coloured chalk is composed mainly of calcium carbonate derived from the shells of small marine organisms known as foraminifera, or from the calcareous remains of marine algae.

The bedrock strata (from northwest to southeast) are:

- sedimentary bedrocks formed in the Jurassic Period (151-161 million years ago), the West Walton Formation, Ampthill Clay Formation and Kimmeridge Clay Formation (undifferentiated) are composed of mudstone, siltstone and sandstone;

- a sedimentary bedrock formed in the Cretaceous Period (100 to 125 million years ago), the Lower Greensand Group is composed of sandstone and mudstone;

- a sedimentary bedrock formed in the Cretaceous Period (94 to 112 million years ago), the Gault Formation and Upper Greensand Formation (undifferentiated) is composed of mudstone, sandstone and limestone;

- a sedimentary bedrock formed in the Upper Cretaceous Period (94 to 100 million years ago), the Grey Chalk Subgroup is composed of chalk;

- a sedimentary bedrock formed in the Upper Cretaceous Period (66 to 100 million years ago), the White Chalk Subgroup is composed of chalk.

In the northwest of the project area are Jurassic sedimentary rocks present beneath much of west Cambridgeshire. The bedrock of the lower half of the project area is dominated by Upper Cretaceous white or grey chalk, the youngest element of the project area's bedrock. This is a continuation of the chalk ridge that runs southwest-northeast across Southern England (BGS 2018).

Superficial Deposits

Superficial Deposits are mostly prevalent in the northwest of the project area, dominated equally by peat and river terrace deposits, with lesser spreads of alluvium. There is also a discrete area of till southwest of Ely and lacustrine deposits some way to the southeast of Ely (Fig 7). Those areas shown in white have no recorded superficial deposits present, the underlying chalk of the southeast half of the project area being dominant, apart from scattered spreads of river terrace deposits and a discrete area each of alluvium and peat (BGS 2018).

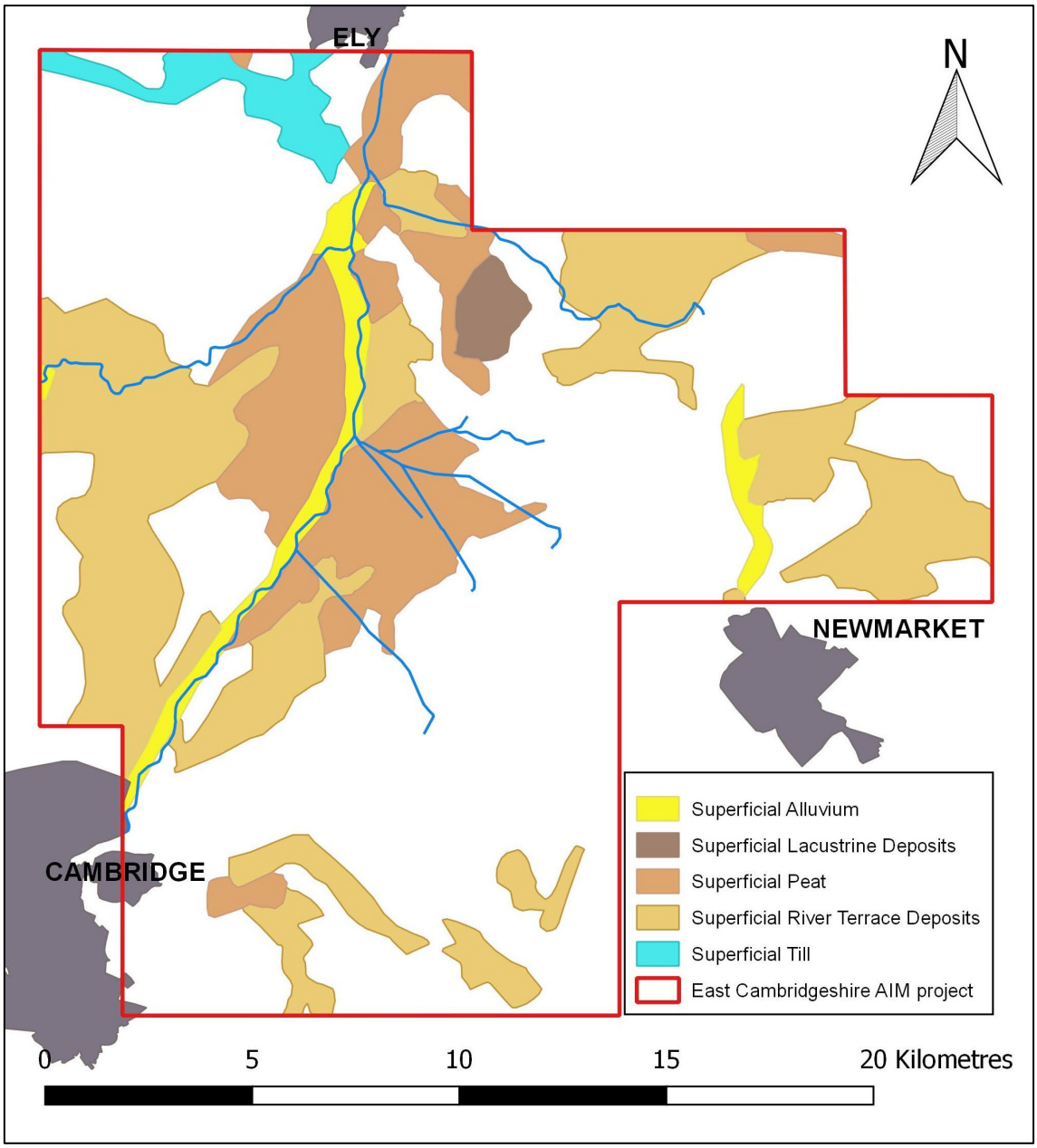

Figure 7. Superficial geology map for the project area. Derived from 1:625,000 scale BGS Digital Data under Licence, DEFRA Affiliated Network Member reference number 2011/052 British Geological Survey. © NERC. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

The superficial geology (less than 2.6 million years old) within the project area is dominated by unconsolidated sediments such as gravel, sand, silt and clay, classified on the basis of mode of origin with names such as, 'glacial deposits', 'river terrace deposits' or 'blown sand'; or on their composition, such as 'peat':

Peat - Peat. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by organic accumulations.

River Terrace Deposits (undifferentiated) - Sand and Gravel. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by rivers.

Alluvium - Clay, Silt and Sand. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by rivers.

Lacustrine Deposits - Clay. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by lakes and lagoons.

Till - Diamicton. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by ice age conditions.

Soils

The Soilscapes soil types illustrated in Fig 8 are defined as follows:

Soilscape No. 3
Shallow lime-rich soils over chalk or limestone;

Soilscape No. 5
Freely draining lime-rich loamy soils;

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

Soilscape No. 7
Freely draining slightly acid but base-rich soils;

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

Soilscape No. 10
Freely draining slightly acid sandy soils;

Soilscape No. 11
Freely draining sandy Breckland soils;

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

Soilscape No. 20
Loamy and clayey floodplain soils with naturally high groundwater;

Soilscape No. 23
Loamy and sandy soils with naturally high groundwater and a peaty surface

Soilscape No. 24
Restored soils mostly from quarry and opencast spoil

Soilscape No. 27
Fen peat soils

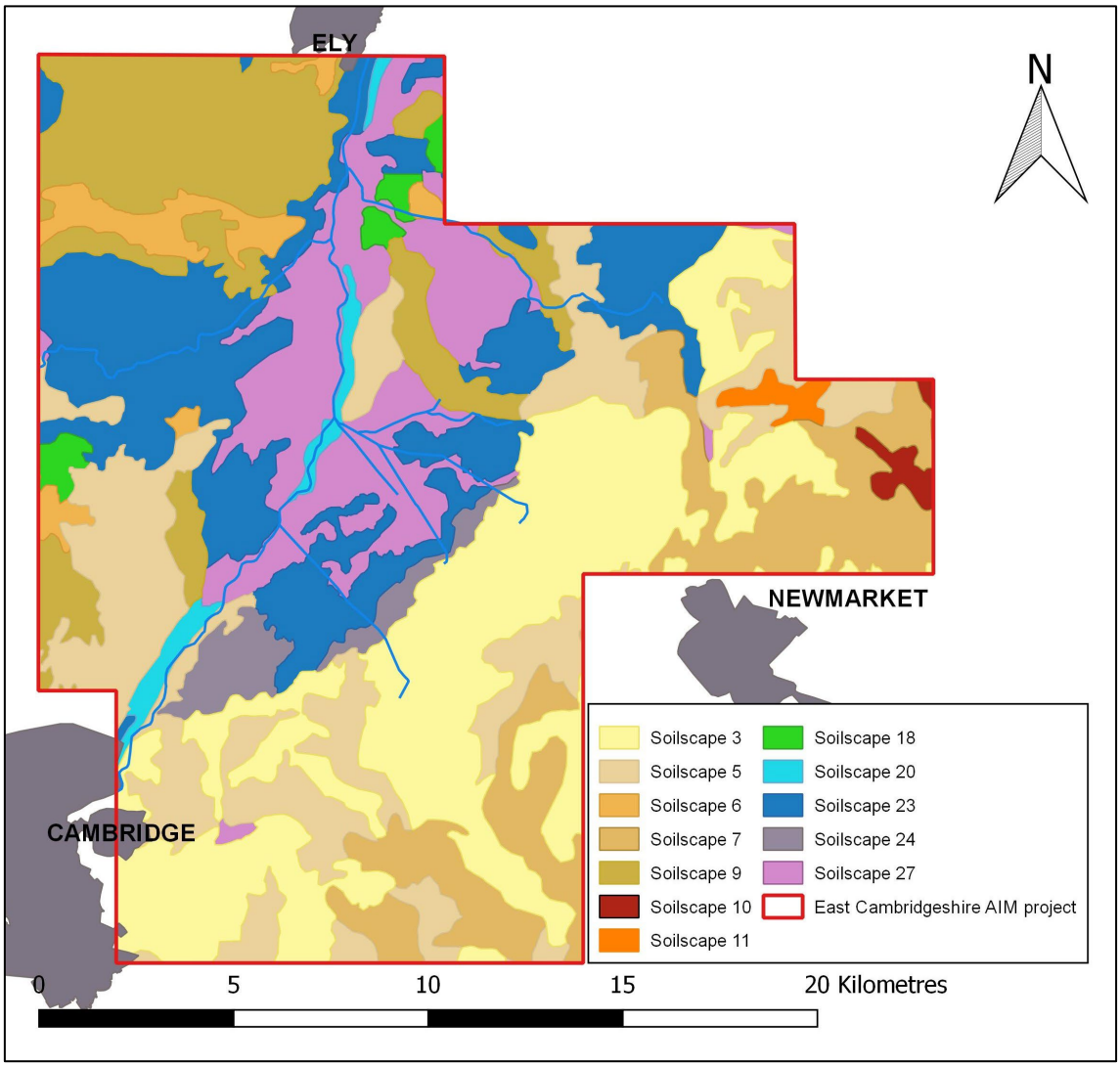

Figure 8. Soils within the project area. Contains, or is derived from, information supplied by Soils data © Cranfield University (NSRI) and for the Controller of HMSO [2021]. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Soils within the project area have a northwest-southeast boundary: the northwest comprises a mix of mostly fen peat soils (Soilscape type No. 27), surrounded by loamy and sandy soils with naturally high groundwater and a peaty surface (Soilscape type No. 23). Southwest of Ely is an area of lime-rich loamy and clayey soils with impeded drainage (Soilscape type No. 9). North of Cambridge at the project's western boundary is an area of free-draining lime-rich loamy soils (Soilscape type No. 5) and a sinuous ribbon of Loamy and clayey floodplain soils

with naturally high groundwater (Soilscape type No. 20) describes the course of the River Cam as it travels north-northeast to The Wash. The project area's southwest is latter dominated by shallow lime-rich soils over chalk (Soilscape type No. 3), to the southeast of which are intrusions of free draining, slightly acid, but base-rich soils (Soilscape type No. 7).

ARCHAEOLOGICAL SCOPE AND METHODOLOGY

Archaeological Scope

There are Historic England standards for the interpretation and mapping of archaeological features visible on aerial sources (Winton 2019a). This includes recording sites visible as cropmarks and earthworks but also structures, in particular those relating to early 20th-century military activities. The AI&M 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 project survey team reviewed over 12,000 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.

All available vertical and oblique aerial photographs held in the Historic England Archive in Swindon were consulted (cover search loan refs 116874, 116875, 122139 and 122140), numbering 9,366. These included 6,151 vertical prints, 36 military obliques and 3,179 specialist oblique aerial photographs, of which 377 were digital images taken as part of Historic England's Aerial Reconnaissance programme since 2005. The remaining body of images assessed comprise Next Perspectives APGB provided vertical aerial photographic imagery in 12.5cm and 25cm resolution, as well as colour infrared. Also assessed were twelve years of historic Google Earth aerial photography, lidar remote sensing data tiles and where appropriate, Next Perspectives APGB digital terrain model data.

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.

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 1930s 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/).

Aerial Photography for Great Britain (APGB) is a digital orthophoto mosaic of Great Britain, showing all ground features at a viewing scale of 1:10,000 for 25cm and 1:5,000 for 12.5cm. This is provided through the Aerial Photography for Great Britain (APGB) agreement and was supplied as 1 sq km 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 currently closed. The vertical and oblique aerial photographs held by CUCAP that cover the project area were filtered to eliminate those that do not, or are less likely to contain, archaeological features such as panoramas and general views. This leaves about 1,280 aerial photographs that likely contain archaeological cropmark, soilmark or earthwork features. Of this number, the HE Archive collection holds 335 CUCAP images.

A further 251 CUCAP aerial photographs (110 obliques and 141 verticals) within the project area have online thumbnail images available to view (https://www.cambridgeairphotos.com/map/), but many were broader landscape images. Others contained archaeological cropmark, soilmark or earthwork features, but the low thumbnail resolution may have compromised the quality and detail of mapping in compliance with AI&M standards.

Cambridgeshire HER does not hold its own oblique aerial photographic archive.

Google Earth's vertical air photography was used for mapping features not otherwise recorded on any other available imagery, with years 2005 and 2018 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 due to its poor clarity and resolution.

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 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 m resolution. The ASCII files were processed using the Relief Visualization Toolbox version 2.2.1, available from The Institute of Anthropological and Spatial Studies at The Research Centre of the Slovenian Academy of Sciences and Arts on (at https://iaps.zrc-sazu.si/en/rvt#v), producing various visualisations at GeoTIFF images for import to AutoCAD Map 3D 2019, ArcMap 10.3.1 and QGIS 3.10.

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, windmill mounds, as well as moated sites. If 1 m coverage was unavailable, 2 m resolution lidar was used, which was suited to record substantial earthworks. Where no lidar was available, APGB provided 2 m resolution DTM data that was used to record earthworks.

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

Monument records

Where relevant, any existing National Record of the Historic Environment (NRHE) unique monument numbers were attached to Cambridgeshire and Suffolk HERs' monument records.

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 MasterMap 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, was viewable as georectified images via the British Library's Georeferencer Compare website (http://www.georeferencer.com/compare#)

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.

Due to a year-long closure of Cambridgeshire County records office for major reorganisation, no tithe and inclosure maps were viewed. However, some online estate maps and historical maps (such as Old Maps Online (https://www.oldmapsonline.org/) were available as well as digitised maps from the National Library of Scotland (https://maps.nls.uk/).

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.

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

The project area has seen considerable developer-funded commercial excavation in advance of large-scale infrastructural projects, such as the creation of Waterbeach New Town. Archaeological mitigation work by Oxford Archaeology East uncovered Iron Age ditch systems, three Roman settlements, two Roman industrial sites, as well as medieval ridge and furrow cultivation (Taylor 2020). Where relevant, available 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.

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 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

Vertical and oblique prints were scanned at 1200dpi and converted to a digital Tagged Image File Format (TIFF) using Adobe Photoshop CS6.

Aerial photographs were rectified using a specialist software package AERIAL, version 5.36. Control was derived from OS MasterMap 1:2,500 scale base mapping. A digital terrain model function used points derived from 5 m interval contour data supplied by APGB was used to improve accuracy of the rectification in areas od steep or undulating topography.

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 2 to 3 m 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 AI&M drawing conventions (see below) from rectified photographs and lidar tiles in ArcGIS 10, QGIS Version 3.10 and Autodesk AutoCAD Map 3D 2019.

Rectified and georeferenced vertical and oblique aerial photographs and lidar data were imported into AutoCAD Map 3D, ArcGIS 10 or QGIS 3.10 using a Tiff World File (.TFW) format file. When required, Google Earth Pro vertical aerial photography was saved as JPEG raster images and rectified using AERIAL 5.36.

Features were mapped in accordance with Historic England Aerial Investigation and Mapping Standards and Guidelines (Winton 2019a) and technical specification (Historic England 2019). 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 HER monument number for each individual features or group of features that comprise the monument.

AI&M digital mapping layer content and drawing conventions are:

LAYER NAME	TYPE	COLOUR	DESCRIPTION
BANK	POLYGON	RED	Use to outline banks, platforms, mounds and spoil heaps.
DITCH	POLYGON	GREEN	Use to outline cut features such as ditches, ponds, pits or hollow ways.

LAYER NAME	TYPE	COLOUR	DESCRIPTION
EXTENT_OF_ FEATURE	POLYGON	ORANGE	Use to depict the extent of large area features such as airfields, military camps, or major extraction/deposition.
RIDGE_AND_ FURROW_AREA	POLYGON	CYAN	Use to outline a block of ridge and furrow.
STRUCTURE	POLYGON	PURPLE	Use to outline structures including stone, concrete, metal and timber constructions e.g., buildings, Nissen huts, tents, radio masts, camouflaged airfields, wrecks, fish traps, etc.
SCARP_SLOPE_ EDGE	LINE	BLUE	This layer is for the T-hachure symbol only. The top of the "T" indicates the top of slope and the body indicates the length and direction of the slope. Use to depict scarps, edges of platforms and other large earthworks. The T-hachure can only be created in AutoCAD. We are exploring other options.
RIDGE_AND_ FURROW_ ALIGNMENT	LINE	CYAN	Line depicting the direction of the rigs in a block of ridge and furrow. The line should not have arrowheads depicted; these can be automatically created for illustration purposes in GIS/Adobe Illustrator if required.

Table 1. AI&M digital mapping layer content and drawing conventions.

The metadata table contains the following information:

Field Name	Description	Sample data
LAYER	The form of the archaeological feature (AI&M Layer Name)	BANK
PERIOD	Date of feature (Periods List). Single or dual indexed terms.	MEDIEVAL or MEDIEVAL/POST-MEDIEVAL

Field Name	Description	Sample data
NARROWTYPE (please note lack of underscore, otherwise the field name is too long in GIS)	Monument Type (from Monument Types Thesaurus). Specific monument type for individual features. Avoid dual indexing.	TOFT
BROAD_TYPE	Monument Type (from Monument Types Thesaurus). Broader monument type to enable grouping of individual features. This field may not be useful in all cases, if not simply repeat the narrow type field. Avoid dual indexing.	SETTLEMENT
EVIDENCE_1	Form of remains (Evidence Thesaurus) as seen on SOURCE_1	EARTHWORK
SOURCE_1	Source feature was mapped from aerial photograph or lidar	HISTORIC ENGLAND ARCHIVE OS/67307 V 0065 20-AUG-1967
EVIDENCE_2	Latest form of remains (Evidence Thesaurus) as seen on SOURCE_2. If EVIDENCE_1 is CROPMARK, simply repeat CROPMARK (unless now quarried away then this would be DESTROYED MONUMENT).	LEVELLED EARTHWORK
SOURCE_2	Latest available source aerial photograph or lidar (HEA Photo References) to give indication of current state of preservation. Not applicable for cropmark sites. Some professional discretion may be required if an earthwork shows well on lidar but is not visible on slightly later orthophotography.	LIDAR English Heritage Trust DSM 03 & 14-MAR-2016
HE_UID	National Record of the Historic Environment (NRHE) Unique Identifier (UID) for those monuments recorded in the NRHE or concorded with existing NRHE records.	23092
HER_NO	HER number for those monuments recorded in the HER or concorded with existing HER records.	10928 or HER5683

For MONUMENT_POLYGONS the attribute or object data is as follows:

HE_UID	NRHE Unique Identifier (UID) for those monuments recorded in the	23092

	NRHE or concorded with existing NRHE records.	
HER_NO	HER number for those monuments recorded in the HER or concorded with existing HER records.	10928 or HER5683

Table 2. AI&M digital mapping metadata table contents.

Monument Recording

New monuments records were created and existing monument records updated in Cambridgeshire County Council's Historic Building, Sites and Monuments Recording (HBSMR) database in accordance with current standards. Cambridgeshire HER's 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.

Data archive and dissemination

The Event Record in Cambridgeshire County Council's HER database is ECB6189 East Cambridgeshire AI&M.

Project Archive

The HE grant project number is 7767.

Within Cambridgeshire County Council's Historic Buildings, Sites and Monuments Record (HBSMR) database, an event record (ECB6189) was created for the digital transcription of the project's mapping, which is linked to all relevant monument records.

Requests for mapping should be made through Historic England Archive (archive@HistoricEngland.org.uk). Monument records created and updated by the project team are available to view via the online Heritage Gateway service (https://www.heritagegateway.org.uk/gateway/advanced_search.aspx). Digital mapping will be made available to view via Historic England's new online resource, the Aerial Archaeology Mapping Explorer (https://historicengland.org.uk/research/results/aerial-archaeology-mapping-explorer/)

The AI&M digital mapping data and relevant monument record information has also been provided to Suffolk County Council as ESRI .shp format files and .docx format, for integration into their GIS and HER database.

The digital AI&M layers are also available via through Historic England's corporate GIS, where it can be interrogated with other archaeological and non-archaeological dataset layers.

GEOLOGY AND ITS EFFECTS ON MAPPING

Within parts of the project area, the interpretation and mapping of archaeological features, visible as both earthworks and cropmarks, was sometimes problematic due to the visibility of superficial geology on the aerial photographs and lidar (Fig 9).

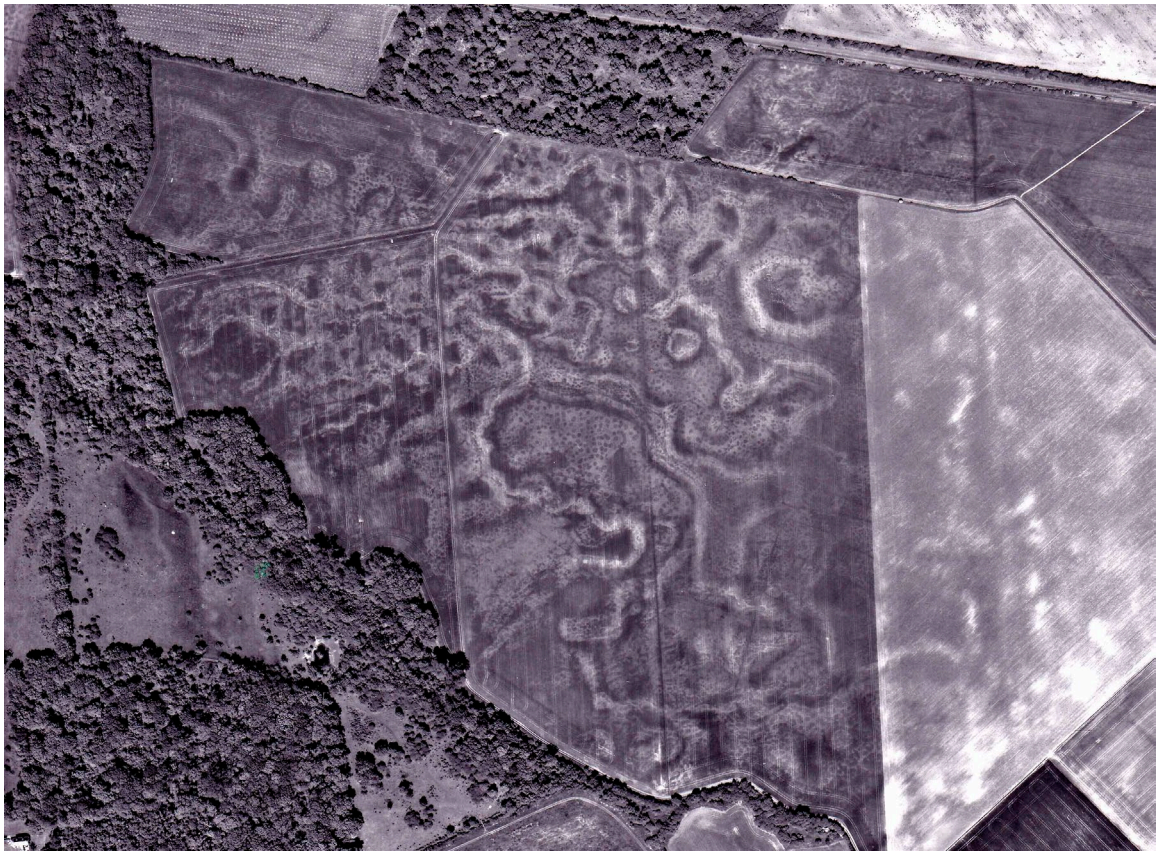

Figure 9. An example of the effects of geological processes visible as cropmarks that may affect archaeological interpretation. OS/96169 V 017 16-JUN-1996. © Crown copyright. Ordnance Survey.

First identified from CUCAP aerial photographs taken in 1959 (CAP YF45 11-JUN-1959), subcircular soilmark features located in fields northwest of Lower Hare Park at Swaffham Bulbeck had previously been interpreted as a medieval motte and bailey castle (HER No 06517) (Fig 10). Recent analysis of boreholes and local geological records (West 2017) suggests that these swirling soil patterns are not archaeological, but in fact related to superficial deposits over chalk. The patterned land is visible as depressed rings and arcs associated with pools formed by groundwater, forming wide and low ditches and filled with sandy sediment older

than the head. These features have been interpreted as geological in origin and have not been mapped.

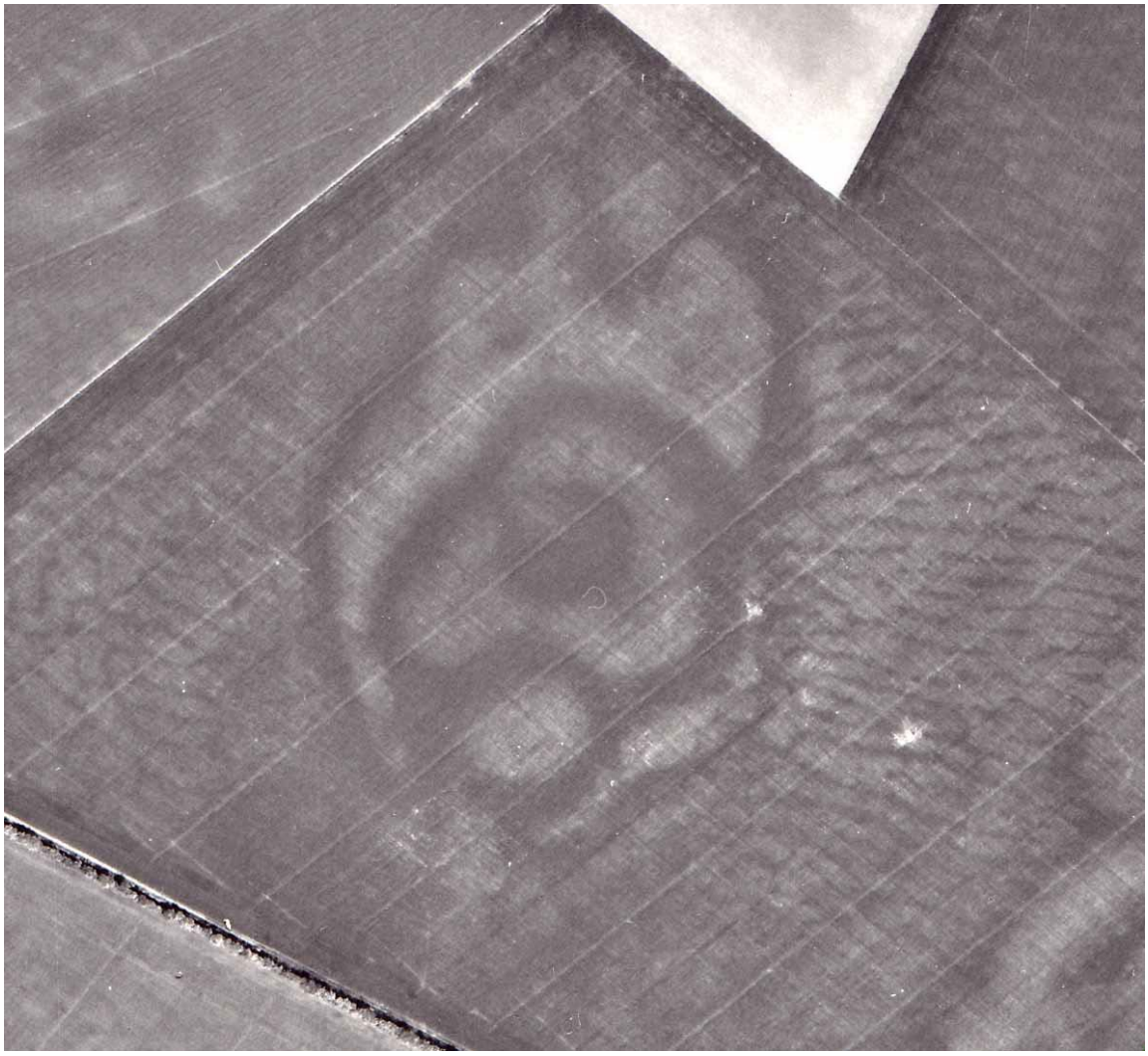

Figure 10. Medieval motte and bailey or geology. OS/68133 V 232 31-MAY-1968 Historic England (OS Photography).

At Herring's House near Fulbourn is the site of a scheduled Neolithic henge (HER 09292/ NRHE 1084756/ NHLE 1011716) (Fig 11). The scheduled monument was identified and recorded from oblique aerial photographs taken in 1965 that are held by CUCAP, whose collection is currently inaccessible. Despite the large collection of historic aerial photographs available to the AI&M project, the features as described from that 1965 aerial photograph and its subsequent interpretation as a henge could not be identified and were not mapped. Without access to the source aerial photograph, it is not possible to record the archaeology described as the basis for the scheduling of this monument.

Figure 11. Site of a potential Neolithic henge and complex geological cropmark formations. OS/96169 V 019 16-JUN-1996. © Crown copyright. Ordnance Survey.

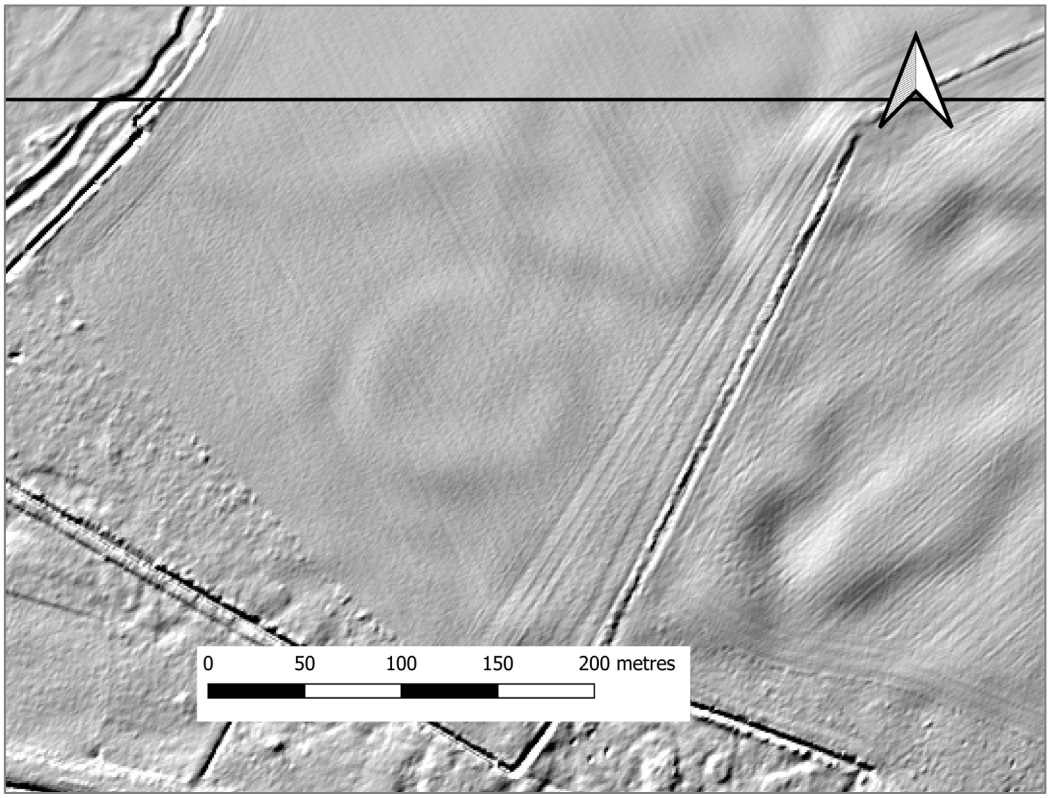

Figure 12. Lidar data revealing earthworks at the site of a Neolithic henge. LIDAR TL5356-TL5357 Environment Agency composite 1m DTM. © Historic England; source Environment Agency.

It is, however, possible that the monument is, in fact, geological in origin and not archaeological features. Fig 12 shows a processed lidar image of the same Neolithic henge site. The earthworks are located within an area of the southeast fenlands where geological and hydrological processes have produced topography with a large number of depressions and ramparts (Hall and Coles 1994,13).

Also present is an extensive system of meandering roddons, these being fossilised Holocene marine alluvial silt and sand-filled tidal creek systems and silt-rich tributaries cutting into contemporaneous clays. Drainage of the land for agriculture from the 18th century onwards and its consequent peat wastage through drying caused the channels to become elevated features in reversed relief (Hall and Coles 1994, Smith *et al.* 2010). Hall and Coles (1994, 45) predict that many Neolithic sites were concentrated along the ancient river courses but lie submerged by the peat deposits or clay, but within the project area may become more evident with continuing peat loss.

The presence of pingos from the last (Devensian) ice age may also relate to the features described. Originating in periglacial conditions, pingos are the result of freezing groundwater expanding and uplifting the ground surface into ice-cored mounds. Once warmer climates had melted the ice, distinctive circular, water-filled depressions that sometimes had raised ramparts around the rims, were often left behind (Sparks, Williams and Bell 1972).

Both buried geological and other natural features were visible as cropmarks in some parts of the project area and required an understanding of the formation processes and patterns of these features in order to distinguish them from archaeological remains. Multiple cycles of Late Pleistocene periglacial activity on chalkland, clays and sands can produce distinctive geological patterned ground in East Anglia (Bateman *et al.* 2014). These geological marks were particularly prevalent along the fen edge basin and served to mask, confuse and even replicate archaeological interpretation of cropmarks (Fig 13). Other areas of geology, such as around Fulbourn, created large-scale cropmark mottling that impeded interpretation of archaeological cropmarks. Cracks and fissures in the ground surface created by periglacial conditions, specifically cycles of freezing and thawing, produce patterns of polygonal cropmarks (Hall and Coles 1994,14). These features may morphologically emulate prehistoric field systems and other man-made features.

Figure 13. Peri-glacial geological and archaeological cropmarks at Denny Abbey. RAF/540/822 V 5028 25-JUL-1952. Historic England RAF Photography.

Well-draining river terrace deposits west of the River Cam and on the fenland edge produce favourable conditions for cropmark formation. Similarly, the chalkland along the southern fringes of the fenlands was also particularly responsive in terms of cropmark formation. This is evident in Fig 14, where the distribution of cropmark sites mapped by the project is overlaid onto bedrock and superficial geology and show a clear association with those underlying geological formations.

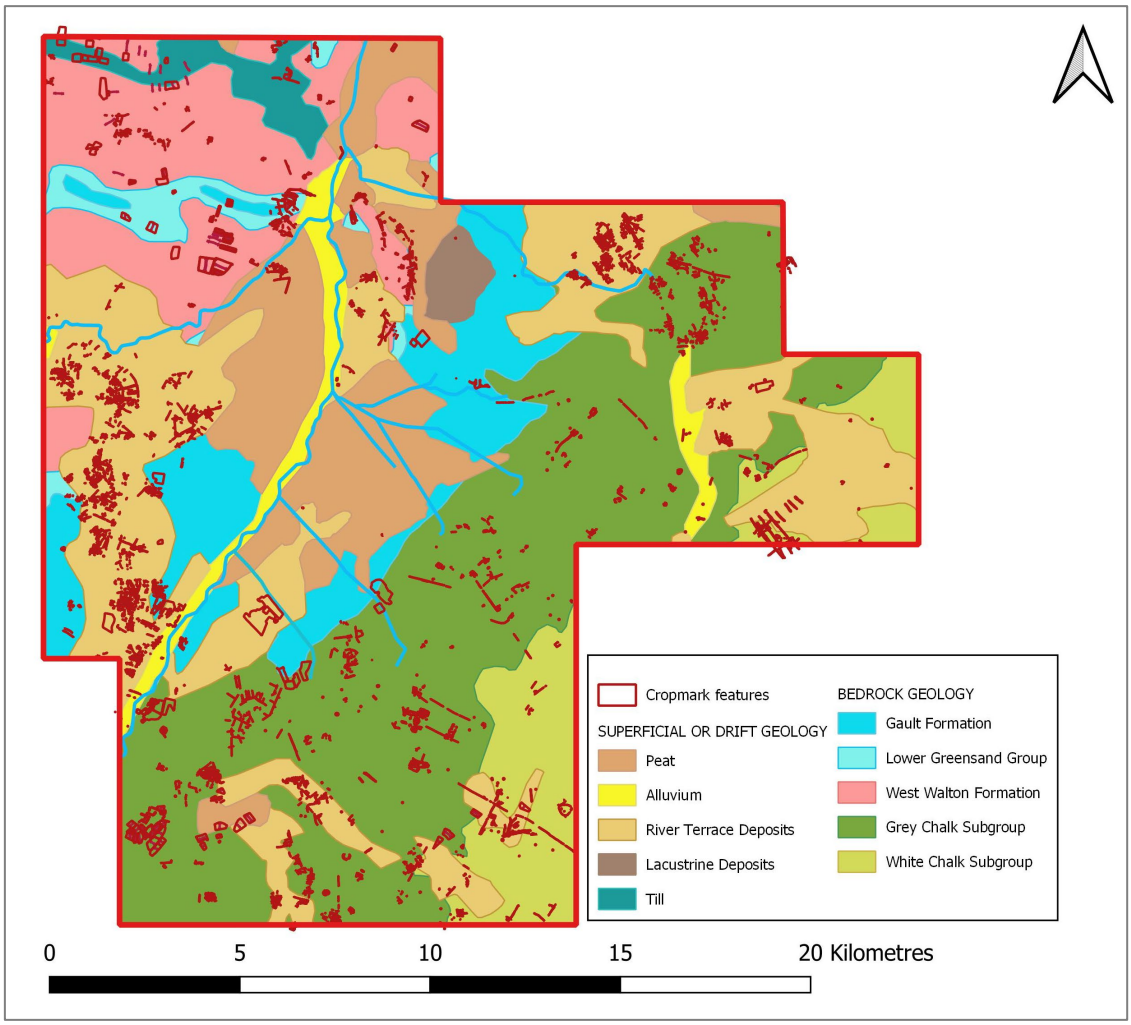

Figure 14. The distribution of cropmark features over bedrock and superficial geology. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Derived from 1:625,000 scale BGS Digital Data under Licence, DEFRA Affiliated Network Member reference number 2011/052 British Geological Survey. © NERC.

Similarly, the distribution of cropmark sites overlaid onto soil types (Fig 15) illustrates the broad variability of sub-surface archaeological remains visible from the air as a consequence of the varying factors affecting soil character, such as drainage, the natural habitat and current or historic land use. Within the project area, not unexpectedly the most conducive soils to cropmark formation are free draining, over both river terrace deposits and chalks. Those moisture-retaining soils with high groundwater, impeded drainage or peat have recorded far less cropmark sites, the soil properties creating conditions unlikely to form cropmarks over buries archaeological features. However, recent dramatic results arising from Historic England's aerial reconnaissance programme and its subsequent mapping in the Bedford Borough NMP project (Adams and Crowther 2021) have demonstrated that clay soils were densely settled from the Iron Age through to the medieval periods; the distribution of cropmarks sites in the project area is therefore

likely a biased pattern of historic activity and occupation. It should be noted that the Bedford Borough aerial reconnaissance finds were the result of particularly intense drought conditions that prompted cropmark formation on usually non-responsive soils.

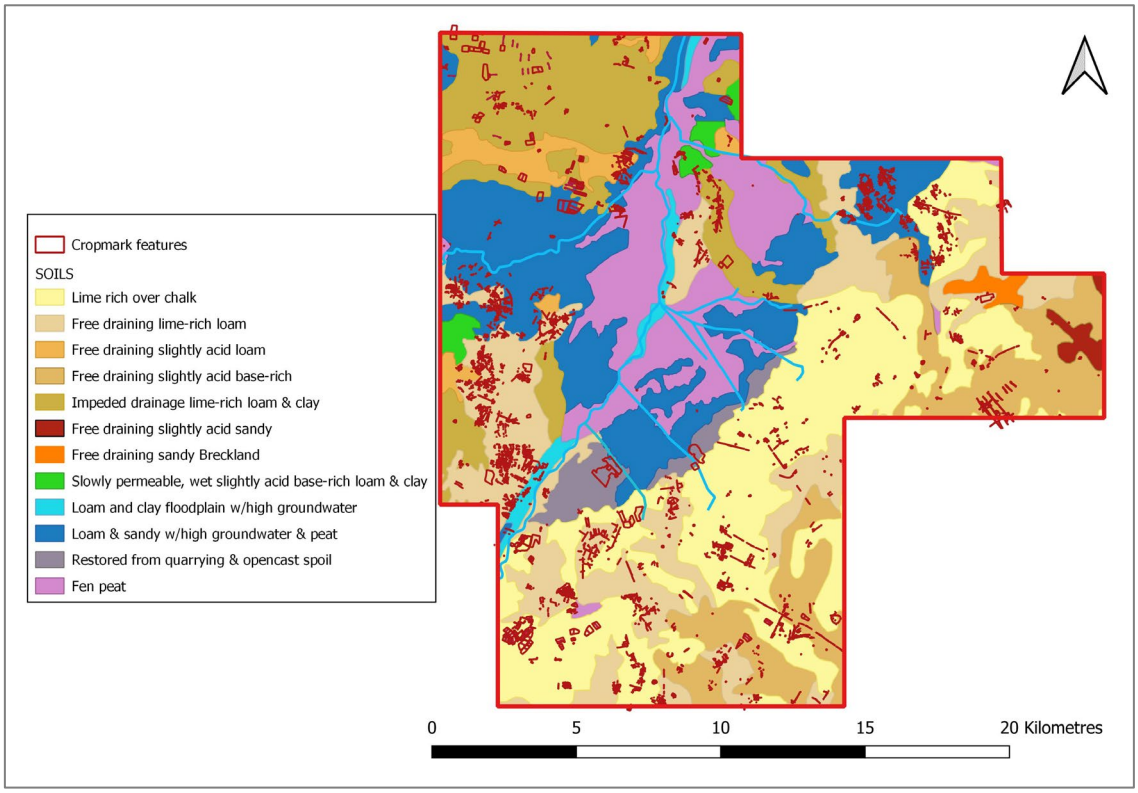

Figure 15. The distribution of cropmark features over soils. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains, or is derived from, information supplied by Soils data © Cranfield University (NSRI) and for the Controller of HMSO [2021].

CHRONOLOGICAL SUMMARY OF RESULTS

This summary provides highlights of the project's mapping and monument recording results in chronological order. Relevant Cambridgeshire County Council HER numbers are provided for each site discussed and can be used to refer to their relevant monument records via the Heritage Gateway website (https://www.heritagegateway.org.uk/gateway/). Notable in Fig 16 is the project's central area where very little mapping is visible. This is the location of large peat-covered fenlands; to the south are also significant areas of industrial scale 19th century open quarrying for the extraction of coprolite minerals, which are discussed in the following chapters.

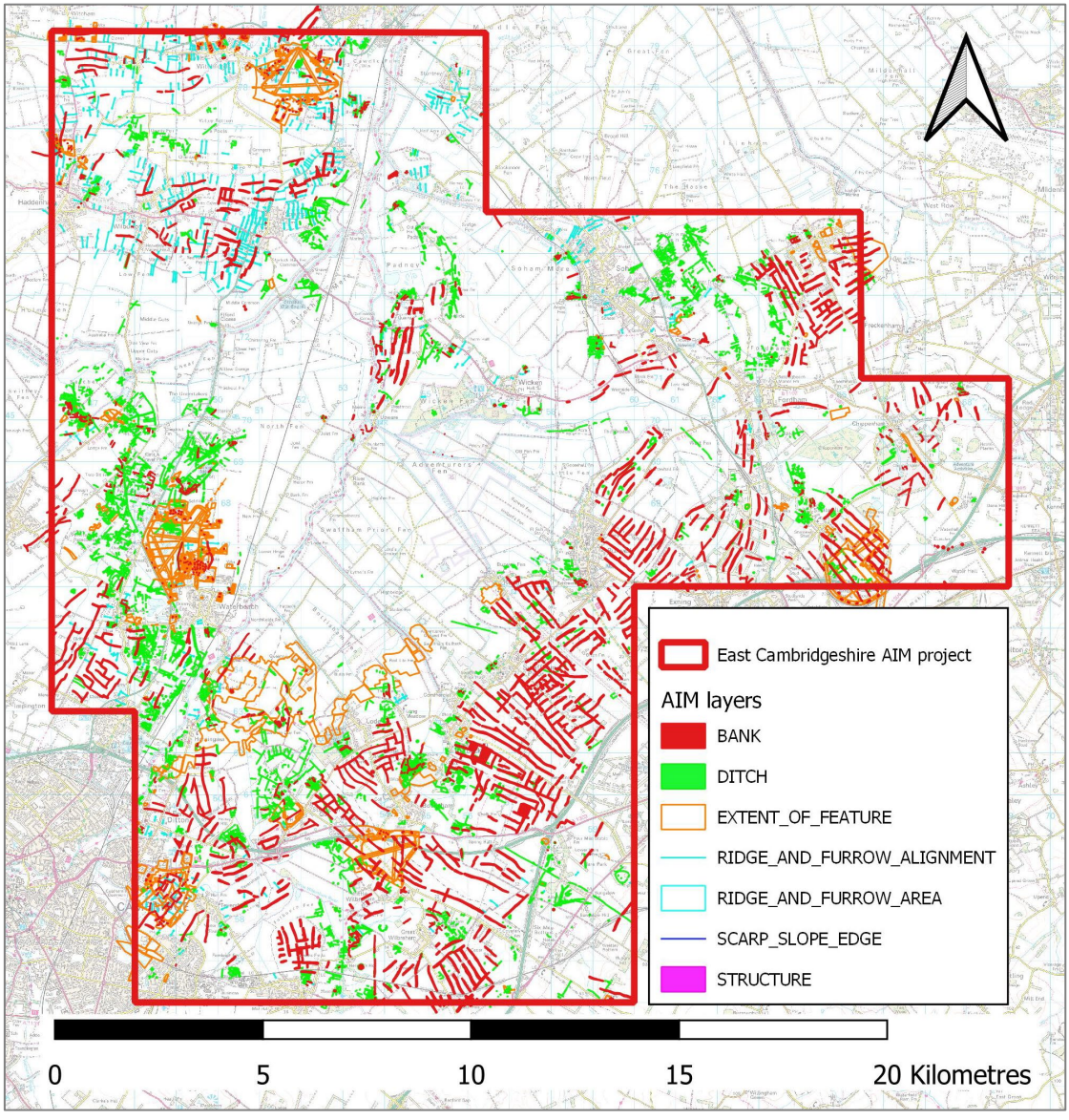

Figure 16. All archaeological features mapped by the AI&M project. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Neolithic and Bronze Age

Features identified as Neolithic or Bronze Age in date are mainly recorded on the chalk lands to the southeast of the project area (Fig 17). The Neolithic and Bronze Age features recorded were associated with prehistoric funerary and ceremonial landscapes.

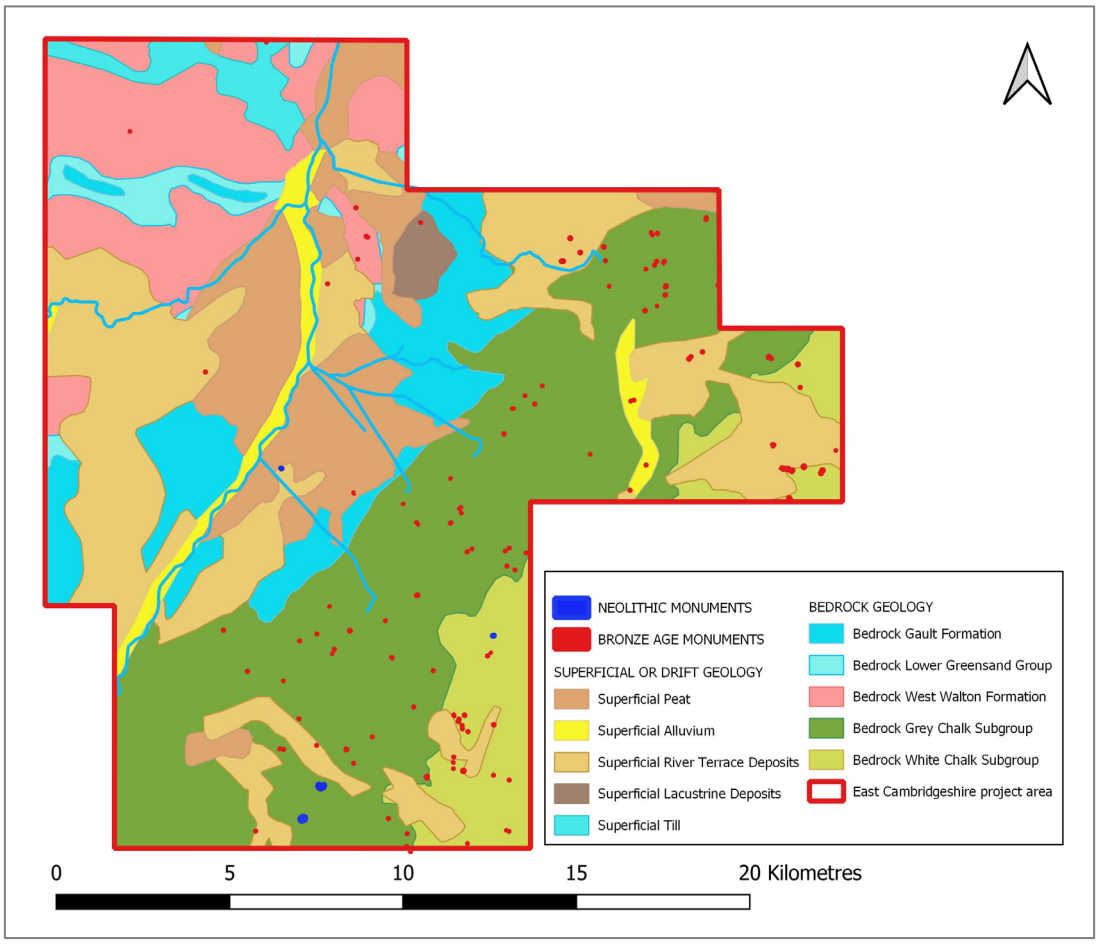

Figure 17. The distribution of Neolithic (blue) and Bronze Age (red) monuments against superficial and bedrock geology. Archaeological mapping ©Historic England. Derived from 1:625,000 scale BGS Digital Data under Licence, DEFRA Affiliated Network Member reference number 2011/052 British Geological Survey. © NERC.

Three monuments attributed to the Neolithic period are located on the chalklands that dominate the south of the project area, a possible henge (HER 09292/ NRHE 1084756/ NHLE 1011716), an interrupted ditch enclosure (Cambs HER 06468/ NRHE 374466/NHLE 1009103) and a long barrow (Cambs HER 10282/ NRHE 375954/NHLE 1020842). A further long barrow Fen (HER No 11549/ NRHE 1381663/ NHLE 1020843) is sited in the peats of Swaffham Prior Fen in the project area's centre (Fig 18, in blue).

Figure 18. Cropmark of a Neolithic long barrow on Swaffham Prior Fen. EARTH.GOOGLE.COM 11-MAY-2011 Accessed 02-DEC-2019.

It is long established that the potential for the survival of prehistoric sites remain buried by later peats and by silts. On Foulmire Fen at Haddenham, just to the west of the project area, a mound was identified by an aerial photograph taken in 1947. Protruding from the protection of the overlying peats, it has since been excavated and revealed to be a Neolithic wooden chambered long barrow (Evans and Hodder 2006) (NHLE 1019983). Close by it at South Fen, Sutton, is another scheduled long barrow (NHLE 1009994) that owes its good state of preservation and survival to the protection afforded by the overlying deposits of fen peats and clays (Hall and Coles 1994, 51).

As part of this pattern of fen margin funerary monuments, the scheduled long barrow on Swaffham Prior Fen (HER No 11549/ NRHE 1381663/ NHLE 1020843) was mapped as a cropmark from Google Earth imagery dated 3rd July 2018, but is visible as a cropmark or an undefined pale soilmark in preceding years of Google Earth aerial photographs in 1999, 2003, 2007 and once more in 2020. Sited where the River Cam and the fen edge met at that time, the listing statement (Historic England 2021) states that the monument is also mostly covered by peat and marine clays. The existence of these barrows in close association with the wetlands and waterways in the fenland, along with the numerous artefact finds, suggest that waterside prehistoric settlement and activity in these fenland areas may be significantly unrepresented in the archaeological record.

In the Fenland Survey (Hall 1996, 192) Palmer states that "*air photography, whilst useful for recording relict watercourses and islands of the wetland area, only begins*

to have archaeological value on the skirtland and upland: notable in a belt bounding the southern extent of the fens".

On the chalk about 8 km to the southeast near Swaffham Bulbeck are the cropmark remains of a scheduled long barrow (Cambs HER 10282/ NRHE 375954/NHLE 1020842) (Fig 19).

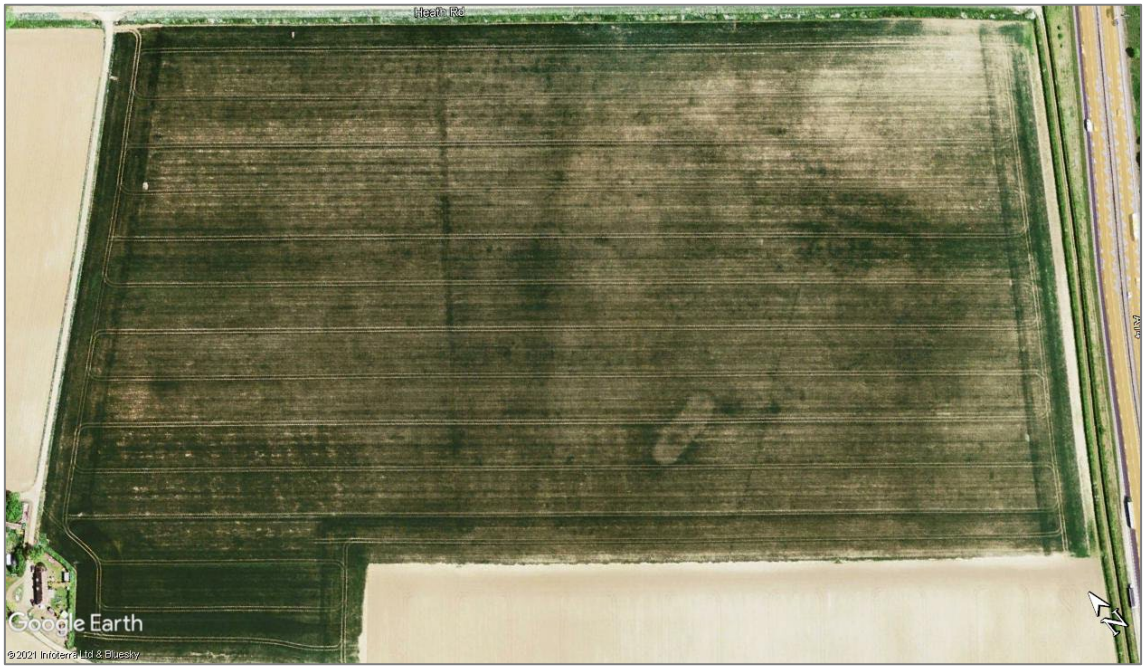

Figure 19. Cropmark of a Neolithic long barrow at Swaffham Bulbeck. EARTH.GOOGLE.COM 11-MAY-2007 Accessed 02-DEC-2019.

Some 7.5 km to the southwest, between Fulbourn and Great Wilbraham, are the two remaining Neolithic monuments mapped by the project, one interpreted as a henge and the other a causewayed enclosure. As detailed in the previous section, a possible Neolithic henge (HER 09292/ NRHE 1084756/ NHLE 1011716) near Herring's House at Fulbourn was identified from aerial photographs taken in 1965 that are held by CUCAP, whose archive is currently inaccessible. Without access to the original source photograph, it is not possible to determine the archaeology described as the basis for the scheduling of this monument. It is likely, however, that the features described are geological and not archaeological in origin, an interpretation also noted in a reappraisal of the nearby scheduled Neolithic causewayed enclosure (Cambs HER 06468/ NRHE 374466/NHLE 1009103) (Evans *et al.* 2006, 159).

The causewayed enclosure was recorded between Great Wilbraham and Little Wilbraham Fen (Fig 20). Located on chalk, the subcircular enclosure is double-ditched and these elliptical features have been mapped from a very low-resolution digital aerial photographic image and so some finer details may not have been visible. The northern third of the enclosure is not visible, but the interrupted inner ring ditch is about 138 m in diameter and the outer interrupted ditch has a diameter

about 194 m. The monument was excavated over two summers in the mid-1970s by members of the University of Cambridge (Evans *et al.* 2006).

The two monuments are divided by the Fleam Dyke (HER 05294/ NRHE 1387300/ NHLE 1006931), a 5 km long multi-phase earthwork bank and ditch monument constructed between the 4th and 7th centuries AD (Malim *et al.* 1997). It is unclear whether this spatial relationship was deliberate or coincidental.

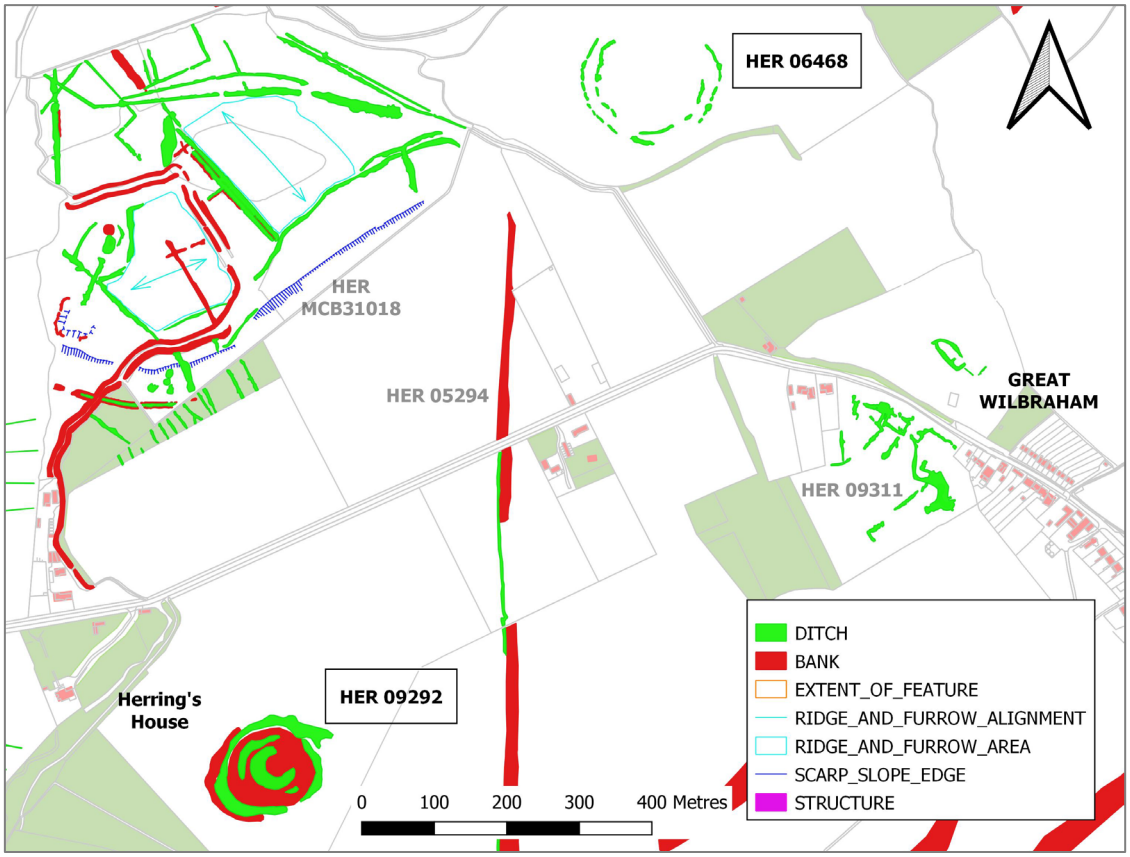

Figure 20. Neolithic causewayed enclosure at Great Wilbraham. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

At Bottisham, two parallel ditches are aligned northwest to southeast and approximately 17 m apart; they extend for approximately 140 m (HER 06605/ NRHE 375025) (Fig 21). These features have previously been recorded as a Neolithic cursus but this interpretation is tentative at best. There are numerous earthworks and cropmarks associated with Bottisham Park (HER 01124). In this instance, the two 'cursus' ditches are aligned with medieval linear boundary ditches and a moat within the parkland so are likely to be similarly dated.

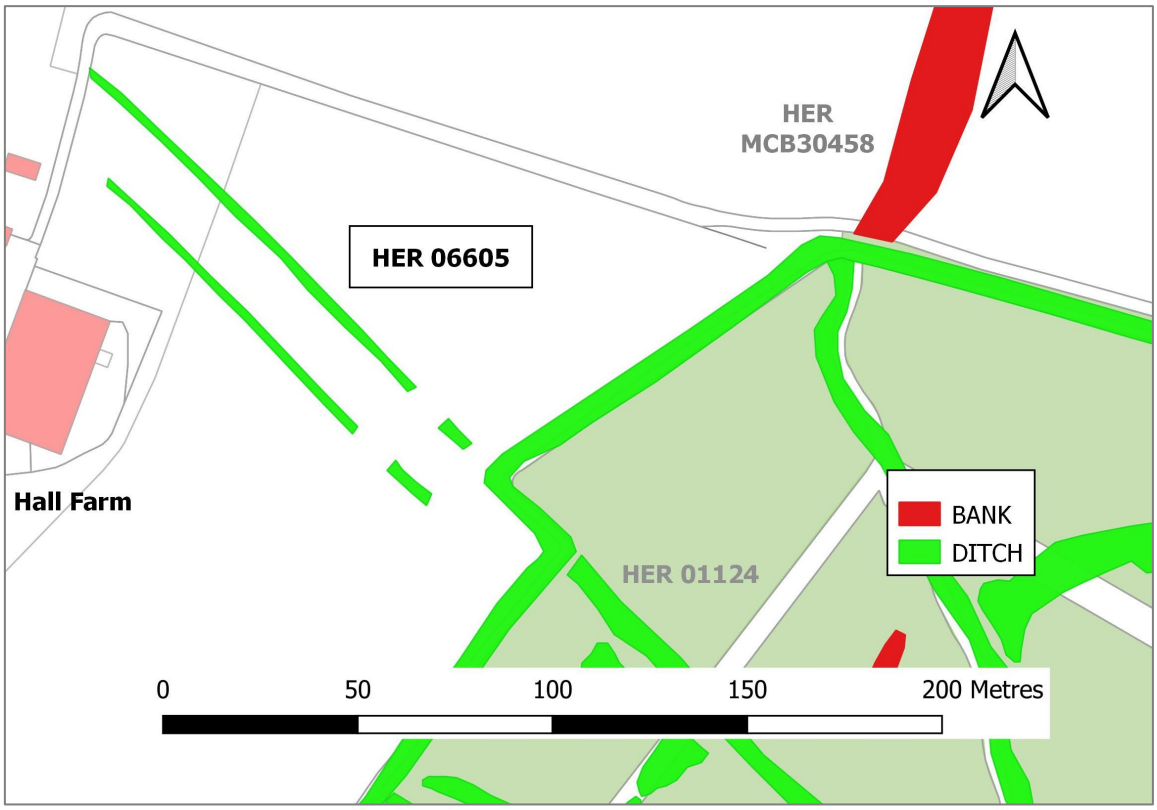

Figure 21. A possible Neolithic cursus at Bottisham Park. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

All the monument records created or updated by the project that were attributed to the Bronze Age relate to ring ditch cropmarks or earthwork mounds, the remains of 129 barrows. Of this number, 119 are located on the chalklands to the southeast of the project area. Clustered barrow groups are located at Hare Park (near the Swaffhams), Snailwell and Chippenham, with a loose cluster of 15 barrows on Fordham Moor (Fig 22).

The western fen edge has few known Bronze Age sites (Hall and Coles 1994). Bronze Age activity around the eastern fen-edge is far more extensive. In the 1930s at Stuntney, just to the southeast of Ely, a ritual later Bronze Age hoard of axes, swords, ingots and palstaves was uncovered, deposited in a wooden container. On a sand ridge at Stuntney, a major lithic site has also been identified, suggesting settlement activity. At Isleham, a huge founder's hoard of over 6,500 leaded bronze pieces were discovered by the Houghton brothers whilst ploughing at their farm in December 1959. In addition to large quantities of raw metal and metal splashes, many pieces were fragments of swords, spearheads and butts, tools and ornaments, along with a few unfinished castings (Britton 1960, Yates and Bradley 2010, Malim *et al.* 2010)). Further bronze hoards were found in the mid-19th century at Wilburton, about 7 km southwest of Ely.

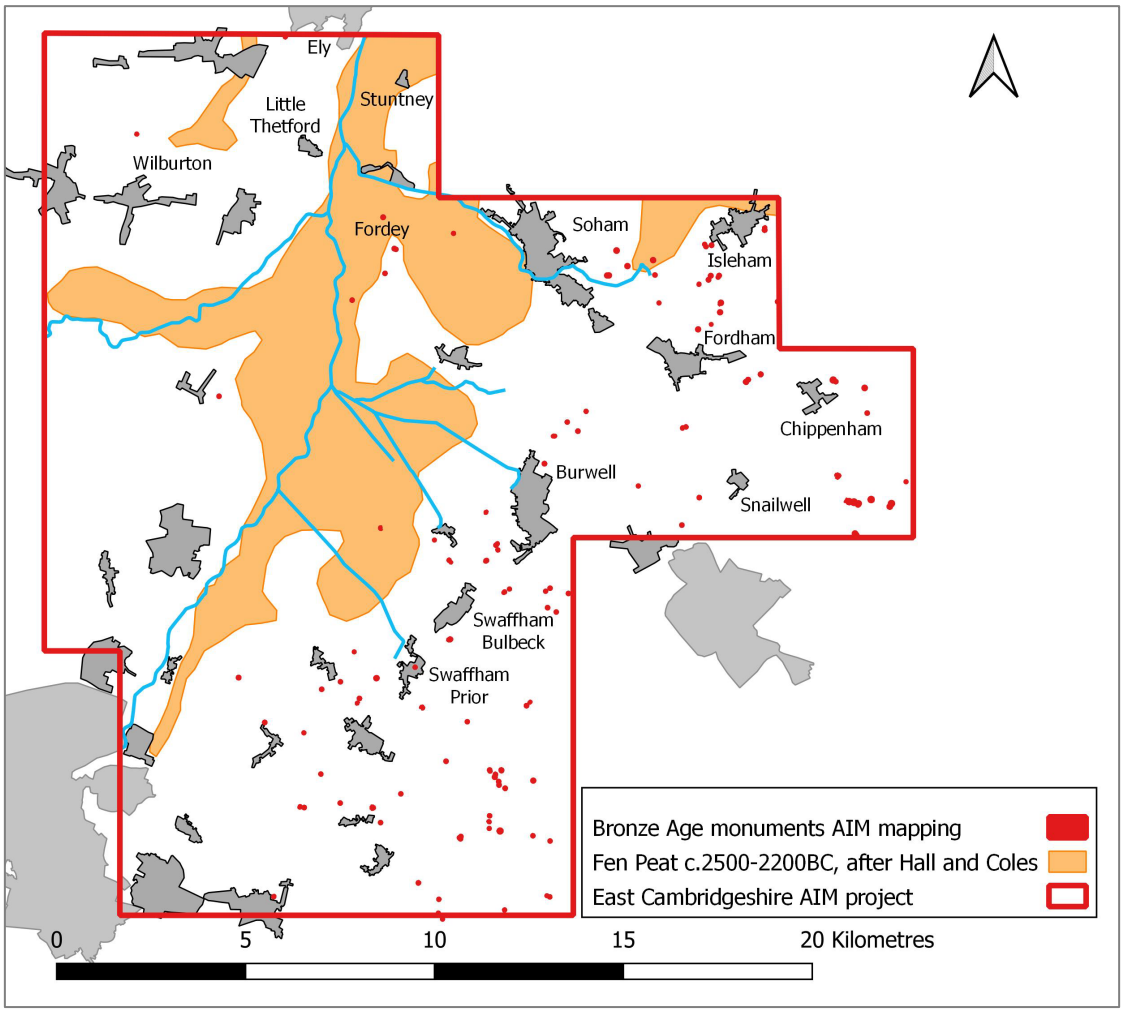

Figure 22. Bronze Age monuments mapped by the AI&M project with extent of peats c.2500-2200 BC, as characterised by Coles and Hall (1994). Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Discovered in the 1930s was a wooden trackway or causeway, about 800 m long and up to 9 m wide, linking Fordey (at Padney) and Little Thetford. It was constructed of sand covering decayed brushwood and held in place by stakes. A similar trackway about 1,500 m long was identified between Ely and Stuntney (Lethbridge and O'Reilly 1935, 1936). A significant settlement has also been identified on Broad Hill at Soham (Hall and Coles 1994). More recently at Soham, two Bronze Age dated graves containing human remains were uncovered along with other multi-period finds on a building site (Mason 2020). Similarly, the skeleton of a middle-aged man of Early Bronze Age (2500-2200 BC) beneath a burial mound and encircled by a ditch was recently uncovered and dated during excavations at Burwell ahead of a new housing scheme. An adjacent farming settlement of Late Bronze Age date (1100-800 BC) does not overlap the funerary monument but appears to respect it (Oxford Archaeology 2021).

Iron Age and Roman

The mapping of features that date to both the Iron Age and/or Roman periods are discussed together here. Features that were constructed in the Iron Age or Roman periods were often morphologically similar or may have been established in the late Iron Age period and continued to be occupied into the Roman period.

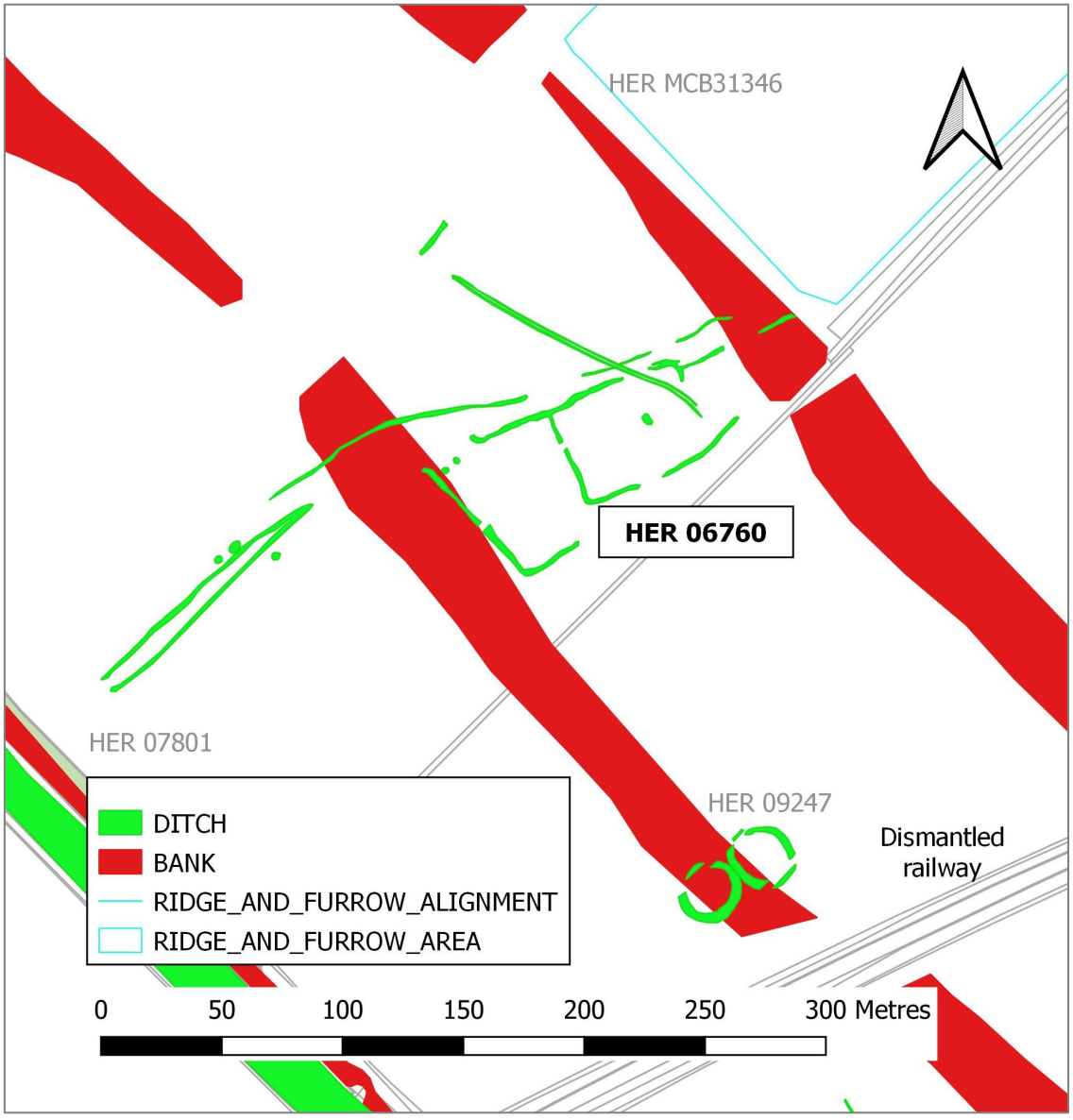

Figure 23. Iron Age and Roman occupation site at Reach. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Excavations have shown that Iron Age and Roman activity is often present in the same discrete geographical area, with evidence of continuous settlement, re-use or overlapping activity (Simmonds & Welsh 2013). For example, rather undiagnostic rectilinear conjoined ditched enclosures mapped and recorded by the project

northeast of Devil's Ditch at Reach show continuity of settlement from the Iron Age to the Roman period through surface finds (HER 06760), including pottery, building debris and roof tiles (Oxford Archaeology (East) 2015d)(Fig 23).

Distribution of Iron Age or Roman features

Iron Age or Roman sites visible on aerial photographs are distributed across the southeastern chalklands and western claylands in the project area, but with a notable absence in the central fenlands area. Those mapped features attributed an 'uncertain' date are included because their geographic proximity with Iron Age and /or Roman features suggest that possibly they may be associated (Fig 24).

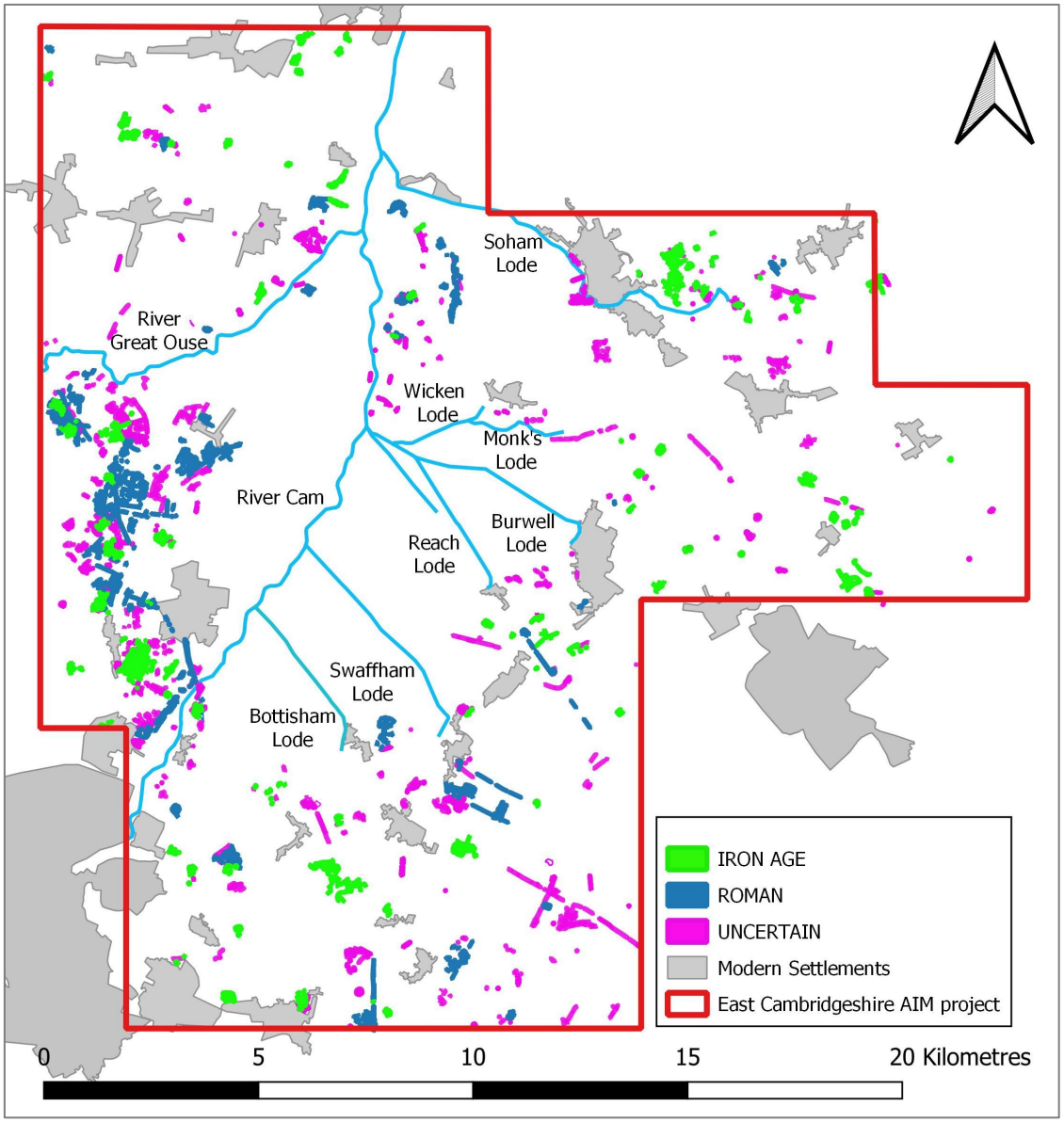

Figure 24. Mapped Iron Age, Roman and features of 'uncertain' date within the project area. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Some other gaps coincide with the locations of settlement and the large former Second World War airfields at Witchford, Snailwell, Waterbeach and Cambridge, although some archaeological cropmarks were recorded in and around the grass airfields once they were returned to agriculture.

Iron Age or Romano-British settlement

From excavated evidence, early Iron Age settlements are associated with Bronze Age funerary monuments. From the middle Iron Age onwards, that association begins to be lost and the morphological diversity of settlement forms increased, with both open and enclosed sites. (Oake *et al.* 2007, 63). Open settlements are difficult to identify on aerial photographs compared to enclosed settlements, typically comprised of post-built roundhouses and pits spread across a relatively large area (Bryant, in Glazebrook 1997, 25). These features may be more ephemeral and less visible as cropmarks; they are also more easily ploughed away compared to substantial ditched enclosures. Therefore, unenclosed settlements may be hidden amongst the complex multi-period landscapes of ditch-defined enclosures and boundaries typically seen as cropmarks on aerial photographs (Deegan 2007).

Numerous Iron Age and Roman settlement activity was recorded within the project area. Areas on the fen edge were extensively and often densely occupied and farmed, notably between the 10 and 15 m OD contour. Morphologically, Iron Age and Roman rural settlement often appear to differ little in appearance, being relatively small, either comprising individual farmsteads or small villages of several farmsteads with associated field systems and droveways. With the construction of imposing infrastructure such as roads and connective canals like Car Dyke, associated Roman settlement appears to increase in size and complexity, along with the farming field systems and network of droveways. This is evidenced at Landbeach and Waterbeach.

Banjo Enclosures

Iron Age 'banjo' shaped enclosures had a range of functions including settlement and stock management (Historic England 2018d). They comprise circular or subcircular enclosures with a single entrance approached by parallel, funnel-like ditches that flare outwards at the furthest extent from the entrance. Numbering less than 200 known sites nationally, these enigmatic and complex sites are mainly found within the south of the countryand fewer than 20 examples have been investigated. To date, these sites have proved to have a Middle to Late Iron Age date, c.400BC to AD 43. They are sites in different contexts, both as isolated sites or part of larger complex settlements and field systems (Lang 2016).

Only two banjo-shaped enclosures were mapped within the project area. Nine banjo enclosures were recorded to the west by the Bedford Borough NMP project (Adams and Crowther 2021), of which at least two had ring ditches within the enclosure. Similar examples were noted in the adjacent NAIS SW Cambridgeshire project area (Knight *et al.* 2019, 56). At Caldecote, west of Cambridge, an excavation showed

that the enclosed ring ditch was a roundhouse of middle Iron Age date (Kenny and Lyons 2011, 70).

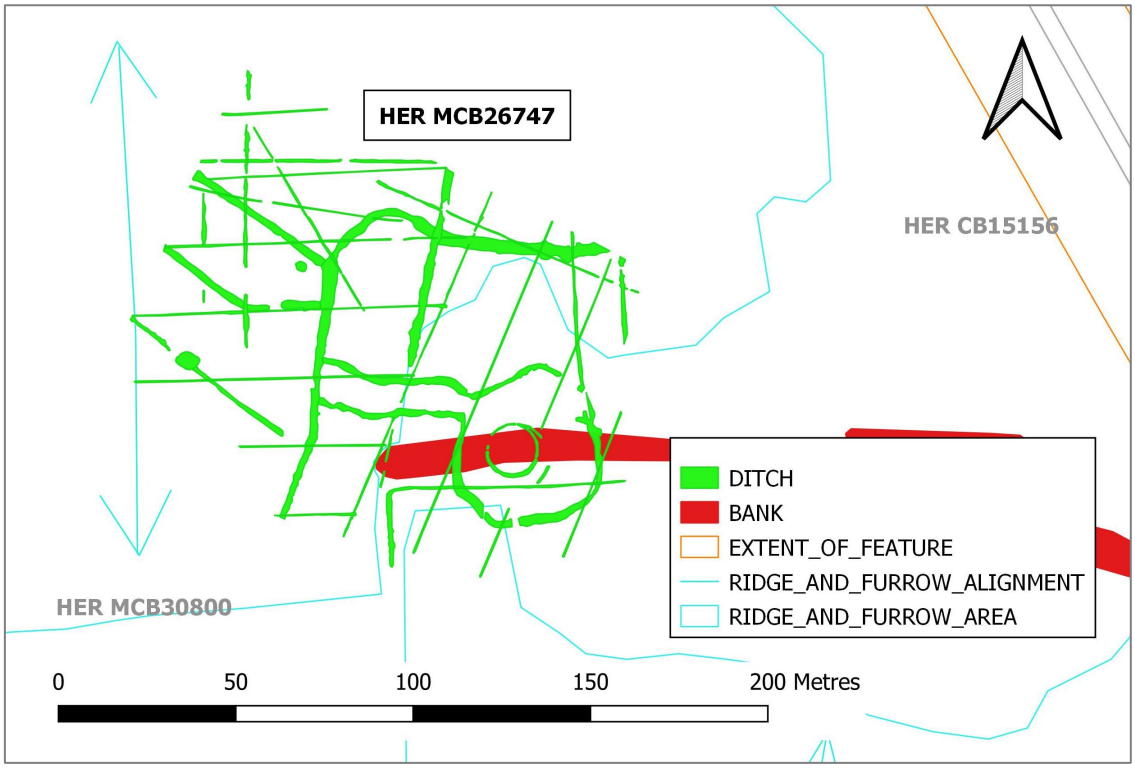

Figure 25. Iron Age banjo enclosure at Witchford. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Located at Lancaster Way Business Park on the former Second World War Royal Air Force operational airfield at Witchford, the excavated remains of an Iron Age settlement (HER MCB26747) was not visible on any of the available historic vertical aerial photographs, being masked by the overlying blocks of medieval ridge and furrow earthworks.

However, specialist oblique aerial photographs recorded the commercial archaeological excavation of this area by Northamptonshire Archaeology (Homes and Simmonds 2009, Holmes 2008, Fisher 2008) and so these features were mapped as soilmarks within the excavation area, rather than as cropmarks (Fig 25). The excavation fieldwork identified finds, pits, enclosures and boundary ditches dating from the Middle/Late Iron Age to the first half of the 1st century AD. The banjo enclosure is a subcircular ditch enclosing an area about 44 m in diameter at its widest, with an elongated entranceway in the northwest side that extends about 40 m. Within the enclosure is a ring ditch about 13.5 m in diameter with a possible entrance facing northwest. The site is traversed and truncated by medieval furrows from the former ridge and furrow cultivation (that was still visible as earthworks in 1944), overlaying all of which are a system of late-20th-century linear land drainage ditches. To the north are further extensive Iron Age settlement features (HER MCB18095) uncovered during archaeological excavation (Homes and Simmonds

2009, Holmes 2008, Fisher 2008). The settlement evidence uncovered by these relatively discrete excavations suggest the probable presence of further features under the grass and ridge and furrow remains at the former airfield.

Also to the west of the River Cam, near Punch Farm at Milton, an isolated banjo enclosure, within which is a ring ditch, is visible within the field (HER MCB27490/ NRHE 1582081) (Fig 26). On the opposite side of the course of the Roman road, still named Akeman Street here, are cropmarks of subrectangular and circular ditched enclosures, also probably late Iron Age in date (HER MCB27489/NRHE 1582075). Excavations of the Roman road at nearby Landbeach suggest that the earliest phase of construction in the area began in the 2nd century AD or later (Malim 1997) and so the banjo enclosure may have had a closer relationship with the adjacent cropmark enclosure features.

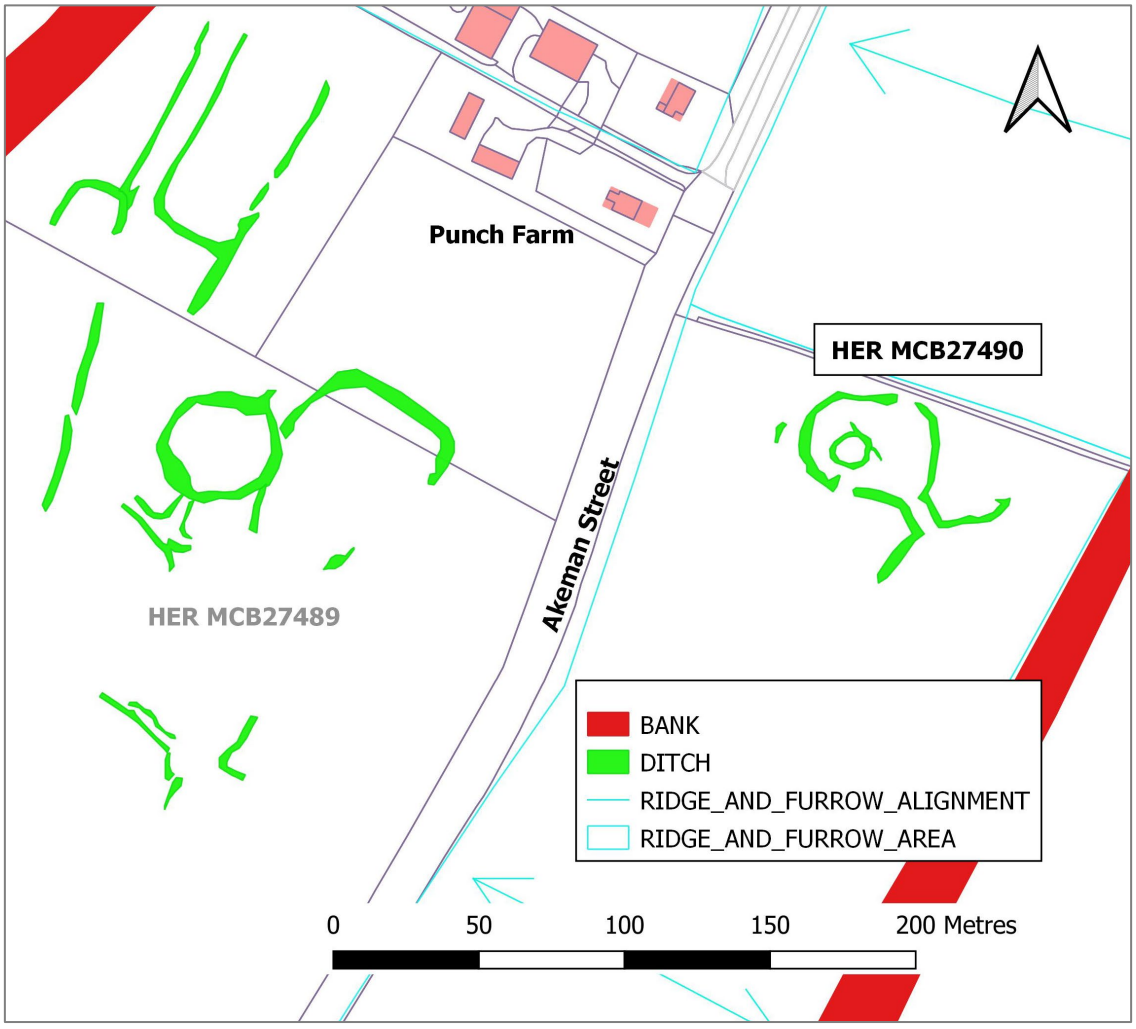

Figure 26. Iron Age banjo enclosure at Punch Farm, Milton. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Complex settlements

Some of the settlements assigned an Iron Age to Roman date within the project area are nucleated and complex, typically comprising multiple phases with circular, irregular, rectilinear and square ditched enclosures, with associated linear ditches and tracks and often including 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 Roman in date (Timby *et al.* 2007,96).

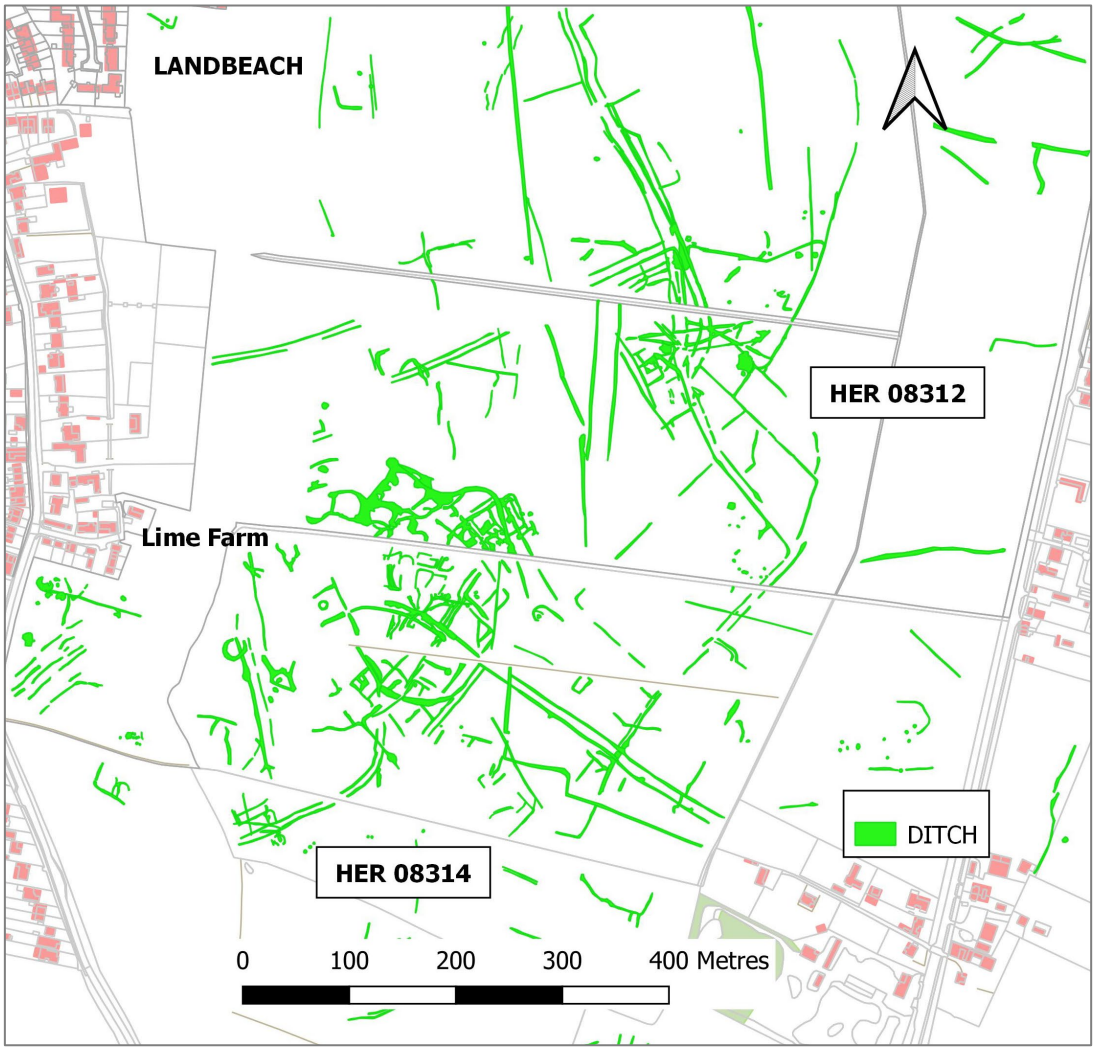

Figure 27. Roman settlement evolution at Landbeach. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

In lands adjacent to Limes Farm at Landbeach on a river gravel terrace just over 5 m above OD, an evolving cropmark settlement complex that transitions from the Middle Iron Age to the Romano-British is visible as trackways, boundary ditches, rectilinear and subcircular enclosures that extend over 25 hectares (HER 08312 and 08314) (Fig 27). Archaeological excavations starting in 1999 identified occupation

evidence in timber structures, ditches, rubbish pits filled with pottery, bone and human remains. With the Roman road Akeman Street passing to the west and canal Car Dyke to the east, the flat and free draining soils would have made the Iron Age settlement an attractive site for continuity to Romano-British occupation (Connor and Sealey 2003, Connor and Palmer 2000). Similar occupation evidence is recorded extending along a gravel river terrace from Milton in the south towards Wilburton in the north, mostly along the west side of the River Cam.

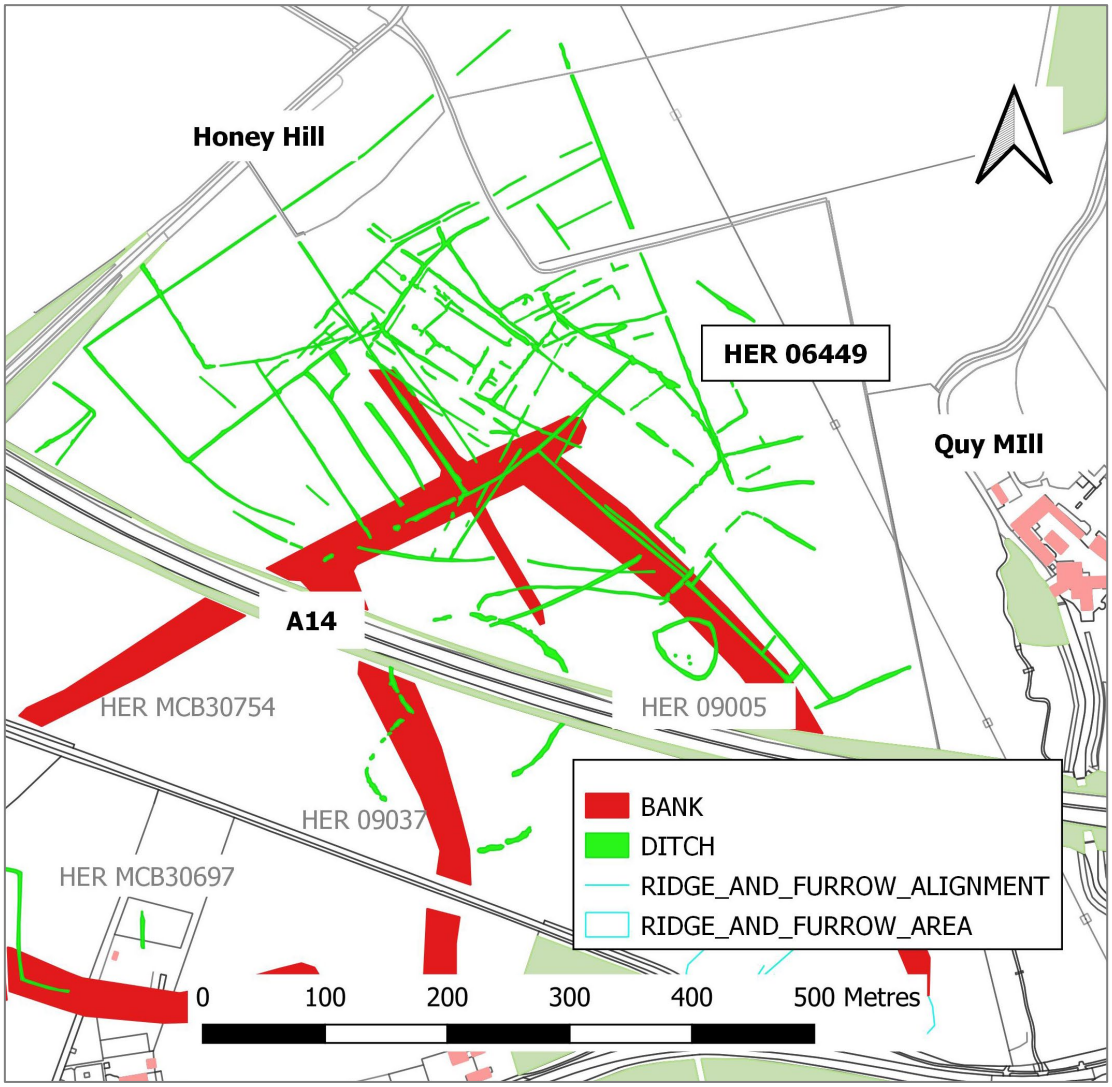

Figure 28. Palimpsest of cropmarks at Honey Hill. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

West of Quy Mill on Honey Hill, near Bottisham, is a palimpsest of cropmark ditched enclosures (Fig 28). The current field pattern had been significantly altered by the construction of the A14 dual carriageway and 20th-century field amalgamation. However, from analysis of the 1880s 1st Edition OS mapping, the probable medieval and post-medieval field boundaries were identifiable in the

cropmark record, revealing an underlying extensive settlement of likely Roman origin from its morphology, as well as HER records identifying fieldwalking finds of Roman-dated pottery (HER 11198) (Fig 29). The settlement (HER 06449/ NRHE 375031) extends over 500 m northwest-southeast and comprised multiple contiguous rectilinear enclosures on two alignments, suggesting a phased development. The settlement is sited adjacent to probable Iron Age and/or Romano-British subcircular ditched enclosures (HER 09005/ NRHE 1582040 and HER 09037).

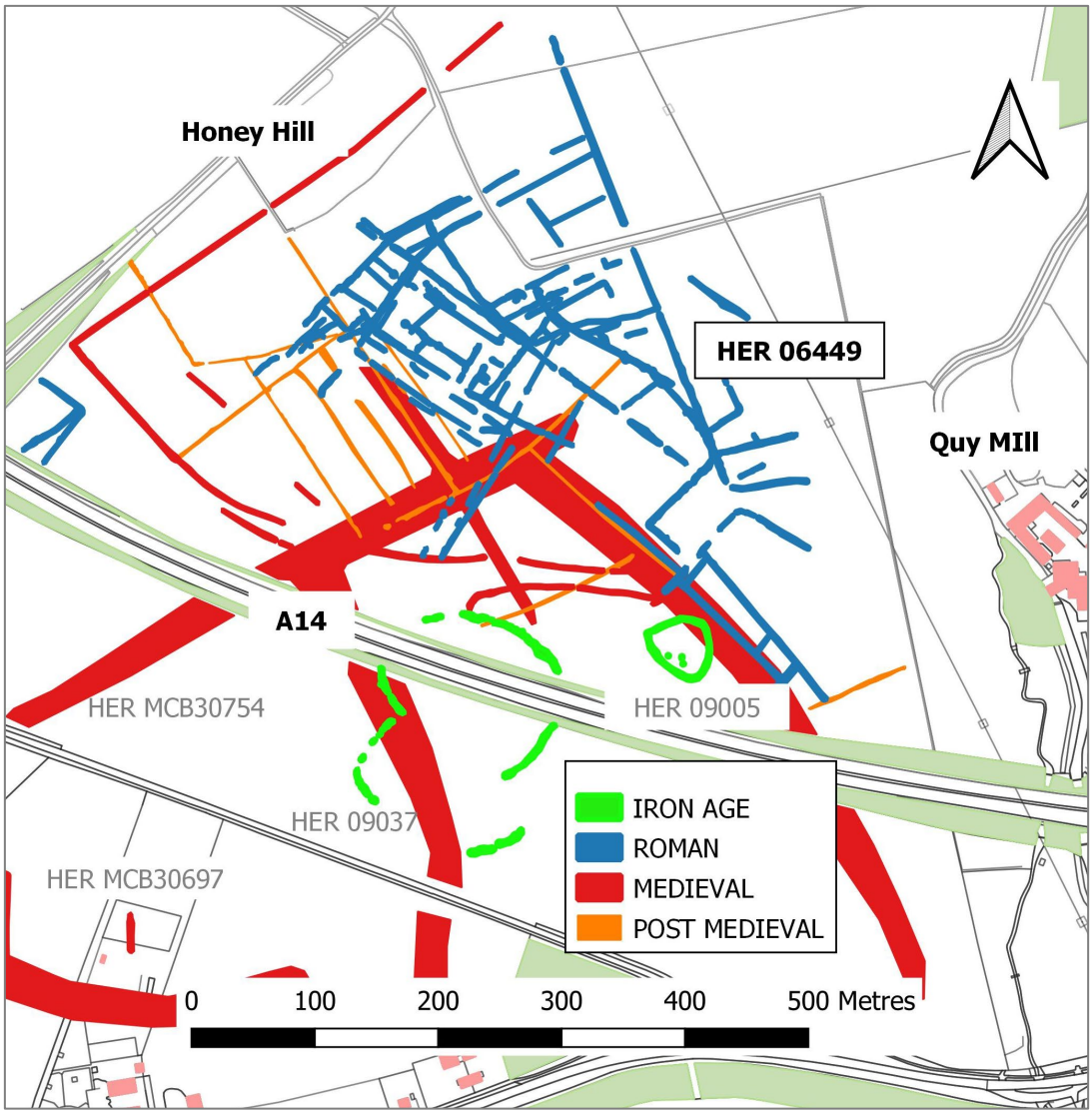

Figure 29. Phased interpretation of Honey Hill cropmarks. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

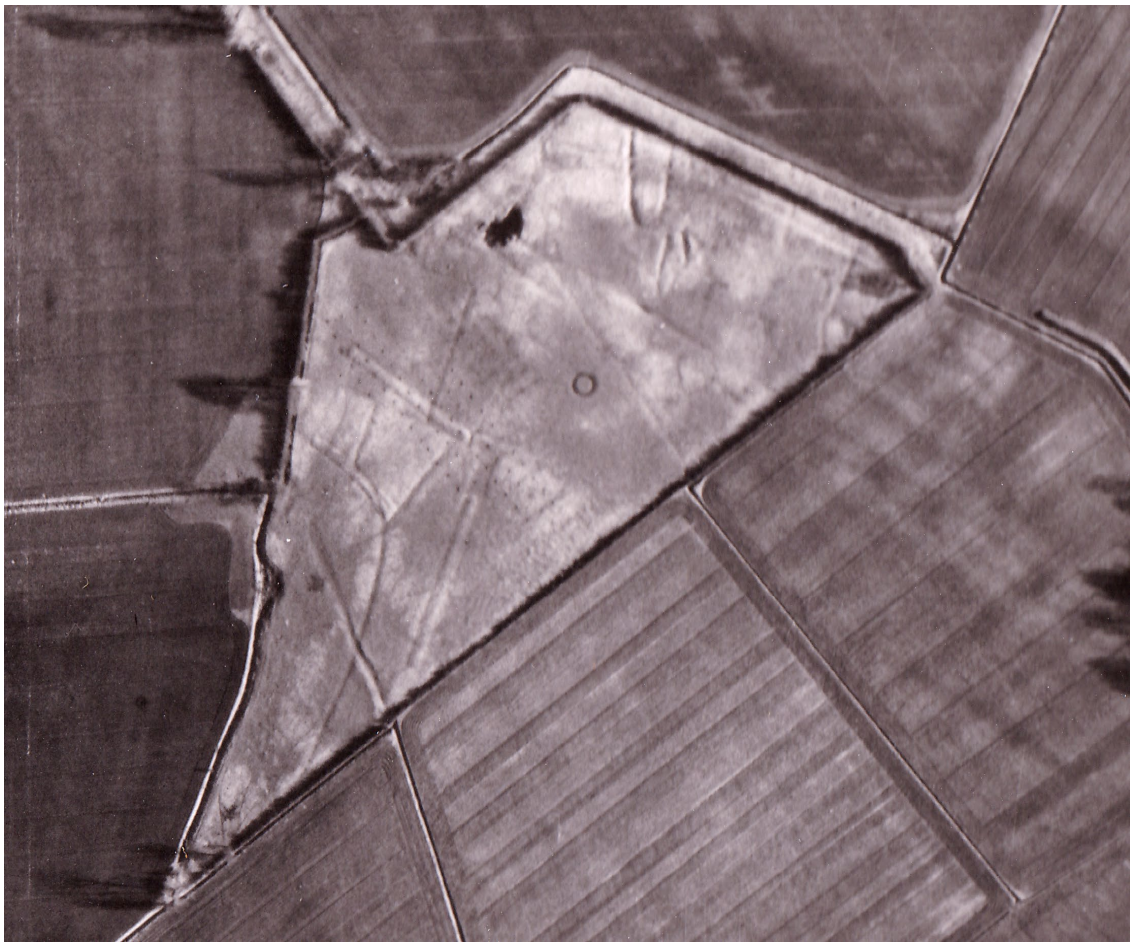

Figure 30. Romano-British settlement at Old Fordey Farm. Extract from RAF/CPE/UK/1952 FS 2072 25-MAR-1947. Historic England RAF Photography.

In a field at Old Fordey Farm, Barway, part of a scheduled Romano-British settlement (HER 07045/ NRHE 375090/ NHLE 1006885) is visible as extant earthworks on historic aerial photographs taken in 1947 (Fig 30). The site comprises rectilinear ditched enclosures, linear earthwork banks and ditches, with double-ditched trackways. Other features bisect or truncate others, suggesting phased settlement. Centred in the field is a slightly ovoid mound, about 7 m at its widest, encircled by a ring ditch about 2 m wide, the function and date of which is uncertain. It may represent a medieval or post-medieval mill mound, or possibly a Roman burial. At Old Fordey Farm, within five years of this historic aerial photograph having been taken, these earthworks appear to have been plough-levelled.

Other similar Roman burial mounds have been recorded, often associated with Roman roads or settlements. Dunning & Jessop (1936) state that the average diameter Roman barrow is about 24 m. The scheduled monument (NHLE 1018974) Bartlow Hills barrow cemetery in Cambridgeshire (but formerly in Essex pre-county boundary changes) are six Roman chalk-built burial mounds, the largest surviving example of which is a steep conical mound about 12 m high and 46 m in diameter (Historic England 1981). At Linton Heath in Cambridgeshire, a group of

five barrows have been interpreted as Roman in origin, with a further barrow about 60 metres in diameter at Hildersham that was excavated in the 19th century (Eckardt *et al.* 2009).

However, a wide variation in size of these monuments is commonplace and smaller examples of Roman dated burial mounds have been recorded. In nearby Babraham, south of Cambridge, excavation identified a circular Roman cremation cemetery, part of which included remains of a late 1st to early 3rd century AD cremation barrow about 7 m in diameter (Timberlake *et al.* 2007). At Hey Hill, near Lord's Bridge in South Cambridgeshire, a (now) oval Roman barrow mound and 5 m wide encircling ditch is recorded with a diameter about 8 m, but though to have been originally circular in plan (Historic England 1962). Similarly, at Overton Hill in Wiltshire three Roman burial mounds were discovered, two of which were also around 7 m in diameter and surrounded by a ditch (Historic England 1994).

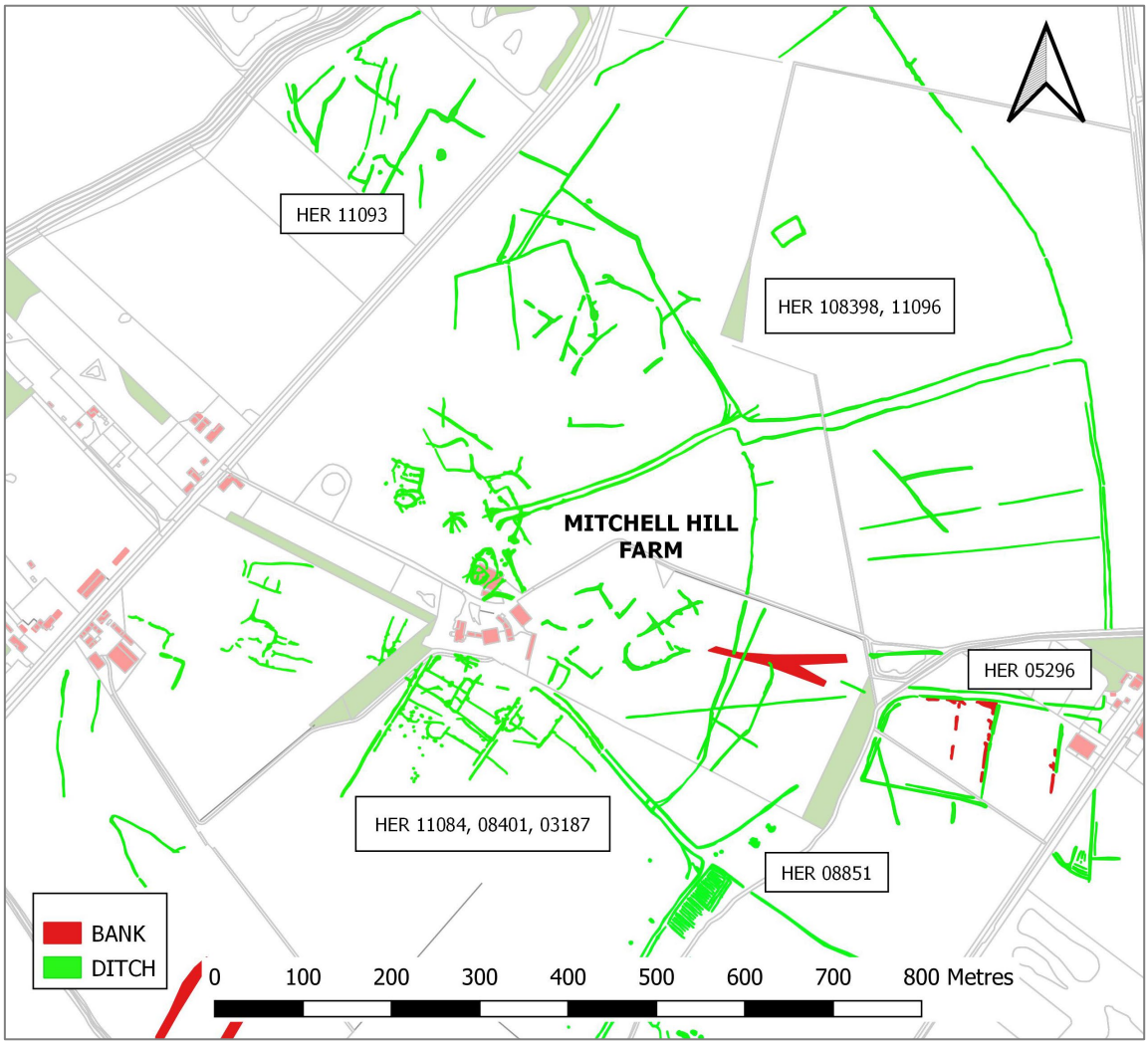

Figure 31. Romano-British settlement and other field system cropmarks at Mitchell Hill Farm. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

The river terrace gravels in the area west of the River Cam, between Horningsea and Chittering, have revealed an almost contiguous belt of Iron Age and/or Romano-British settlement and field systems. At Mitchell Hill Farm, near Cottenham, extensive cropmarks reveal the site of Roman settlement enclosures (HER 11094, 08401, 03187/ NRHE 371841), with a sprawling system of associated trackways and arcing field systems (HER 08398, 11096/ NRHE 372144) (Fig 31). South of the farm buildings, parallel trackways approximately 100 m apart have field boundaries joining at right angles and smaller subdivisions in between. North of Mitchell Hill Farm, cropmarks of a large rectilinear ditched enclosure and other linear features continue south of Twenty Pence Road and may form part of the same extensive settlement (HER 11093). The full extent of this settlement is not clear due to the area to the north-west of Mitchell Hill Farm having been quarried in the 19th or 20th century.

The area identified in the Mitchell Hill Waste Recovery Plan (Wiser Environment Ltd 2019,55-56) for the importation of 1 million cubic metres of inert material over 15 years includes some of the features mapped above. As the AI&M mapping post-dates the publication of that plan, it is suggested a review of the archaeological significance of these newly identified features may be warranted.

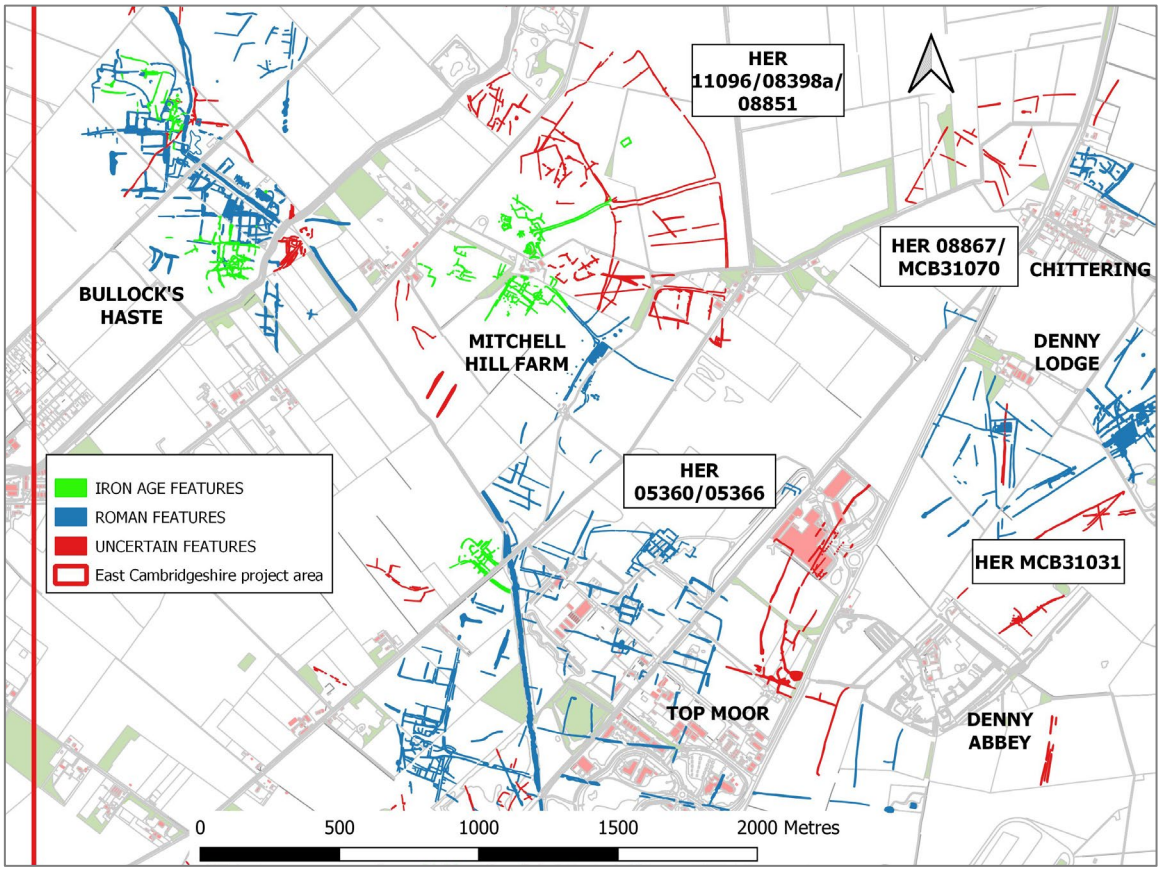

Figure 32. Iron Age, Roman and Uncertain dated field systems. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Around Waterbeach, extensive Iron Age and/or Romano-British settlement and field systems extend across many square kilometres (Fig 32). Notable is the variation in size and morphology of field systems in close proximity. At Top Moor, the extensive rectilinear ditched field systems (HER 05360/05366) are clearly cut by Car Dyke, a canal for which construction began c. AD 80, suggesting a very early Roman date for the field system features. At Bullocks Haste Common, the north-south orientation of linear ditches and rectilinear enclosures on both sides of the canal also suggest that at least some of the settlement's features may pre-date the dyke's construction. At nearby Mitchell Hill Farm, the pattern of field system, trackways and droveways is different from its neighbouring Roman-dated sites, with a radiating field pattern (HER 11096/ 08398a and 08851). The date of these features remains unclear.

Other enclosure types

An interesting enclosure of probable Roman date is located at a track or road junction (HER 08847/NRHE 371846) (Fig 33). Located between Green End and Denny End, Landbeach, a 770 m long trackway or road runs approximately west-north-west to east-south-east with another roadway joining it at right angles from the northeast. Located at this junction is an enclosed settlement in the form of two subrectangular ditched enclosures, divided by a further track or alleyway. Each enclosure is further subdivided, within which are cropmarks of a 5 m wide ring ditch, pits and linear features. There is also a double-ditched subrectangular enclosure within the larger enclosure, with a possible entrance on the eastern side. A Roman artefact scatter is recorded within the enclosed settlement and a Roman ditch is also recorded on the edge of the subrectangular enclosure. The coherent features appear to represent a single phase of occupation and are sited about 300 metres west of Car Dyke, which is now only visible as a roadside ditch aligned northwest-southeast at Denny End. Given its prime position, it may be that this is not a domestic settlement, but rather served an industrial or commercial function.

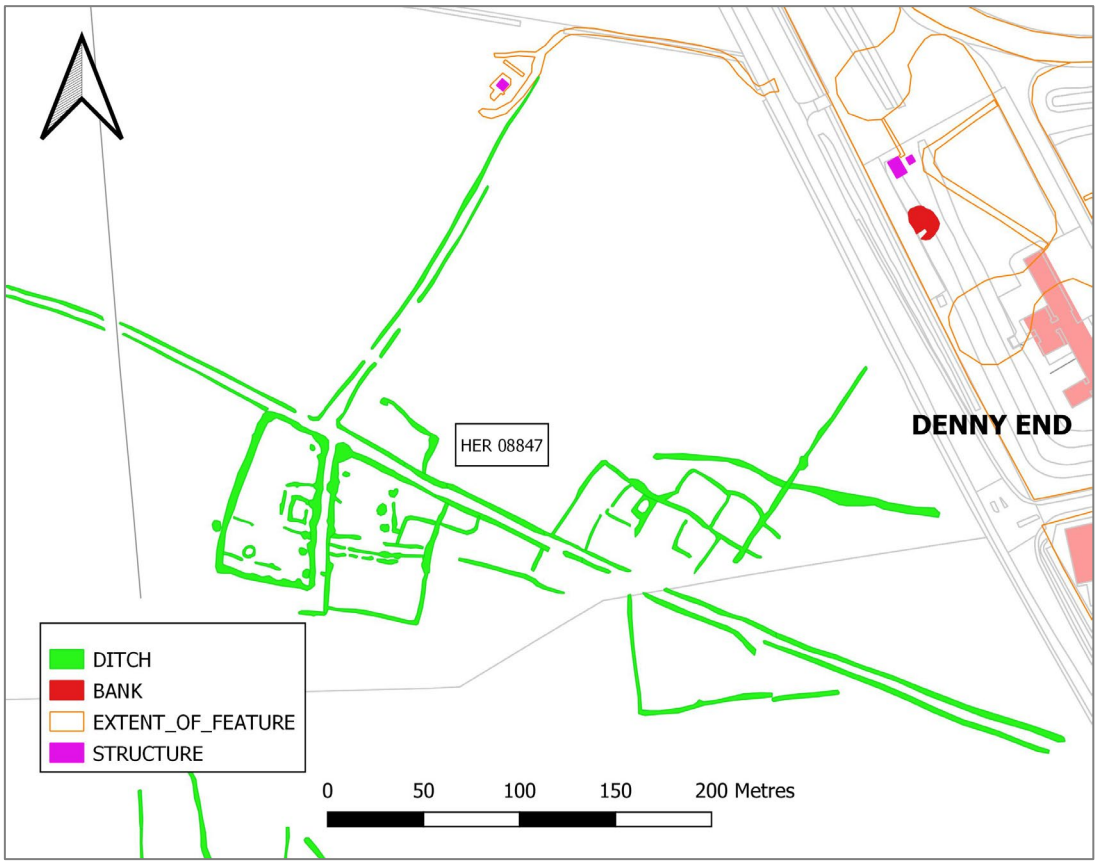

Figure 33. Roman enclosures at a road junction near Landbeach. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

A possible square barrow was also recorded close to North Far, Landbeach (HER MCB30651) (Fig 34). A 3.5 metres wide square ditch encloses an internal area about 20 metres square, within which is an irregularly shaped macula in the west facing corner. There also appears to be an entrance on the north east facing side.

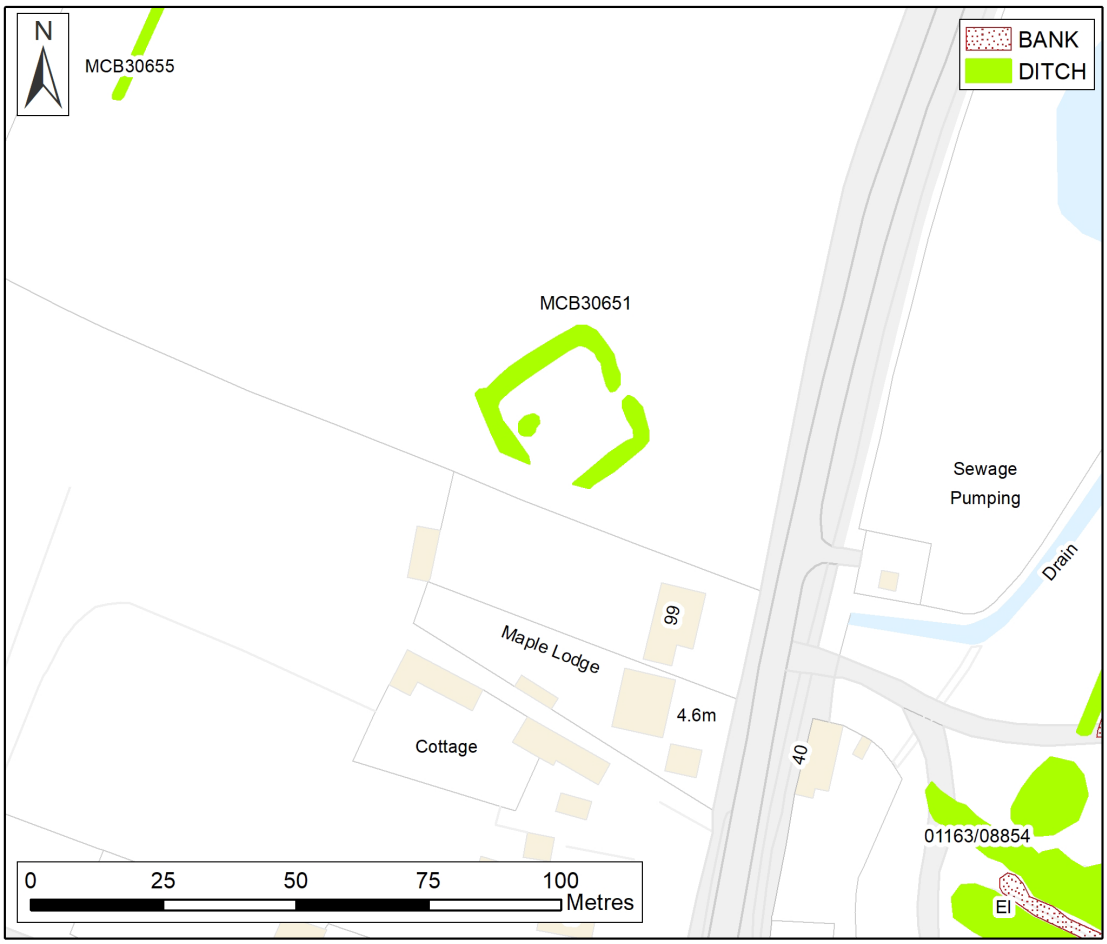

Figure 34. Square enclosure near North Farm, Landbeach (MCB30561). Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Conjoined linear enclosures

Amongst the settlement features assigned an Iron Age to Roman date, there are several examples of morphologically similar conjoined ditched enclosures that appear to be locally distinct.


HER 08841
Long Drove
DITCH
0 25 50 75 100 Metres
HER MCB30644
DITCH
0 25 50 75 100 Metres
HER 11555
A14
DITCH
0 25 50 75 100 Metres
HER 08857
DITCH
0 25 50 75 100 Metres
Top Moor
HER 05365
DITCH
0 25 50 75 100 Metres

Figure 35. Roman conjoined ditched enclosures at (clockwise) Cottenham, Mason's Pastures, Landbeach, Landbeach, Top Moor and Fen Ditton. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

There are five examples shown in Fig 35: Linear features near Cottenham (HER 08841), Rectangluar enclosures east of Mason's Pastures, Landbeach, (HER MCB30644), Tracks and Enclosure, Landbeach (HER 08857), Roman Pottery Scatter and Cropmakrs, Horningsea, (HER 11555) and Top Moor (HER 05365). Comprising at least three contiguous linear ditched subrectangular enclosures, these are constructed in various sizes that extend roughly around 100 m in total length and aligned either roughly SW-NE or SE-NW.

The function of these enclosures is unclear, but they all occur within more extensive settlement evidence. The example at Top Moor (HER 05365) appears to be both wider, longer (though truncated by modern boundaries), contains more conjoined enclosures and is altogether more substantial. Whether this represents an evolution of the type from the smaller examples is unclear.

Roman Villas

Within the project area, there are four mapped Roman villa sites, with a further seven known villas that were not visible on the available aerial photographs, from a total of 41 villas recorded in Cambridgeshire (Greenfield 1995). The known villa site within the project area that have not been mapped are: at Dimmock's Cote, Wicken where, in 1965, building stone, roof and flue tiles, 3rd and 4th century AD ceramics were discovered that suggested the presence of a villa (Cambs HER MCB10525): at Tunbridge Lane, Bottisham, where during an excavation stone-founded structures, pottery, CBM and small finds suggested a high-status villa site with tiled roof and hypocaust, as well as ancillary buildings, though the villa range was not located (Newton 2014, Kenney 2002) (Cambs HER CB15605): about 1 km west of Isleham (Cambs HER 07622, 11661/ NHRE 377645), when excavations in the 1930s recovered painted wall plaster, tesserae, hypocaust and other tiles suggesting the site of a significant Roman building that underlies a medieval 14th century moated site known as 'The Temple' (Cambs HER 05704a/ NRHE 377645): on East Fen Common at Soham, when an excavation in the early 1970s identified hypocaust tiles and subsequent small finds suggest the presence of a villa site (Cambs HER 07578/HER 07688): at Snailwell Fen at Fordham, where a partial excavation of a building in 1971 identified painted wall plaster and hypercaust (Cambs HER 07483/NRHE 377396/ NHLE 1006868): at Hinton Fields Manor Farm, near Teversham, where excavations between 1978 to 1986 identified the site of a villa, mosaic and ceramics of Roman date (Cambs HER 05099/NRHE 371259) (Pullinger and White 1991): and at Exning, where a 1904 excavation and subsequent 1950s investigations identified a villa site with mosaic, painted wall plaster, masonry and a bath suite, as well as ceramics and coins (Suffolk HER EXG012/ NRHE 377367).

These villas, along with those recorded in the project area, form part of a group of similar buildings that form a dense and broad line of settlement along the fen-edge from Swaffham Prior to Hunstanton and which are sited parallel to the Icknield Way and Peddars Way (Margery 1967).

The likely attraction that focuses settlement at this juncture of upland and fen-edge is the availability of a wide range of resources that both environmental and geological zones offer. Villa or farm estates could have been self-sufficient, cultivating grains on the upland chalks, whilst also able to exploit the wetlands for their game and fish, as well as seasonal meadow pasture mainly for sheep and cattle and peat cutting (Gurney 1986). The density of occupation and general settlement pattern that has been observed in the fen margins of Norfolk appears to continue along the east fen edge of Cambridgeshire: a small number of high-status stone-built buildings, interspersed with small settlement areas of ditched enclosures (Gurney *ibid.*,48). Gurney (*ibid.*) speculates that this pattern may have been part of a much larger imperial fen estate, with estate officials occupying the large buildings, and estate workers the more ephemeral occupation areas.

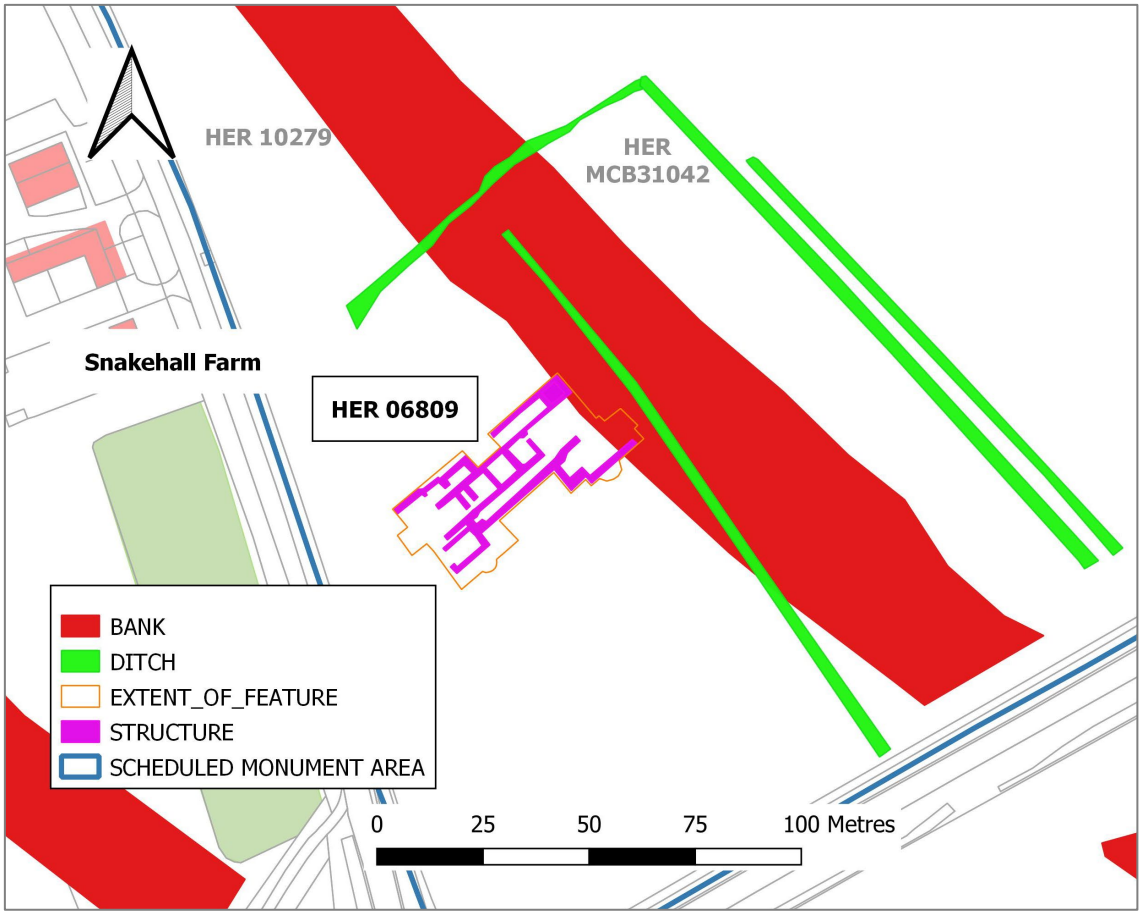

Figure 36. Reach Roman villa. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

At Reach Bridge, a Roman villa (HER 06809/NRHE 374665/NHLE 1006875) was discovered in 1892 and partially excavated shortly thereafter (Fig 36). A linear medieval furlong boundary (HER 10279) cuts across the site and other (probably Roman) enclosure or boundary ditches (HER MCB31042) extend west of the villa, truncated by the former railway line to the south. The scheduled corridor villa is about 25 by 50 m with small protruding wings on the southeast facing side at each end (Atkinson 1894, Wilson 1974). Cropmarks of a double-ditched road or trackway, about 9 m wide and 860 m long, leads southeast directly towards a temple complex on Gallows Hill, the relationship suggesting an important Roman site (Fig 39). A small section of this track was excavated ahead of pipeline works. This identified no evidence of metalling or wheel-ruts between the tracks boundary ditches within the excavated area but determined that it provided access for the villa occupants to the temple sit on Gallows Hill (Robinson 1992, 20). The villa's style and associated finds of tessellated pavement and hypocaust suggest the owner was likely a wealthy local or a high-ranking official and the villa is likely to have had its own temple and cemetery (Bray and Malim 1998)

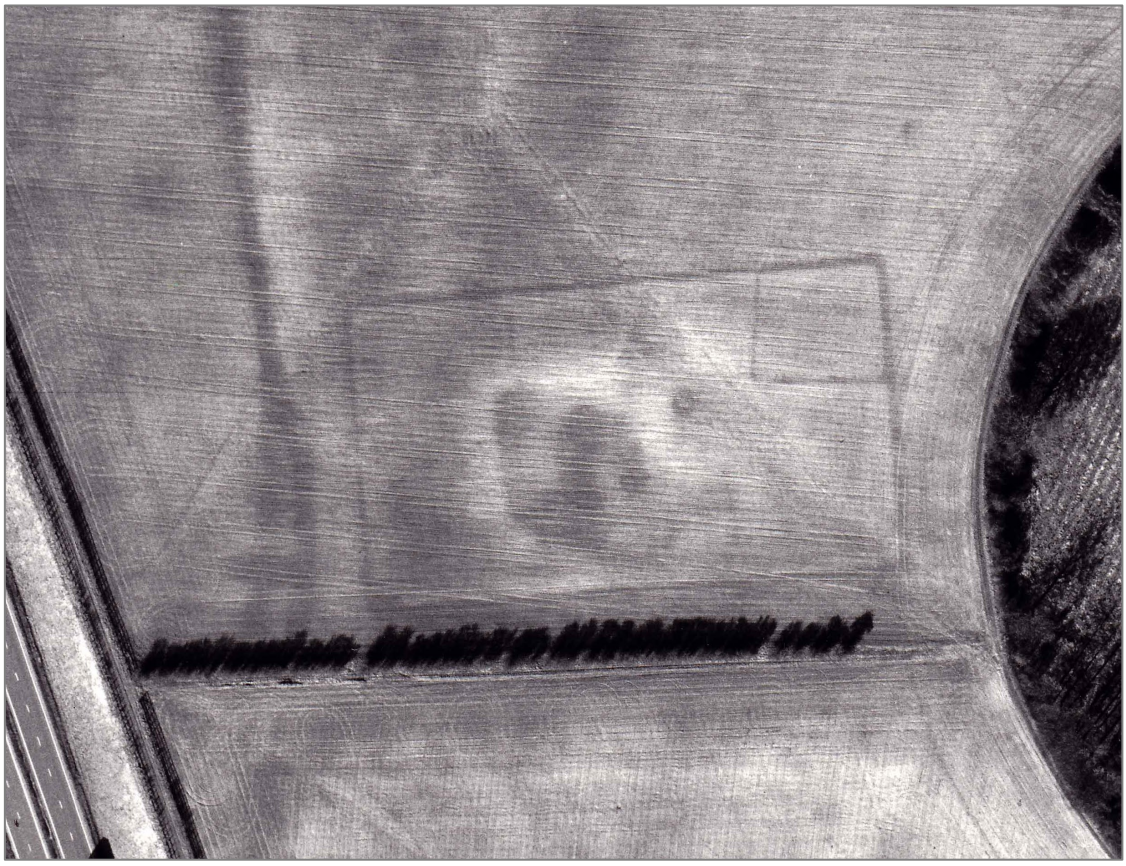

Figure 37. Cropmarks of Romano-British settlement and possible villa, Allington Hill. NMR 2108/1063 24-MAR-1982 © Crown copyright. Historic England Archive.

On Allington Hill and overlooking Bottisham to the west is a scheduled Roman settlement and possible villa building, visible as cropmarks, dated to the 3rd and 4th centuries AD from pottery finds (HER 06834/NRHE 374383/NHLE 1006901) (Fig 37). In the centre of a rectangular ditched enclosure is a slightly sunken area

that appears as a dark subrectangular cropmark and possibly represents the site of a villa or building. In the north eastern corner of the enclosure is a small, sub-square ditched enclosure (Historic England 1974).

There is also a 2nd/3rd century AD villa located at Springs Plantation just east of Great Wilbraham (HER 06279/ NRHE 1095800), part of which was uncovered by commercial excavation as part of the Dungate Pipeline Scheme, along with a courtyard and altar (Ette and Hinds 1993). Ette and Hinds (*ibid.*, 18) suggest that the main suite of rooms may not have been identified by the pipeline excavation.

Funerary and ritual monuments

Adjacent to Queens College Farm in Fulbourn, extensive Iron Age and Romano-British cropmarks (HER 17881/ NRHE 1406434) are located across three fields, extending north of the Cambridge-Newmarket railway line, including an Iron Age apsidal enclosure that encloses an Early Bronze Age barrow, which Moan (2015, 30) suggests had a ritual, rather than occupation, function (Fig 38). The cropmarks comprise at least nine contiguous rectilinear ditched enclosures, at least two of which overlap, suggesting phased occupation. A slightly curvilinear double-ditched trackway adjoins a series of further rectilinear boundary ditches of varying sizes. Throughout the cropmark complex are numerous pits and maculae of various sizes that may be associated with the settlement.

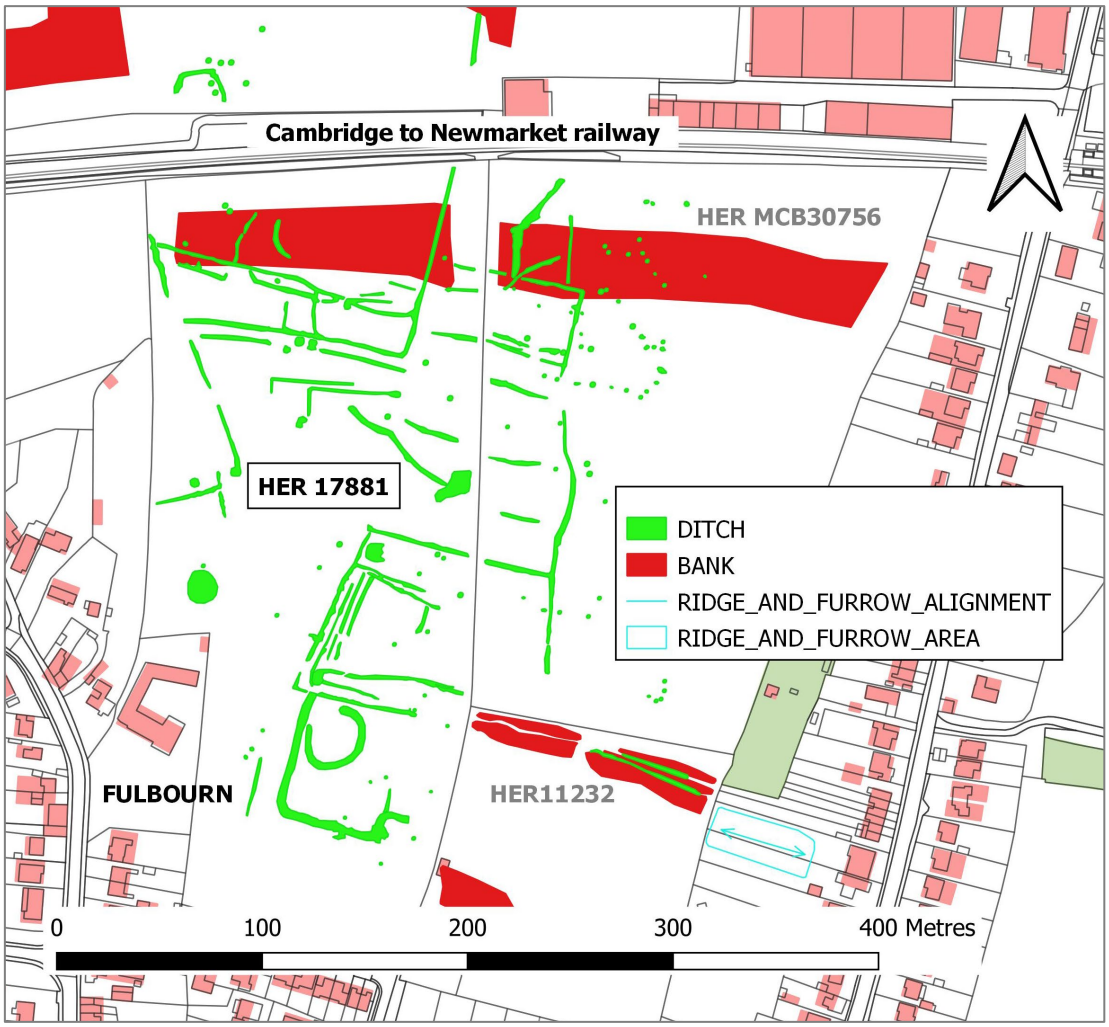

Figure 38. Bronze Age, Iron Age and Romano-British cropmarks at Fulbourn. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

The site has been partially excavated and elements have been scheduled since the start of this AI&M project (NHLE 1465057). Within a dated late Iron Age ditched enclosure is a large Bronze Age ring ditch about 25 m in diameter. The ditched enclosure's eastern side appears apsidal, having a semi-circular plan. A large assemblage of finds from across the site dated to the Late Iron Age and Roman periods. Also excavated was a Romano-British cemetery containing cremations and inhumations, as well as early-medieval and medieval structures and industrial remains (Moan 2015/ Historic England 2020).

Roman Temple sites

A number of possible Romano-British temple sites are recorded within the project area. Of those that were visible on the available aerial photographs, the most extensive example is at Swaffham Prior (HER 11054/HER 06782/ NRHE 1200473), where excavations recovered pottery within a square building that suggest a date range from the 1st and 2nd century AD (Bray and Malim 1998, 11). From this site, a probable Roman road or trackway (HER 10549/NRHE 374957) leads for nearly a kilometre directly towards the nearby villa at Reach Bridge (HER 06809/NRHE 374665) (Bray and Malim 1998) (Fig 39).

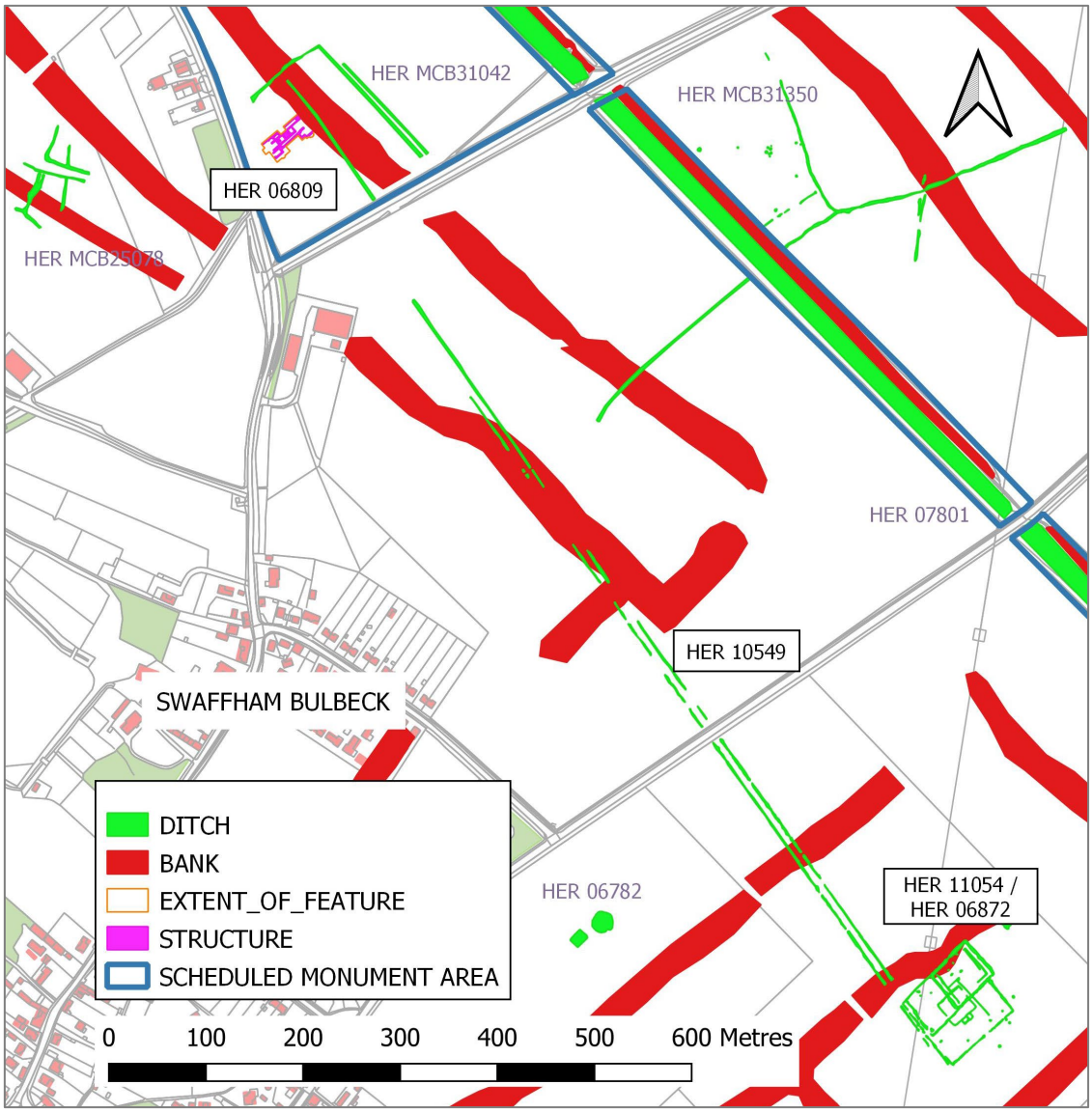

Figure 39. A Roman temple, roadway and villa. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

The probable temple complex is visible as cropmarks, with a large square enclosure containing a number of smaller interlinked square enclosures and a near square double-ditched enclosure, within which is a central square structure (Bray and Malim 1998). Both the temple and Reach Bridge villa share the same alignment, with the structure's corners oriented to the cardinal points.

About 3.5 km to the southwest at Whiteland Springs, between Bottisham and Swaffham Bulbeck, commercial archaeological excavation identified the foundations of a building that was tentatively interpreted as a Romano-British temple site (Robinson 1992, 43) (HER 10396/NRHE 1151638). No features as recorded by that excavation were visible on the aerial photographs available to the project. This lies about 2.5 km NW of the Roman villa at Allington Hill near Six Mile Bottom (HER 06834/ NRHE 374383).

A third probable temple site that has been recorded by the project is located in the west of the project area at Top Moor (HER 05523), between Waterbeach and Chittering (Fig 40). Morphologically similar to the site partially excavated at Whitelands Springs and other ambulatory temple structures identified throughout Britain (Muckelroy 1976), the partial square double-ditched enclosure is one element of a larger fen-edge settlement that has since been destroyed by quarrying.

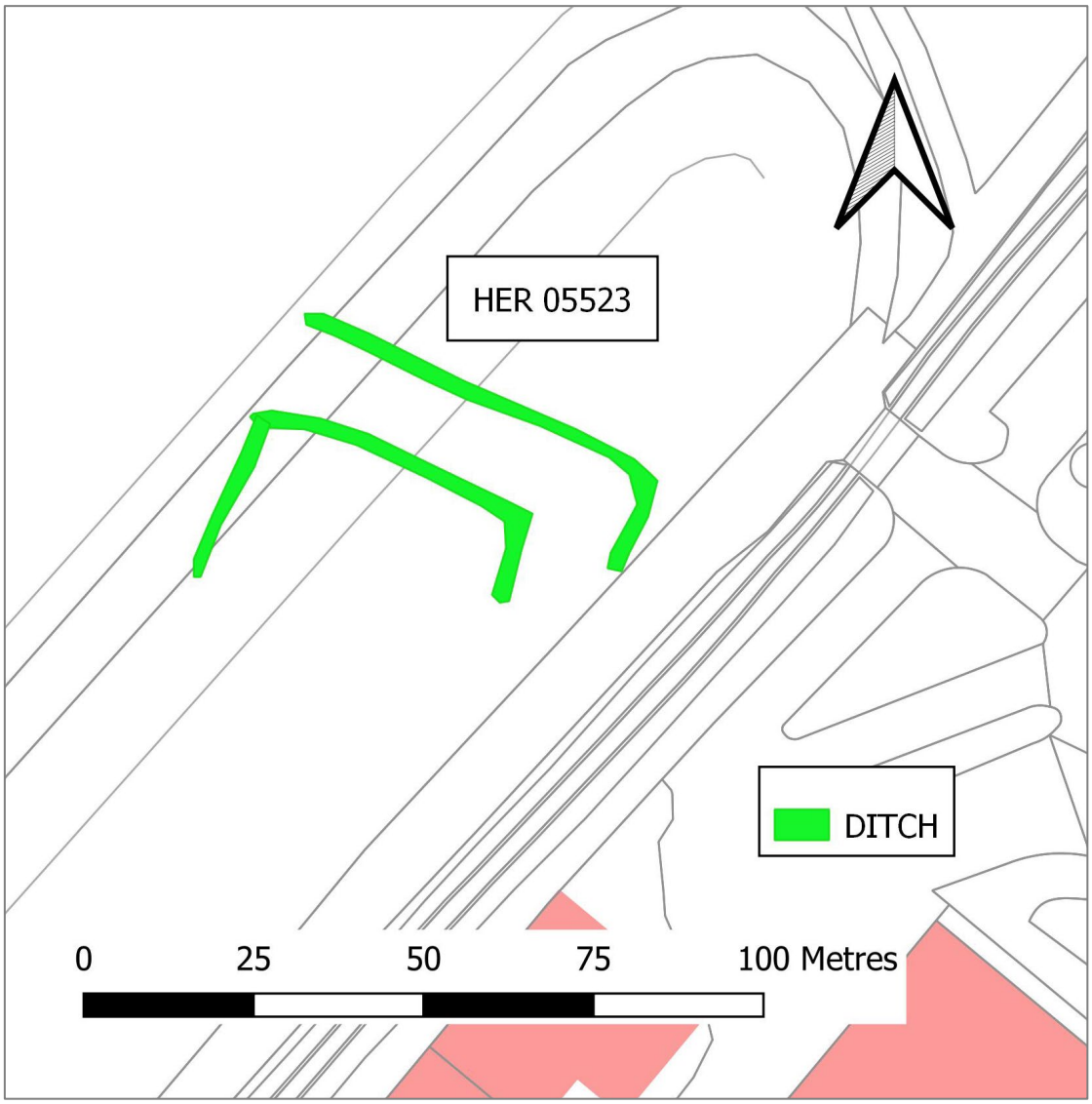

Figure 40. Partial remains of a Romano-British temple at Top Moor. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Linear multiple-ditch systems

Multiple linear ditches alignments have been recorded in adjacent south Cambridgeshire (Knight *et al.* 2018), as well as in neighbouring counties of Bedfordshire (Adams and Crowther 2021), Northamptonshire (Deegan & Foard 2007) and Lincolnshire (Boutwood, in Bewley 1998). Boutwood (1998) sets out the complexity and variation seen in these monuments across the east of the country: ditches number from single to quadruple and lengths vary between metres and kilometres.

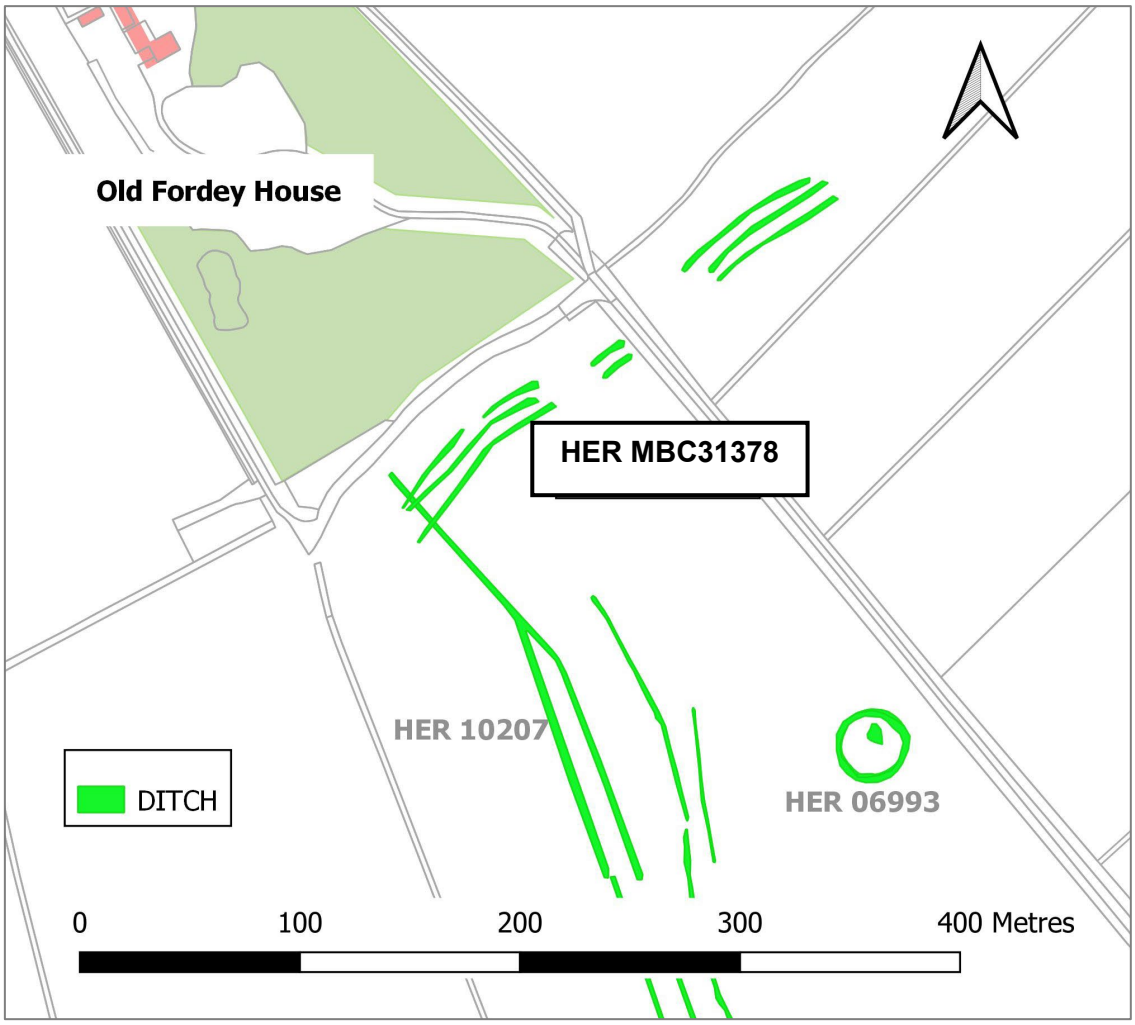

Figure 41. Parallel linear boundary ditches (HER MCB31378) at Old Fordey Farm, Padney. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Near Old Fordey Farm near Barway, about 700 m southeast of the Roman settlement (HER 07045/NRHE 375090), three parallel linear ditches (HER MCB31378) are perpendicular to and bisected by the access road but align with a trackway and watercourse. These multiple boundaries were likely not 'defensive'. Earthworks such as shown in Fig 41 on their own do not present an effective barrier. They may, however, have acted as a boundary in the control of movement of people and livestock (Willis, in Cooper 2006). Dating has been problematic, but lifespans vary and can be multi-period, during which time re-cutting may take place and ditches may be added (Boutwood 1998). These features appear to extend from the Late Bronze Age and through the Iron Age (Willis, in Cooper 2006). Burleigh (2018) suggests that similar multiple ditches occurring in south Cambridgeshire are of Iron Age date. Pickering (1978) suggested that multiple-ditch systems were perhaps associated with the Icknield Way, an ancient route from Norfolk to Wiltshire, as examples of these ditch systems are located either perpendicular to or parallel with it. Known as the Mile Ditches, three parallel Iron Age ditches run from

Therfield Heath in Hertfordshire to Bassingbourn Springs in Cambridgeshire, a distance of about three kilometres and lying across the Icknield Belt (Burleigh 2018). In the Chilterns, similar multiple ditches are situated perpendicular to the Icknield Way (Bryant, in Glazebrook 1997).

However, the established paradigm of this routeway being one of England's most important prehistoric trackways has been questioned and reinterpreted as more of a broad zone or belt of communication comprising a number of parallel trackways used for local movement, rather than a single continuous route. Harrison (2003, 18) contends that the lack of cartographic and other evidence for the eastern part of the Icknield Way, including its course in Cambridgeshire, indicates it is either medieval in date or entirely mythical.

Southwest of Overbrook Farm at Landbeach (HER 08834 & 08835/NRHE 1077773) are the cropmark remains of a probable Iron Age and/or Romano-British settlement, with a D-shaped double-ditched enclosure, oval enclosure, ring ditch, field system and trackways (Fig 42). Within these cropmarks are four parallel linear ditches aligned southwest-northeast that extend over 215 m. The multiple-ditch systems remain somewhat enigmatic features.

Figure 42. Parallel linear ditches at Landbeach. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Lazy beds

The project recorded a number of earthwork sites that appear to represent 'lazy beds', a series of short, linear, parallel ditches that end next to a perpendicular boundary ditch at one or both ends, such as those recorded at Mitchell Hill Farm (Fig 43). Lazy beds have been interpreted as a system for the cultivation of crops based upon parallel soil ridges created from spade-dug ditches, used where soils were heavy or in locations where space was limited. From previous excavations in Northamptonshire of similar Roman dated features, it has also been suggested that lazy beds may also have been reserved for more specialised cultivation, such as viniculture or for asparagus. Lazy beds have also been recorded within Cambridgeshire but outside the project area at St Neots, Fen Drayton and Caldecote. From the archaeological investigations at these sites, the lazy bed features have been dated to the late Iron Age/Early Roman periods (*ibid.*, 13). Other morphologically similar lazy beds were excavated at Milton, with closely spaced, regular, parallel ditches and a perpendicular bounding ditch, that were associated with pottery finds of the mid to late Iron Age periods (Green 1978; Connor 1999, 13).

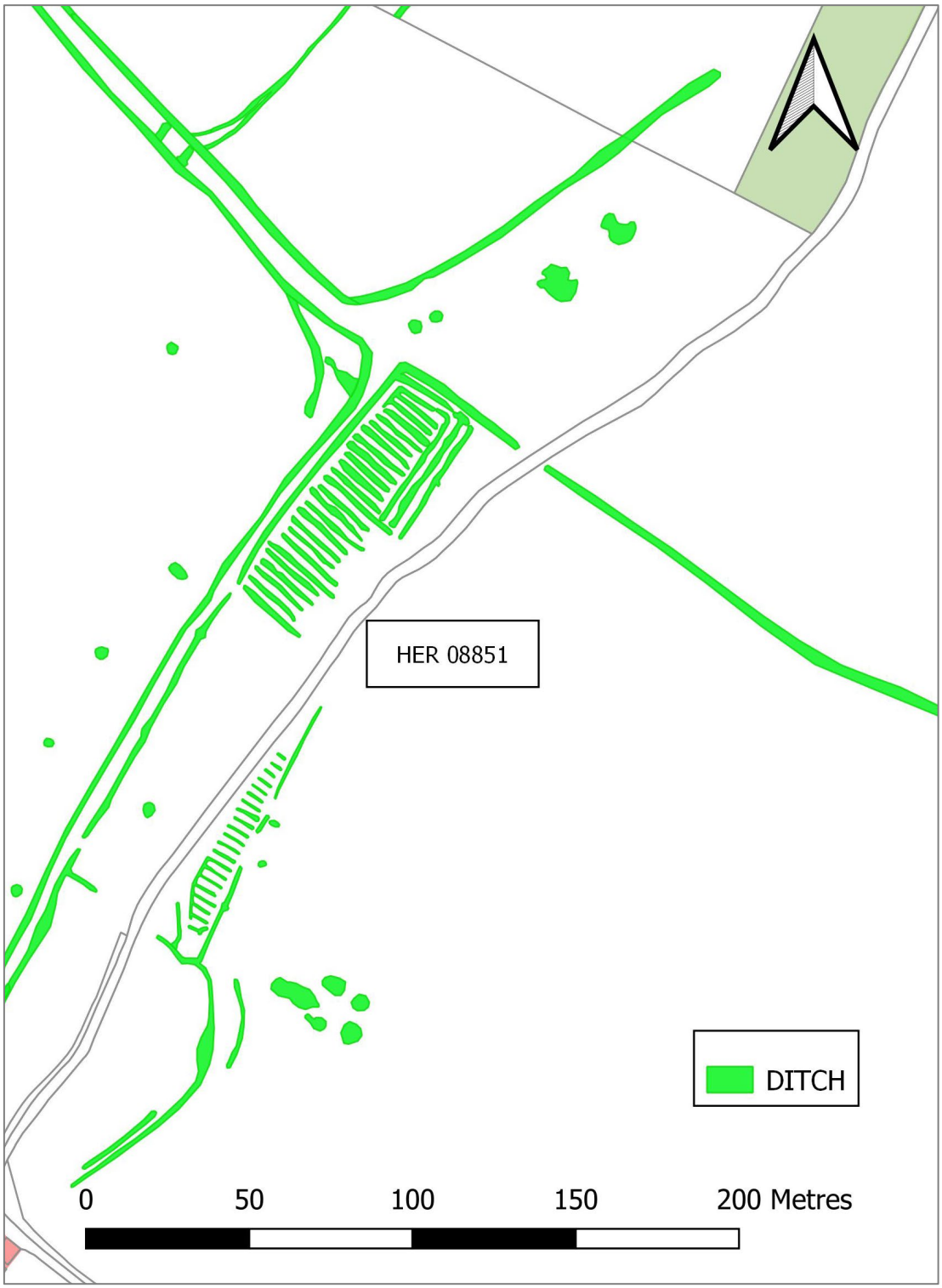

Figure 43. Romano-British lazy beds at Mitchell Hill Farm. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

At High Fen Farm, Padney, a discrete group of 14 short linear parallel ditches about 1.5 m apart and terminating just short of a perpendicular bounding ditch fill an

irregularly shaped area (HER 06985/HER 11178) (Fig 44). At Denny Lodge are two sets of seven parallel ditches bounded by a perpendicular ditch at both ends (HER MCB30131). On Bullocks Haste Common and adjacent Car Dyke is a large Iron Age/Romano-British settlement which has three separate spreads of lazy beds, one on the southwest side of the dyke and two on the northeast side (HER 05495). They all appear to share similar characteristics as those interpreted elsewhere in Cambridgeshire as lazy beds.

Figure 44. Romano-British lazy beds mapped at (clockwise from top left) Denny Lodge, High Fen Farm, and Bullocks Haste Common. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Newly mapped and recorded by the project are a series of linear parallel ditches between Bottisham and Swaffham Bulbeck extending over 400 m and several fields,

whose date and function is unknown at this time (HER MCB30809)(Fig 45). However, there are several Roman settlements (MCB30912/ MCB30907) and ceremonial sites in close proximity, including villas at Great Wilbraham (HER 06279/NRHE 1095800), Reach (HER 06089/NRHE 374665) and Allington Hill (HER 06834/NRHE 374383).

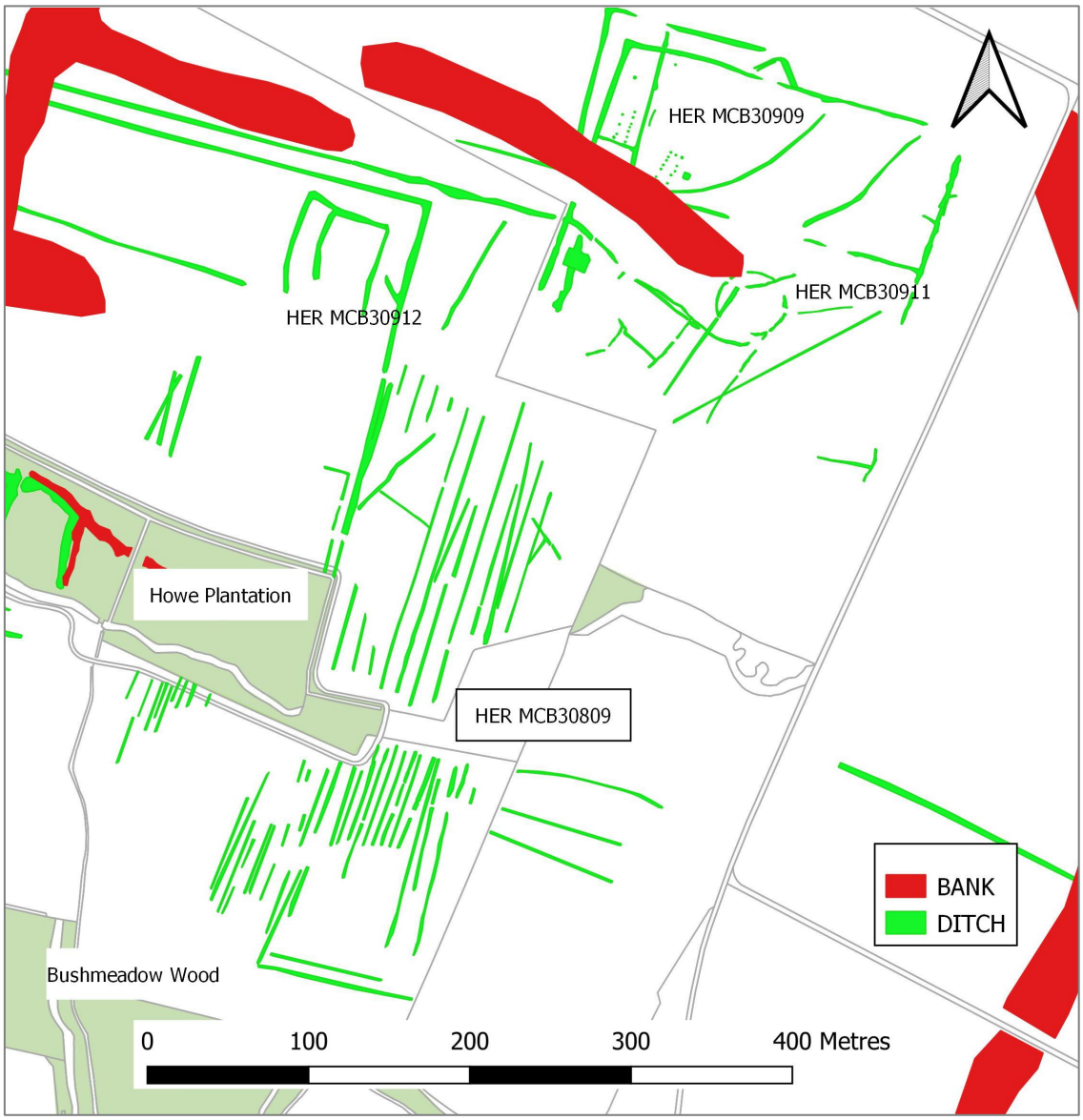

Figure 45. Parallel linear ditches adjacent a Roman settlement at Swaffham Bulbeck. Archaeological mapping Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

At Caldecote in Cambridgeshire (Kenney 2001), Barkway in Hertfordshire (Fletcher 2009) and Wollaston in Northamptonshire (Meadows 1997; Brown *et al.* 2001), evidence for Roman viniculture has been identified through excavation and palynology. The linear parallel ditches at Swaffham are also set out in a similar

arrangement with those sites: on south-facing sloping ground with the ditches running downhill and spaced between 3 and 8 m apart, close to the well-used Roman roads of Worstead Street (aka Via Devana) and Akeman Street, as well as significant occupation and industrial Roman activity. It is speculative that the Swaffham Bulbeck features possibly represent a vineyard.

Canals and Lodes

Lodes are a series of linear man-made navigable waterways that are believed to have their origins in the Roman period. The lodes (meaning way or course from the Old English word 'lād' (Wiktionary 2021)) extend eastwards from the main rivers into the fens to connect fen-edge settlements. Connecting to the River Cam are seven lodes: from southwest to northeast, Bottisham, Swaffham Bulbeck, Reach, Burwell, Wicken and Monk's Lode. The River Great Ouse enters the project area from the west, from where Cottenham Lode extends southwest. The Cam then joins the River Great Ouse at Stretham, where there is the final Soham Lode. These lodes (shown in Fig 24) have not been mapped by the project as they remain extant.

Within the project area is the southern section of Car Dyke, a line of earthworks and cropmarks of a canal of Roman origins that extends from the River Cam Waterbeach to the River Witham near Lincoln, some 120 km to the northwest. Car Dyke has been variously interpreted as a military logistical supply route linking with the northern lands, or a catchwater as part of draining the fens to create an Imperial estate, or to facilitate the salt-making industry (Macaulay and Reynolds 1994, 3). Excavation of the canal revealed the channel to be wide and shallow, having gently sloping side and a wide central slot, suggesting the profile of a canal. This is in contrast with the profile of the northern part of the dyke outside the project area, which appear more drain-like (Macaulay and Reynolds 1994, 15).

The length of Car Dyke (HER 05405) that falls within the project area runs from the Cam at Waterbeach to Cottenham where it then joins the 'Old West River', as the lower reaches of River Great Ouse are also known (Macaulay and Reynolds 1994, 4). The canal crosses through the parishes of Waterbeach, Landbeach and Cottenham, covering a total length of approximately 7.8 km and is between 7 m and 15 m wide along most of the length, but up to 42 m at its widest at the southern end.

There are four areas in the project area where the canal is still visible. At the south-most end, closest to the River Cam, the earthworks are just over 1 km in length and bisected by the railway. This area of the monument is scheduled (NHLE 1006930) and is visible as an earthwork. It then continues south of the railway as an ephemeral earthwork on lidar. Approximately 400 m northwest of the scheduled area are three areas of linear, levelled earthworks on the line of the former canal, but they are very subtle and not clear enough to map. The canal continues as a drainage ditch that then becomes the route of the A10 road, where it serves as a roadside ditch. The ditch then rewidens and continues for 830 m as an earthwork ditch with a possible bank on the east side. Other features, such as trackways, appear to lead to the canal or are crossed by it. A large field system (HER 05360) is

bisected by the canal. There are also areas of settlement (HER numbers 05321, 05364, 05365, 05396, 05535, 06159, and 08841) that were visible as earthworks on historic aerial photographs and then in later dated aerial photography, seen as cropmarks. The northern-most section of the canal in the project area is approximately 1.5 km long and heads northwest towards the River Great Ouse. With these earthworks is associated a settlement site, field system and trackways (HER numbers 05330, 05495 and 08858), some of which remain as extant scheduled earthworks (NHLE 1006897) on Bullock's Haste Common (Fig 46).

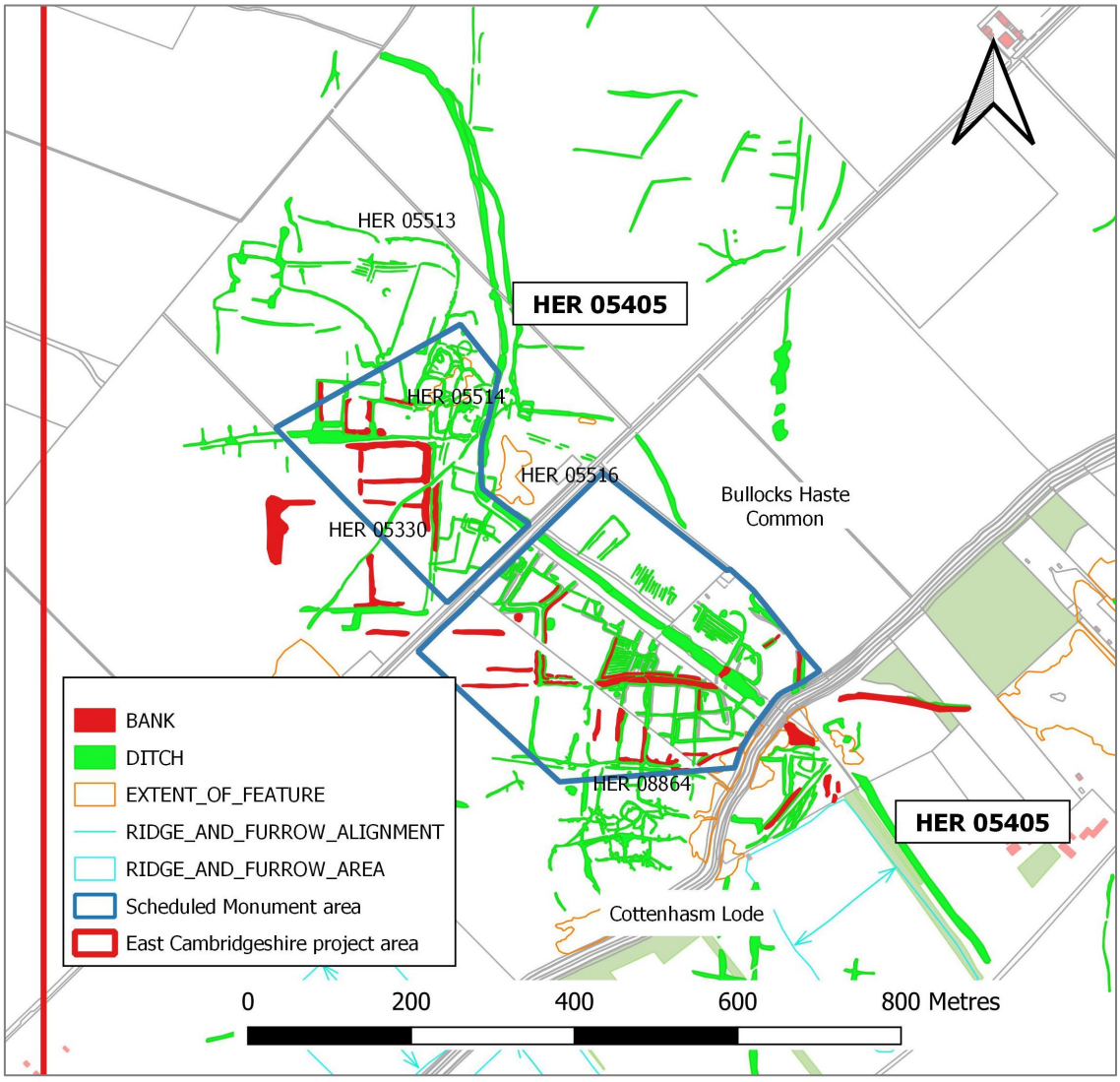

Figure 46. A section of Roman Car Dyke and associated settlements. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

This section of Car Dyke at Waterbeach (HER 05405) remains as earthworks over 1,500 m long and 20 m wide, dimensions compatible with water transport. Accurate construction dates and subsequent disuse through silting up or other reason are unclear, but a cross causeway at Cottenham appears to have blocked the

dyke around AD375, though the canal continued to be recut and reused through to the post-medieval period (Macaulay and Reynolds 1994, 4, 8). Excavations in the locality recorded large collections of pottery and kiln sites are recorded nearby. Identifying the life spans of these pottery sites might shed more light as to the function, date and fate of the dyke as a transport canal (Macaulay and Reynolds 1994, 15).

Early-medieval

The project mapped and recorded little evidence of early-medieval occupation activity, especially when set against the widespread settlement evidence of the Iron Age and Romano-British periods and the ubiquitous organised field systems and furlong boundaries of the medieval period. No new early-medieval settlement sites were identified. In the NAIS SW Cambridgeshire aerial investigation and mapping project area, bordering the project to the southwest, excavated evidence suggests that some of the typical Romano-British sites 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).

The Devil's Ditch or Dyke was probably constructed in a single episode during the early-medieval period as a defensive structure against Anglo-Saxon incursion. It comprises an earthwork ditch that in places is up to 4.5 m deep and 33 m wide, with a high bank on its eastern side that is up to 5 m high, forming a barrier between the marshlands of the fens and lands to the east. The whole earthwork feature is over 11 km in length and aligned northwest-southeast, with its northwest end at Reach village and its southeast end at Pickmore Wood, between Stretchworth and Ditton Green villages. Southwest of Newmarket town it cuts across the southwest to northeast aligned prehistoric routeway the Icknield Way. The dyke is aligned with Reach Lode, whose origins are Roman. Some sections that fall outside the project area have been listed. The project mapping records just over 4.4 km of the ditch and bank (HER 07801; NRHE 1043028) (Fig 47). Where the earthwork dyke is visible as a cropmark at the northwest end of Reach village, it has been levelled, probably during the medieval period to create Fair Green (Morgan 2014).

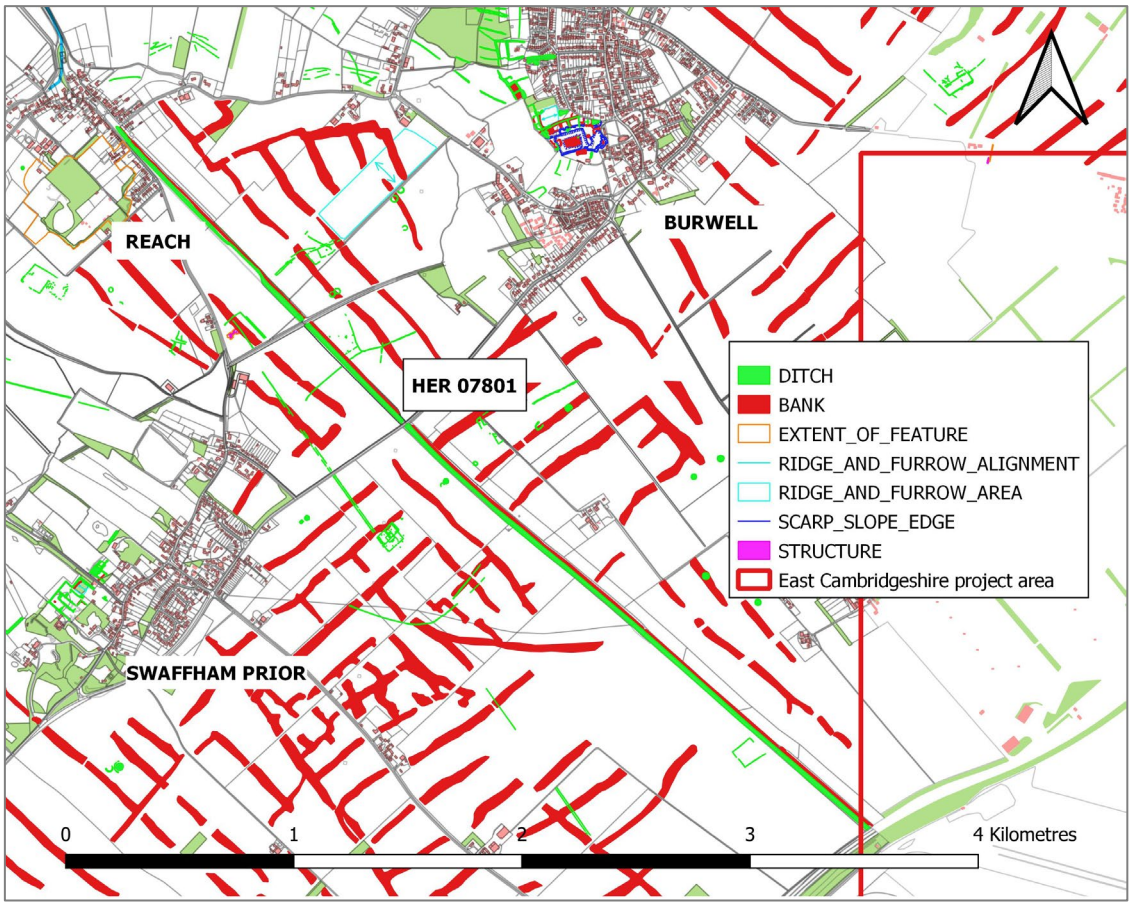

Figure 47. Devil's Ditch or Dyke, an early-medieval defensive boundary. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Fleam Dyke (HER 05294, NRHE 138700) comprises an earthwork bank and ditch. The bank is up to 8 m high in places and the monument extends 5 km from Balsham to Fulbourn, of which the northmost 1,600 m lies within the project area (Fig 48). The dyke is constructed across the prehistoric route of the Icknield Way. It has been suggested that the north extends further from Quy to join the River Cam at Fen Ditton, but the survey mapping did not record any such features. Early-20th-century excavations and finds date the dyke to the Anglo-Saxon period and it was interpreted as a 7th century AD East Anglian defence against the kingdom of Mercia. Late-20th-century excavations revealed that unlike the other dykes named, Fleam Dyke has been constructed in a number of phases, probably initiated in the 4th century AD and completed by the 7th century AD. The complex phased construction possibly reflects the conquest and reconquest of the dyke during times of conflict, necessitating construction, reconstruction, reinforcement and refortification. Had there been an earlier prehistoric boundary on the same alignment, the construction of Fleam Dyke had probably destroyed any evidence of it (Malim *et al.* 1997).

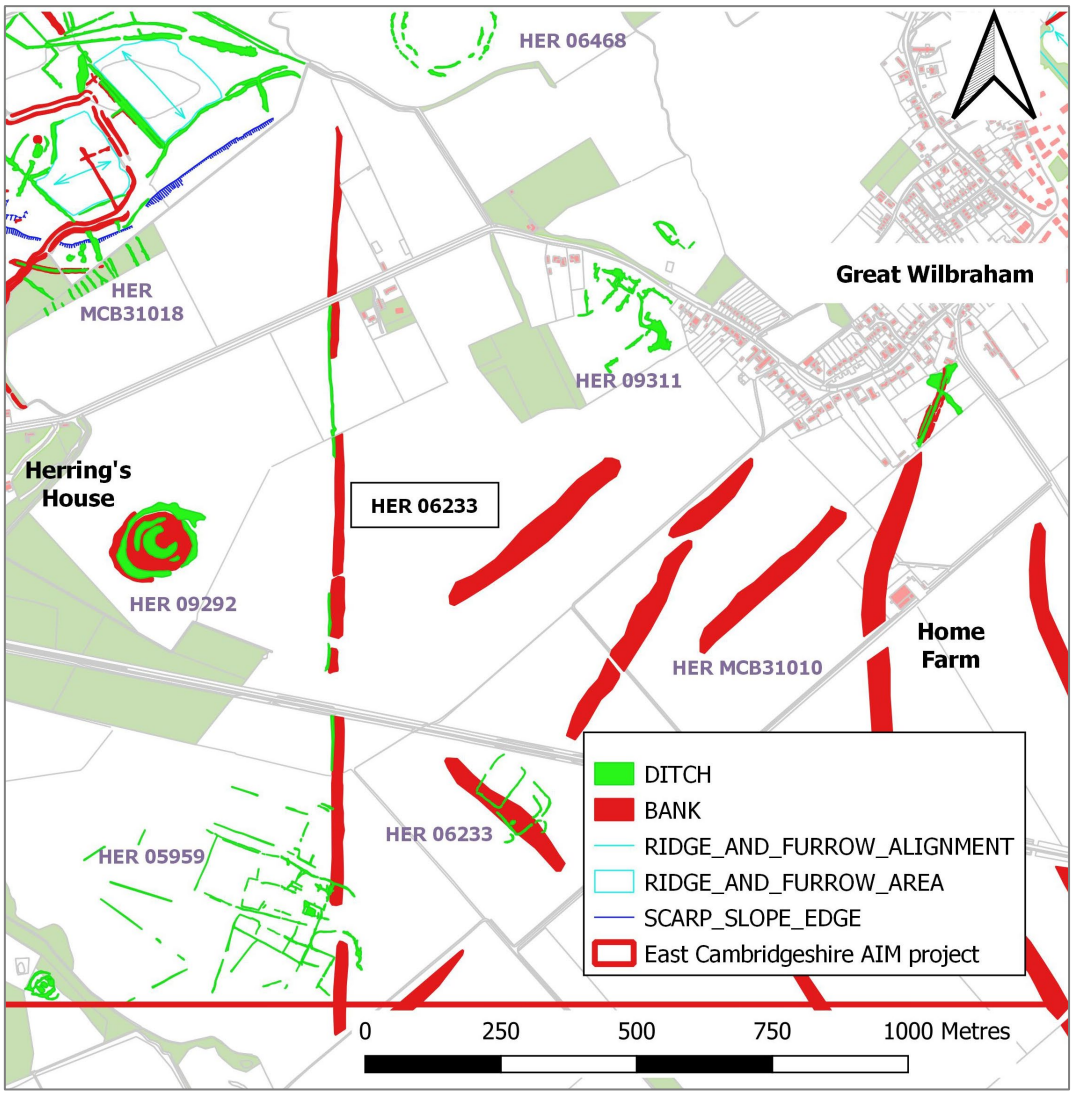

Figure 48. Fleam Dyke, an early-medieval defensive boundary. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Fleam Dyke passes right beside a Bronze Age barrow on Mutlow Hill, about 1.5 km south of the project boundary, which was an important Anglo-Saxon meeting place. The north end of the dyke also passes 300 m to the east of the supposed Neolithic henge (HER 09292/NRHE 1084756/NHLE 1011716) at Herring's House, Fulbourn, and any further extension of the dyke to the north would then also pass 150 m west of a Neolithic causewayed enclosure at Great Wilbraham (HER 06468/NRHE 374466/NHLE 1009103) where it meets the river. This association of the dyke with prehistoric ritual sites may have been a deliberate act by its constructors to add significance to the earthwork (Malim *et al.* 1997).

Medieval

Medieval activity was recorded within the project area, but with a notable dearth of mapped features within the central fenlands (Fig 49). Many medieval features are located in close proximity with existing villages and are visible as earthworks on historic aerial photographs taken in the 1940s and 1950s, but which have since been plough-levelled or covered by post-war residential expansion or commercial development. Medieval evidence includes mill mounds and embanked flood defences, as well as the remains of medieval agricultural regimes.

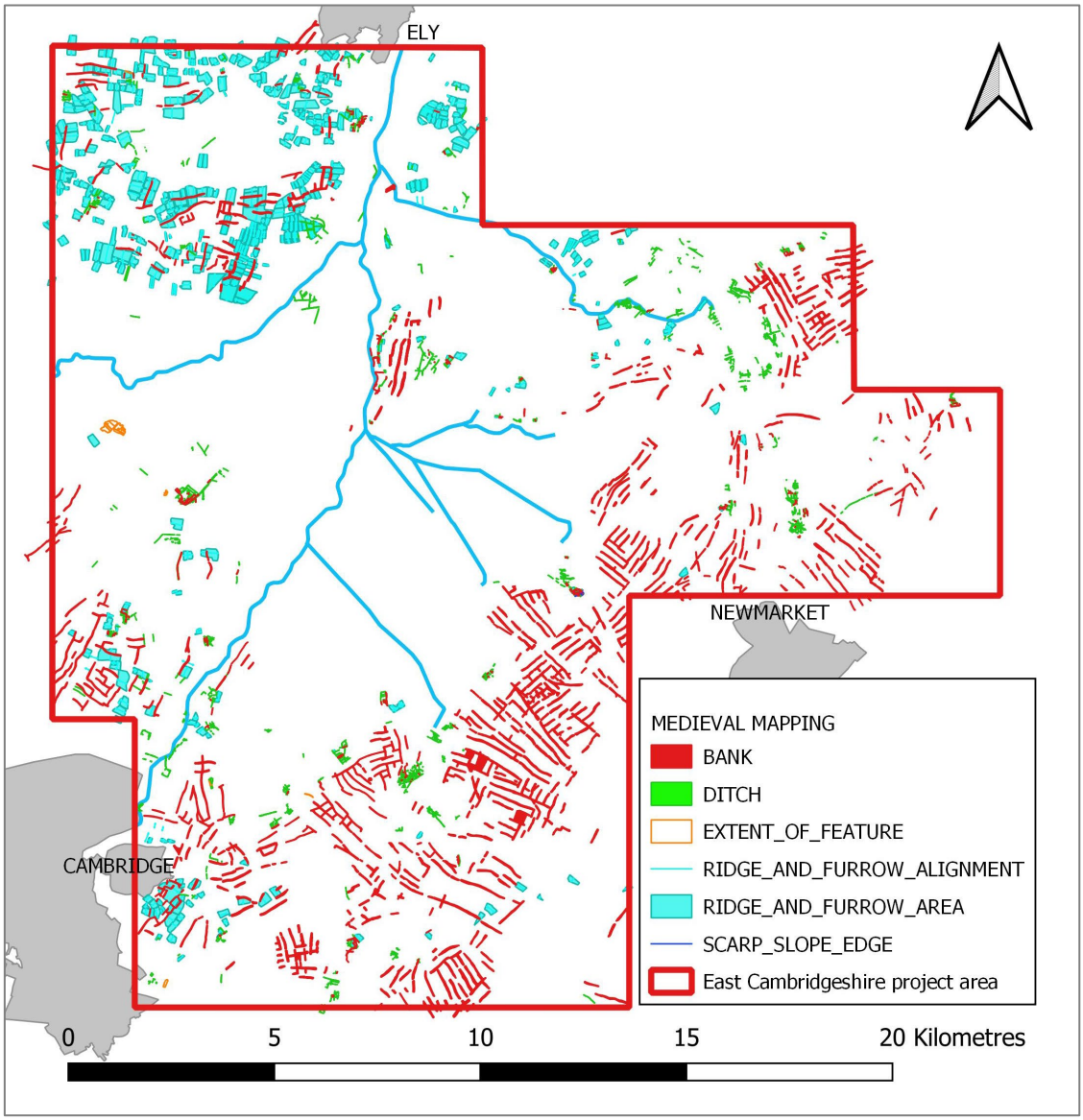

Figure 49. The distribution of medieval dated features within the project area. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Settlement evidence includes the motte castle at Burwell, ecclesiastical site, and moats of varying sizes and status. Evidence of village abandonment or shrinkage, inlcuding hollow ways, trackways, platforms and ditched enclosures of former crofts, tofts and closes was also recorded.

Settlement Sites

Settlement sites recorded represent the breadth of medieval society, from castle to village cottage enclosure. The 12th century motte castle earthworks at Burwell (HER 01775; NRHE 374655; NHLE 1015596) are said to be sited on the remains of a Roman villa (Fig 50). It was constructed on the orders of King Stephen during the Anarchy period in order to control Geoffrey de Mandeville, who then subsequently died before castle construction had been completed (Oxford Archaeology (East) 2015e). The project mapping not only records the castle earthworks, but a series of adjoining ditched enclosures, boundary banks and platforms that extend northwest and provides a more holistic landscape context for the motte.

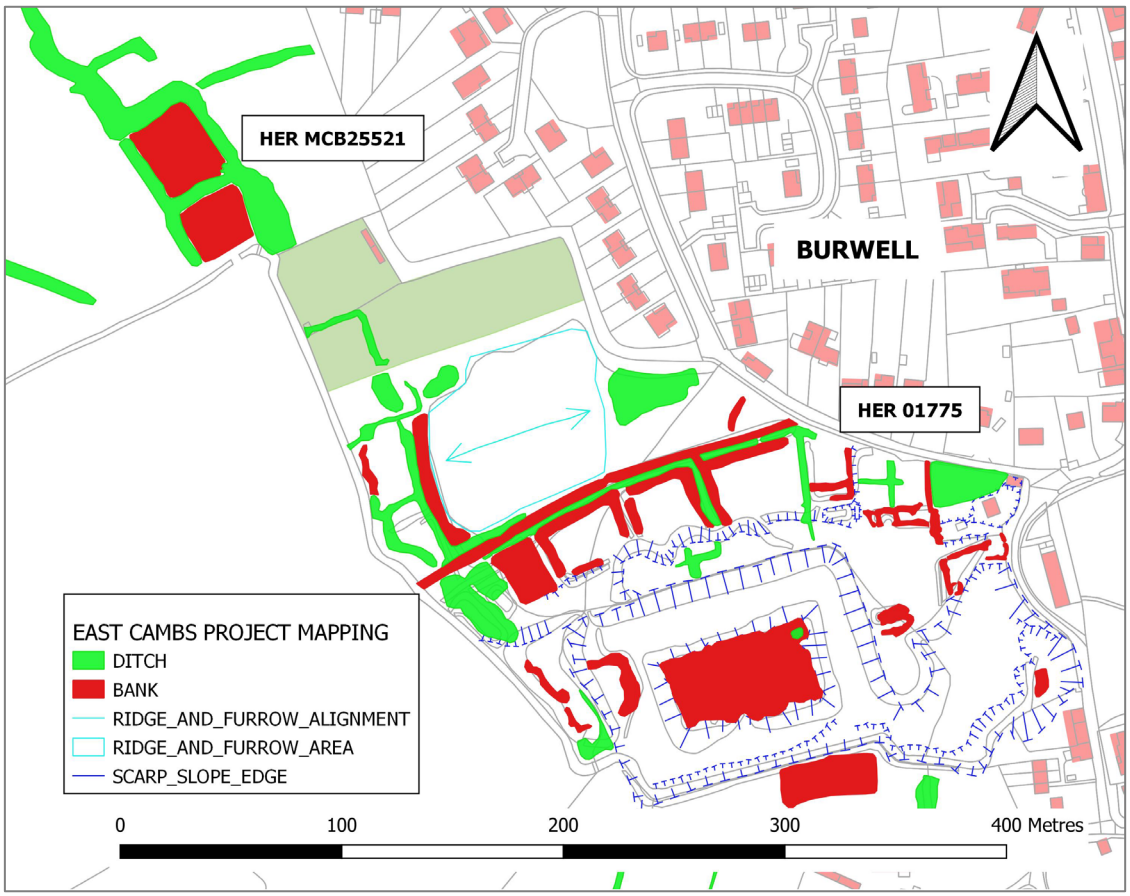

Figure 50. The 12th century motte castle at Burwell. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Earthworks are also recorded at the ecclesiastical sites of Anglesey Abbey at Stow cum Quy, Denny Abbey at Waterbeach, Spinney Abbey (Priory) at Wicken, Fordham Abbey and Biggin Abbey at Fen Ditton.

The East Anglia region has the highest number of moated sites in England (Wade 1997, 47). In the grounds of Bottisham Hall, adjacent to the Second World War Royal Air Force Quy camp (MCB27715), lidar has revealed an extensive complex of ditches, banks and platforms that are the earthwork remains of a homestead moat and deserted settlement (HER 01124; NRHE 375011), probably called Angerhale from which nearby Anglesey Abbey is named (Wareham and Wright 2002c) (Fig 51).

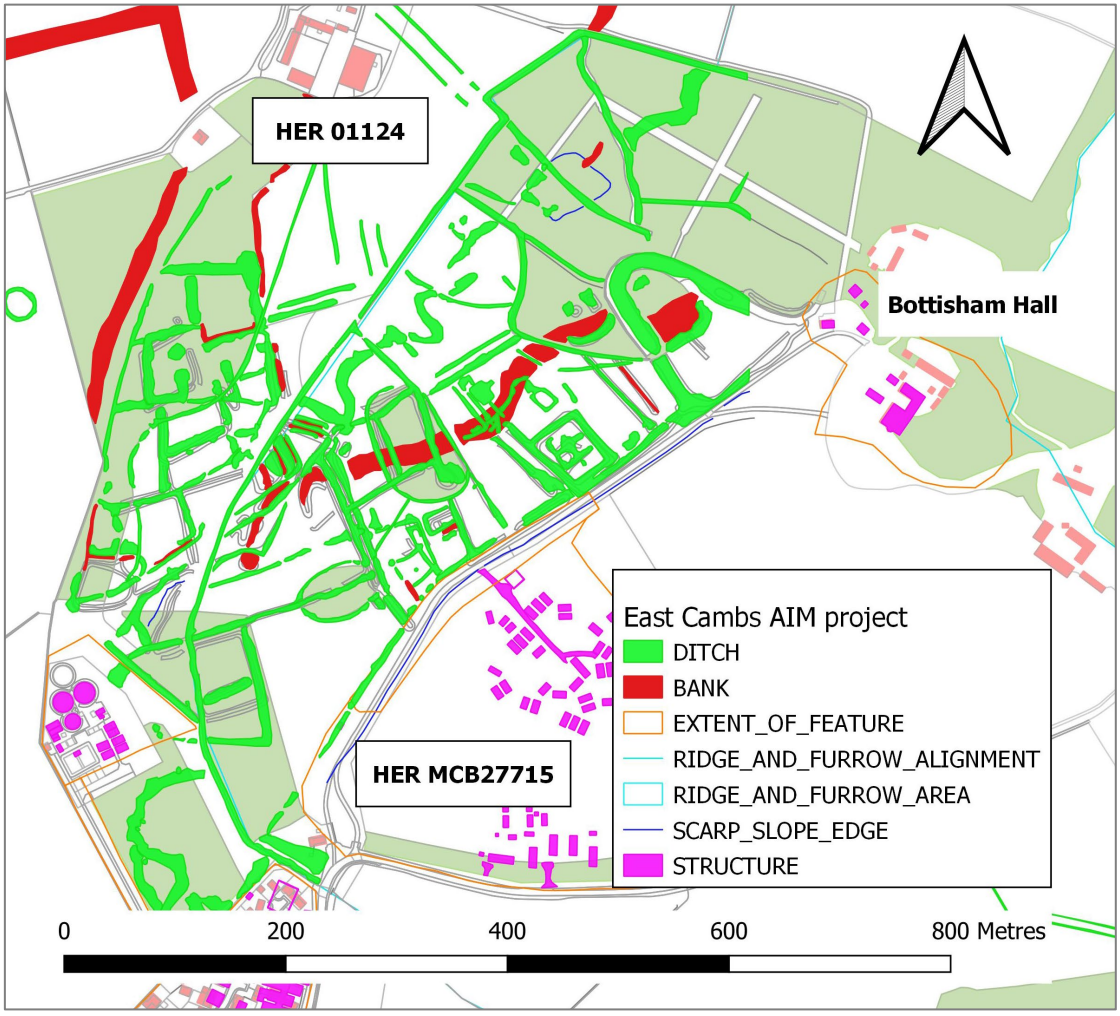

Figure 51. The medieval moat and deserted settlement at Bottisham Hall. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Agriculture – Field systems and ridge and furrow

Interpreting medieval and/or post-medieval agricultural landscapes and land-use where the distribution pattern of ridge and furrow is not well known or documented may be problematic based on the mapping of ridge and furrow alone. Aerial mapping of ridge and furrow earthworks generally necessitates two events: firstly, a field must have been ploughed into ridges: then usually that land must have been put to pasture and remained as such until aerial photography recorded it (Liddiard 1999). Mapping ridge and furrow earthworks in the project area often derives from mid-20th-century RAF vertical aerial photographs, where these features are visible as upstanding earthworks, but in many places are subsequently plough-levelled by post-war agricultural practices.

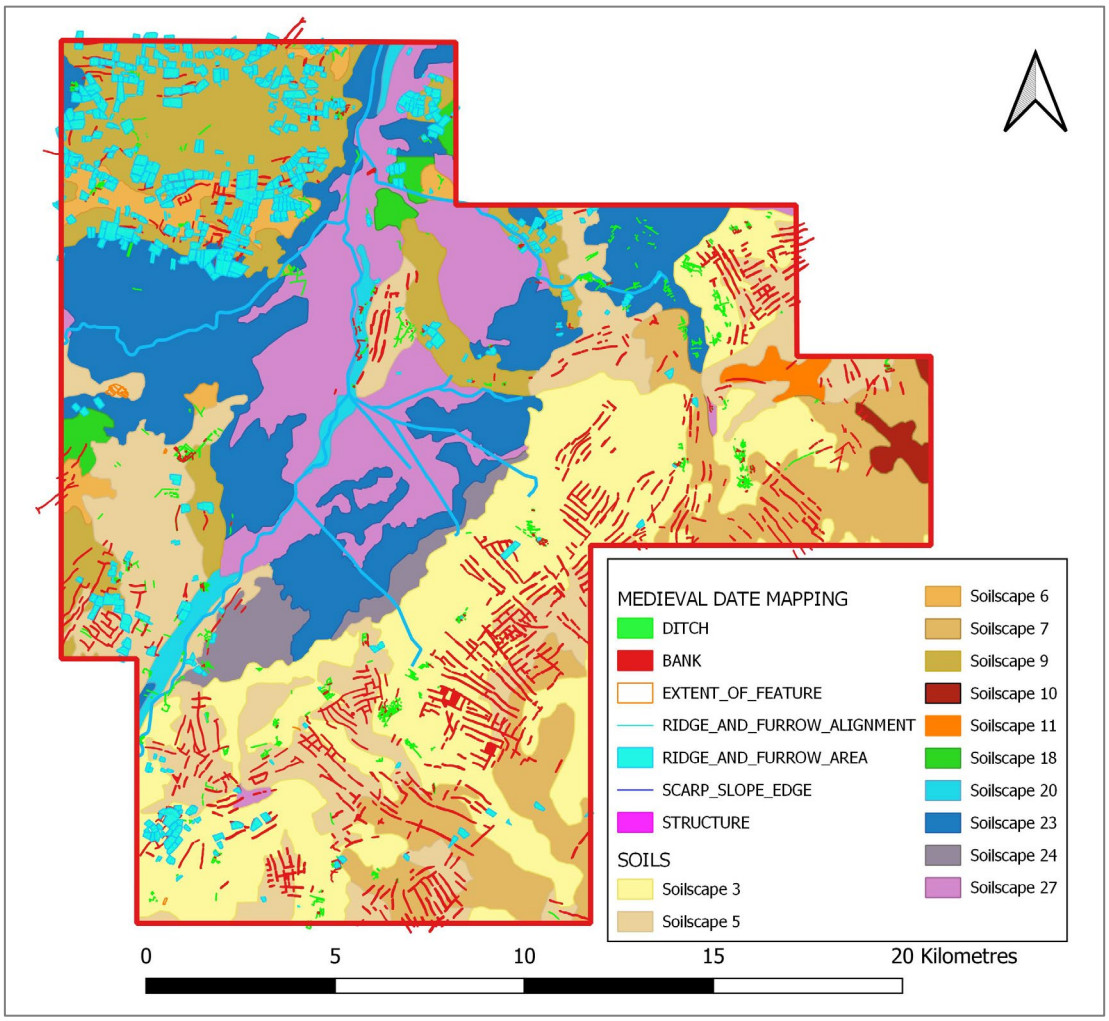

Figure 52. The distribution of medieval and/or post-medieval ridge and furrow cultivation (pale blue) against soil types. Archaeological mapping © Historic England. Contains, or is derived from, information supplied by Soils data © Cranfield University (NSRI) and for the Controller of HMSO [2021]. Base map derived from © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

As shown in Fig 52, earthwork and cropmark remains of former medieval and/or post-medieval ridge and furrow cultivation visually dominate the north of the mapped medieval landscape. These are concentrated on the claylands, notably on lime-rich loamy and clayey soils with impeded drainage (Soilscape type 9). Extending down to Soham, the extensive ridge and furrow cultivation blocks have a general north-south alignment trend of the ridging. These features appear to be representative of a classic two, three or four field Midland system, believed to have rapidly evolved from open fields beginning between the 7th and 8th centuries and becoming widespread through England by the start of the 14th century (Bailey 2010). The medieval farmer who cultivated heavy soils in the open field system had no real practical alternative to ridge and furrow to drain their land, unless they ploughed deep furrows down both sides of a strip, which was inefficient (Liddiard 1999).

By contrast, there is little evidence of ridge and furrow cultivation blocks on the chalklands to the south and east of the fens, which is instead dominated by an extensive system of linear earthwork boundary banks, identified as a 'furlong boundary' in project mapping, which Taylor (2000) refers to as 'balks'. Fig 52 illustrates the association of the boundary banks with the intrusions of free-draining, slightly acid, but base-rich soils (Soilscape type 7) and free-draining lime-rich loamy soils (Soilscape type 5), also overlapping onto the more widespread shallow lime-rich soils over chalk (Soilscape type No. 3).

This network of long, parallel, regularly spaced, linear earthwork banks can extend for kilometres on either a southwest-northeast alignment, or aligned perpendicular to that, southeast-northwest. Many blocks of ridge and furrow mapped by the project to the east of the River Cam are located in small enclosures around villages such as Burwell, Fulbourn and the Wilbrahams. Only in the northwest corner of the project area, north of the River Great Ouse, are contiguous ridge and furrow blocks clustered between Haddenham, Wilburton, Stretham, Little Thetford and Witchford, encircling Grunty Fen. The widespread absence of ridging in east Cambridgeshire was noted in late 18th century agricultural literature, attributing this to the combination of well-draining soils, cross-ploughing and the practice of underdraining (Liddiard 1999).

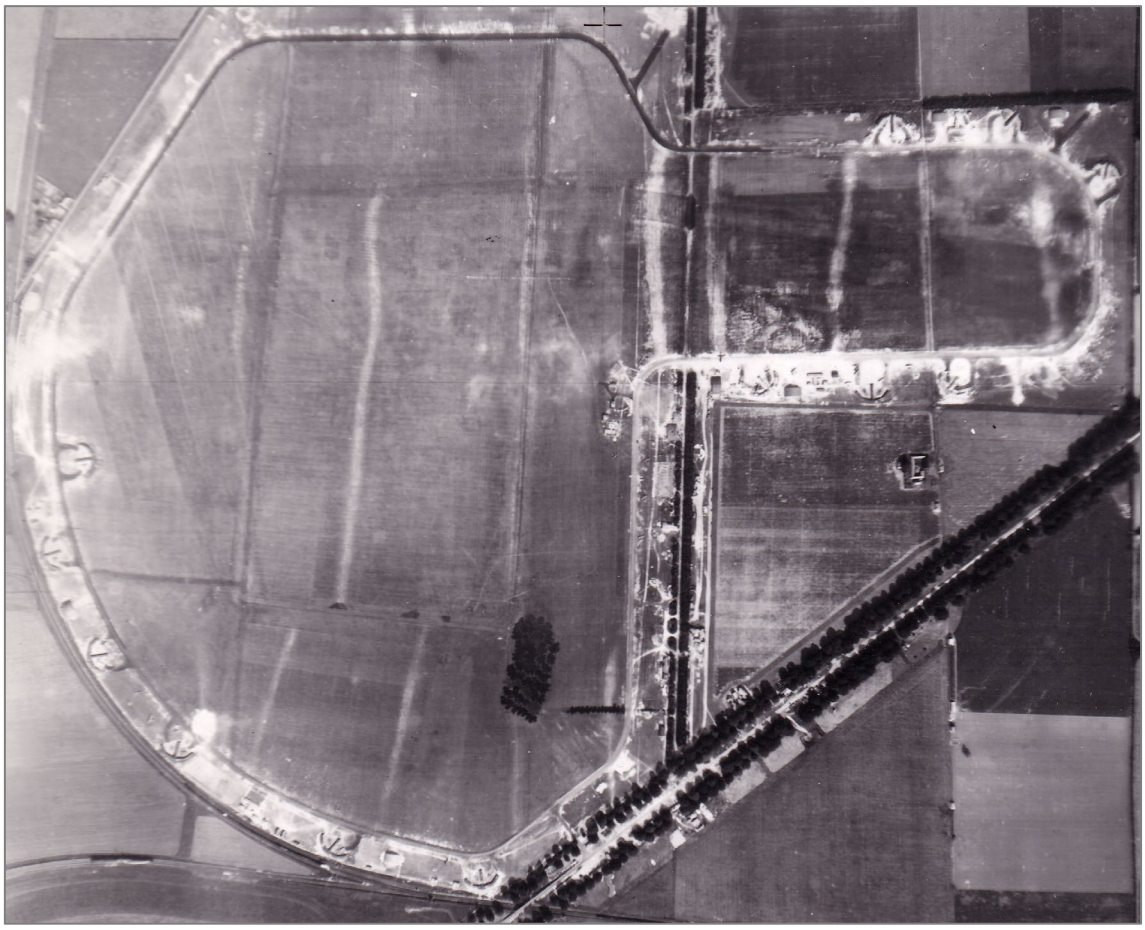

Figure 53. Soilmarks of medieval linear furlong boundaries on RAF Snailwell. RAF/FNO/67 V 6032 26-JUL-1942 Historic England RAF Photography.

Visible almost exclusively on lidar or on height data-derived terrain models, with a few examples mapped from historic aerial photographs, these linear boundary banks are generally considered to date from the medieval period onwards. On lidar images, these low earthwork banks vary in width up to 60 m, but many appear to average at around 25 to 30 m wide. Where these banks are occasionally visible as pale soilmarks on 1940s dated RAF vertical aerial photographs, such as on the wartime airfield at RAF Snailwell (Fig 53), they are about 15-20 m wide, the difference probably representing post-war plough-spreading of the bank material.

However, it is likely that some banks survive as remnants from an earlier agricultural landscape, as suggested by Oosthuizen (2003, 2005 and 2006). Oosthuizen (*ibid.*) describes the low ridges of the medieval furlong boundary and headland system of the Bourn Valley in nearby west Cambridgeshire and considers that it was probably laid out between the Roman and Late Saxon periods. She asserts that the length and width of these earthwork-banked furlong boundaries, many of which are named as 'commons' on pre-inclosure maps, likely functioned to provide a supplemental source of nutrients for livestock in an intensively cultivated arable field system. This pattern of land division appears to extend across a wider regional area, with equally extensive boundary systems recorded by the adjacent

NAIS SW Cambridgeshire AI&M project (Knight *et al.* 2019) and the Bedford Borough National Mapping Programme project (Adams and Crowther 2021) further to the west.

Why this boundary system does not extend to the north of the project area is unclear from the available mapping. Perhaps the medieval ploughmen that created the ridge and furrow earthworks on those heavier soils where more extensive drainage was required eradicated any evidence of an earlier boundary system; whereas, on the more free-draining chalk soils to the southeast, it is possible that there was far less requirement for ridge and furrow on the open fields and so pre-existing linear boundaries remained extant (Liddiard 1999). It is possible that the extent of medieval ridge and furrow in east Cambridgeshire was far more widespread than has been recorded by the aerial survey and had been almost entirely eradicated by the practices of post-medieval arable cultivation.

The new agriculturalists of the Industrial Revolution era regarded the method of ridging as a retrograde practice that had no place in the new industrialisation of agriculture. A ploughing practice known as stitching became commonplace in East Anglia, where annual cross-ploughing would rapidly leave little or no trace of ridge and furrow earthworks and then retain a flat surface. Also, underdraining became widely employed from around the mid-18th century, burying below agricultural land a drain that had openings, through which water entered when the water table reached the level of the drain. Where blocks of ridge and furrow have survived, it is likely by chance (*ibid.*).

Post-medieval

Features mapped within the project area that date to the post-medieval period include earthworks associated with parkland and gardens, flood defence banks and drainage ditches, some post-inclosure ridge and furrow cultivation blocks and probable steam ploughed rig, pre-inclosure field system boundaries with droveways, often disrupted by the construction of the railways; and also agricultural structures such as windmills, either as wind pumps or mills for processing corn or sometimes phosphate nodules.

Mill sites and mounds

The remains of the post-medieval smock mill were recorded at Swaffham Bulbeck (HER MCB26787). One of an adjacent pair from three extant mills in the village in the early 19th century, they are recorded as being worked by up to 5 millers employed by one Thomas Livermore between 1850 and 1865. One mill was subsequently demolished at the end of the 19th century, leaving the remaining smock mill to continue working until it was sold in 1904. Known to still be standing in 1910, by the 1930s only the base remained (Wareham and Wright 2002b) (Fig 54).

Figure 54. The brick remains of the base of the smock mill at Swaffham Bulbeck taken in 1935. Reproduced with kind permission © Weald and Downland Open Air Museum.

The brick-built octagonal foundation base of the ruined mill building, which was 7 m in diameter, is still visible on vertical aerial photographs taken in 1946 (Fig 55). By 1968, the building remains had been demolished and the site only remained visible as a cropmark.

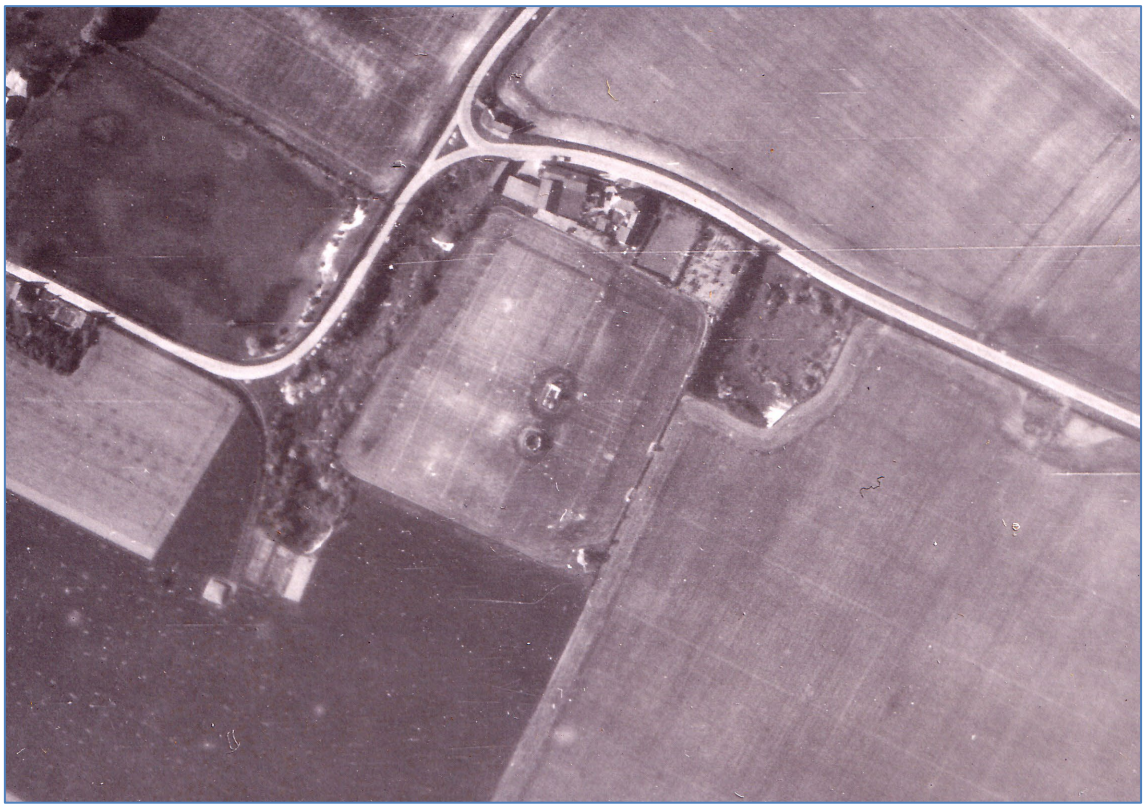

Figure 55. In the image centre, the octagonal base of the post-medieval smock mill at Swaffham Bulbeck in 1946. RAF/106G/UK/1490 RS 4308 09-MAY-1946 Historic England RAF Photography.

The Coprolite Industry

The most prominent post-medieval features recorded are the remains of the coprolite extraction industry which became more profitable than farming at its height. The extraction of phosphate nodules, or coprolites, as they were mis-identified, was a valuable part of the economy in the late 19th century until demand dropped after 1900 (Wareham and White 2002a). Its remains can be seen across the parishes of Fen Ditton, Horningsea, Stow cum Quy, Lode and across to Swaffham Bulbeck, covering approximately 490 hectares in total (Fig 56), shown as hatched orange areas that follow the mineral bearing geology.

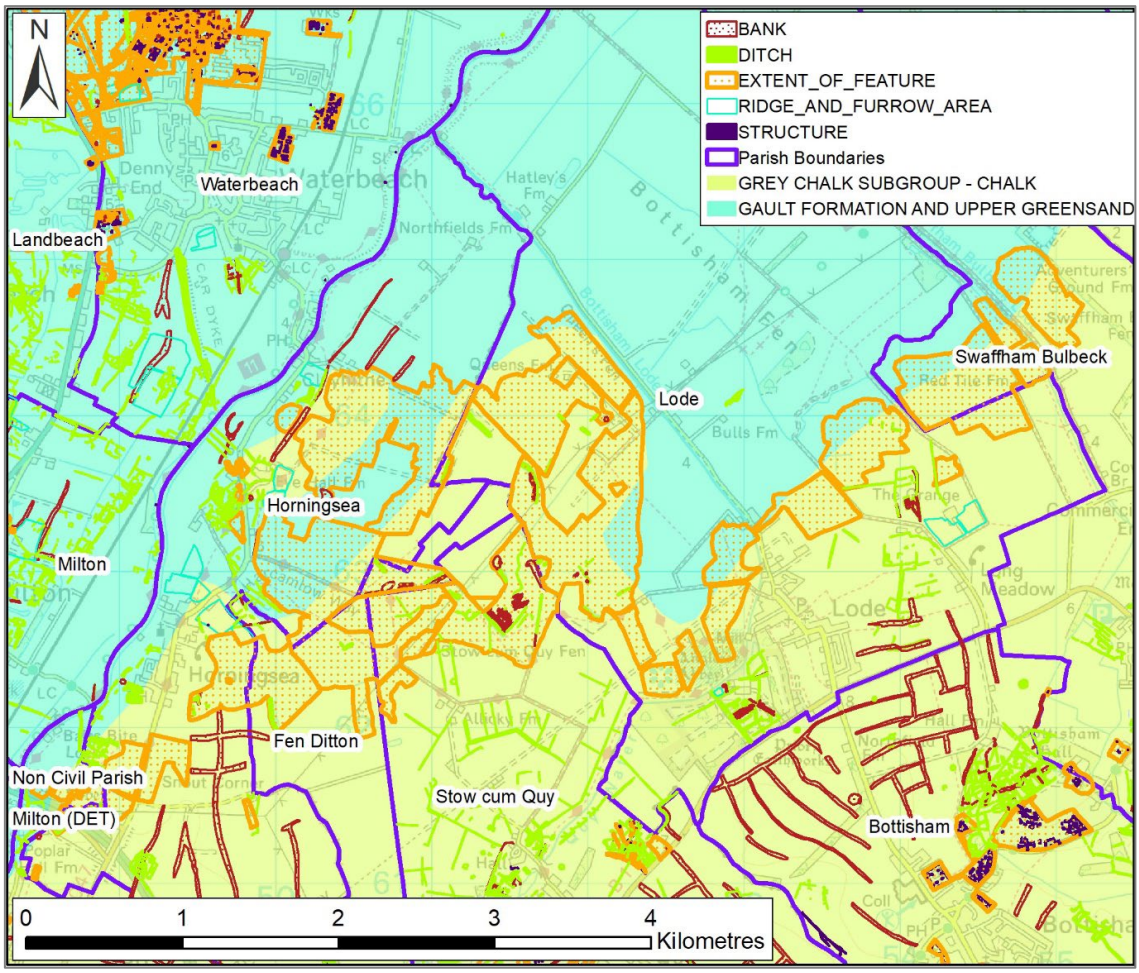

Figure 56. Distribution of coprolite workings mapped across the parishes of Fen Ditton, Horningsea, Stow cum Quy, Lode and Swaffham Bulbeck shown over bedrock geology. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains British Geological Survey materials © UKRI [2021] 1:625,000 Geological map

Coprolites are nodules of phosphate from former shelled creatures that were deposited on the base of the Chalk above the Gault Clay in a layer approximately 0.3 m thick about 6 m below the surface (Grove 1976). A sample of this material can be seen at Sedgwick Museum of Earth Sciences, Cambridge (Fig 57). These nodules were hand dug from the ground (Fig 58) and processed to make the first chemical fertilisers. They became unprofitable as cheaper sources of phosphates were imported from America, although extraction was briefly restarted during the First World War for the manufacture of munitions (Wareham and White 2002a; Grove 1976)

Figure 57. Coprolite nodules as they were extracted from the Cambridge Greensand in the 19th century. Photo taken in the Sedgewick Museum of Earth Sciences, Cambridge (09 July 2019) © Skylarkeology

The census returns for the villages in this area show how many people were working in this industry and how important it was for local landowners and farmers who could make a much better income than they could from farming, even on the valuable agricultural fenland. The soil was much improved after extraction because of the marling of surface layers (Grove 1976).

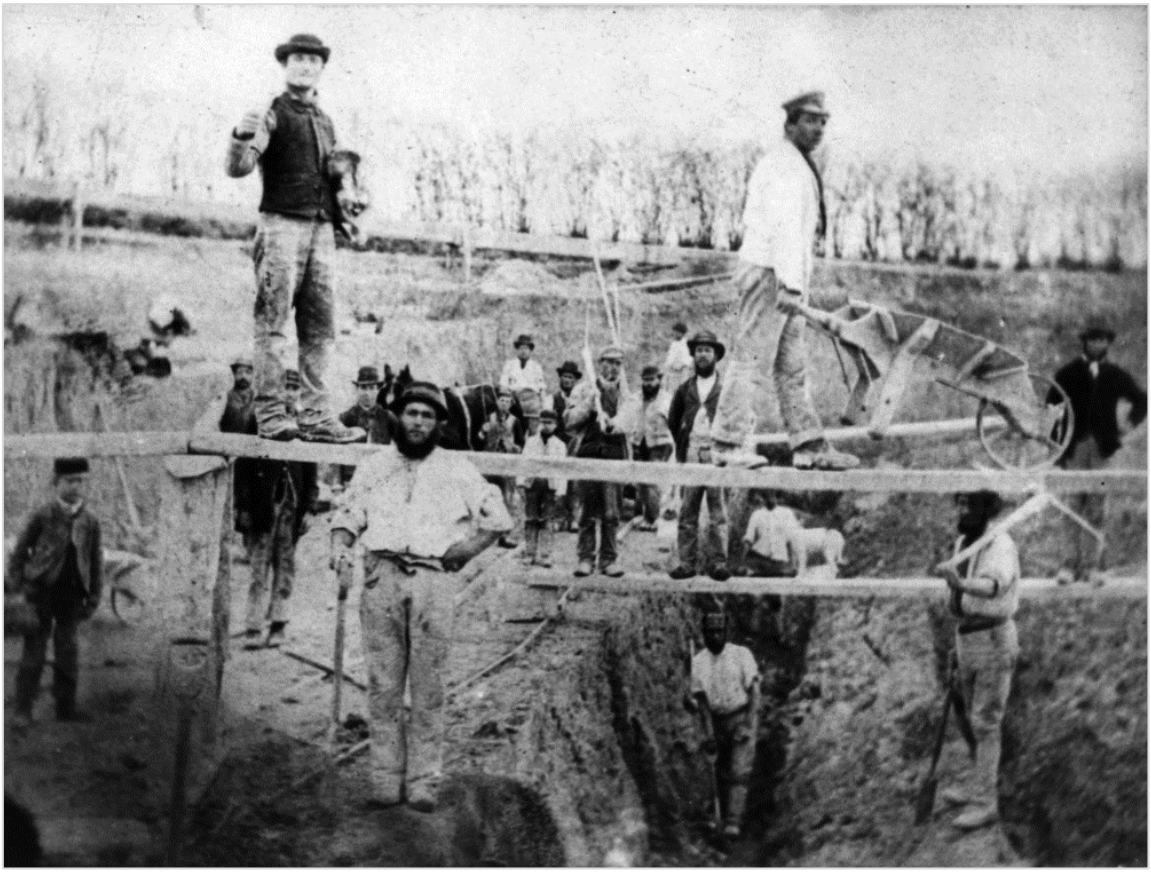

Figure 58. Coprolite miners near Orwell, Cambridgeshire, showing the type of workings that would have been undertaken at Stow cum Quy – reproduced with kind permission of the Museum of Cambridge.

The majority of these areas are now under arable land use. Areas of former coprolite extraction are mainly visible as long, deep parallel cropmark ditches and as subtly uneven ground (when compared to other arable land that was not exploited in this way) that is visible on lidar Digital Terrain Model (DTM) data. Cropmarks and soilmarks of coprolite extraction have sometimes been interpreted as ridge and furrow cropmarks because of these parallel trenches (see Fig 59 and Fig 60). Long narrow ponds also show where extraction has taken place.

The best-preserved earthworks from the extraction process (HER MCB16580) remain extant by chance at Stow cum Quy Fen and are now within a Site of Special Scientific Interest (SSSI 1002332) which has not been converted to arable land use. Notified in 1955 it is an area of 'floristically rich calcareous pasture' formed on Chalk Marl; these are areas of grassland and open water that are rare in the British Isles (Natural England undated). The DTM (Fig 59) shows the earthworks that remain with the characteristic narrow ponds and trenches as well as areas which have been returned to agricultural use but where the disturbed ground from other workings is still visible. Levelled spoil heaps and infilled trenches also show as soilmarks on aerial photographs (US-7PH-GP-LOC285 6914 5052 10-Apr-1944 see Fig 81).

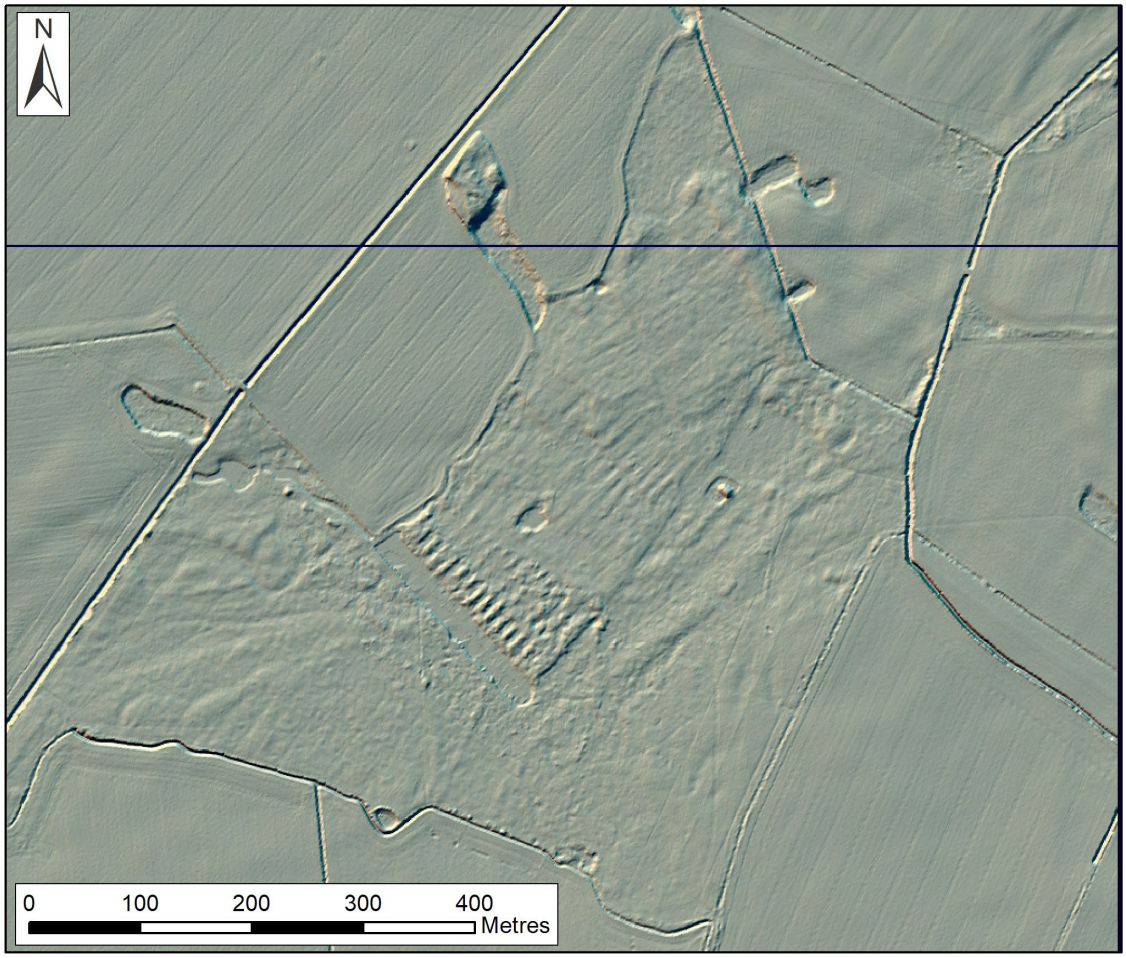

Figure 59. Lidar visualisation showing how much of the earthworks from an area of coprolite workings remain within an SSSI. Lidar TL5162, TL5163 Environment Agency DTM 1m Composite 2004-2017. © Historic England; source Environment Agency.

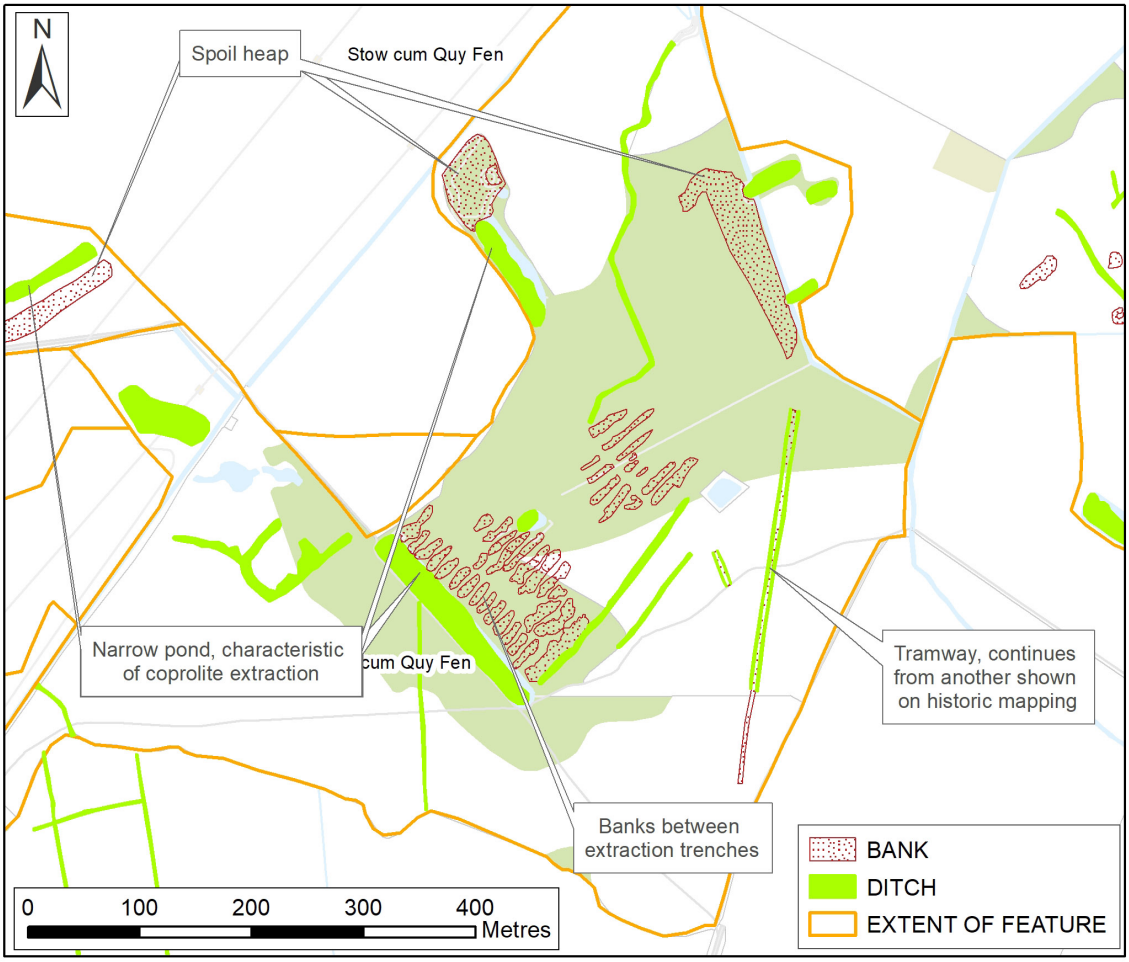

Figure 60. Features mapped on Stow cum Quy Fen. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

What is mapped within this area are earthworks of parallel banks, in between the former excavation trenches, which can be seen during digging in Fig 58, and a long linear pond associated with the trenches. Spoil heaps were also visible in the 1940s as well as a straight linear earthwork of a possible tramway, to the east of the trenches and banks, extending to the south from a tramway shown on historic Ordnance Survey mapping.

Excavation here started in the late 1880s but lasted only four years before the company was wound up in debt. As a result, the 'cuts' were not infilled and left as earthworks and pools (Cambridgeshire Federations of Women's Institutes, 1999, 209), and these have formed the basis of the SSSI. Prior to this, the area was grassland (not for grazing). A memorial to a local man killed by lightning while cutting hay exists within the area of the SSSI (*ibid,* HER MCB17778)

The change in vegetation between 1944 and the modern aerial photographs shows an increase in trees and scrub and the extent of former trenches visible as soilmarks and cropmarks with the chalk soils highlighting the former trenches.

In addition to post-medieval coprolite extraction in the area, the gravel deposits continued to be exploited into the 20th century, removing all surface evidence of former settlements, occupation or activity.

Brickworks

Brickworks with associated clay pits, possible tramways and kilns are also fairly short-lived industries that have left evidence on the ground surface and visible on aerial photographs taken in the 1940s, and in some instances on lidar DTMs. The brickworks at Haddenham is a good example of this; historic maps mark the location of kilns, possibly clamp kilns or areas for stacking and drying bricks, which still appear as anomalies on the modern ground surface.

The brickworks at Haddenham had a Hoffmann kiln and tall chimney (HER MCB20040) which are visible on aerial photographs taken in 1946 and 1947 but both structures are not visible by 1959 (see RAF/58/2688 F21 145 25-Jan-1959). A photograph of Selwyn Peacock on his horse in front of the brick kiln with the chimney behind shows it was still standing between 1948-52 (Fig 63).

Figure 61. Selwyn Peacock in front of the brick kiln at Haddenham Brickworks, taken 1948-52, held in Haddenham Archive and Local Studies in Haddenham Library. Reproduced with kind permission of the Haddenham & Aldreth CCAN

Figure 62. The Brickworks Haddenham taken 1928-32, held in Haddenham Archive and Local Studies in Haddenham Library, reproduced with kind permission of the Haddenham & Aldreth CCAN

The clay pits are still extant today of which one is now called Guppy's Pond and used for boating activities. These pits were hand dug and very deep (Fig 64). Some of the brick wagons that ran on the tramway remain, on site at Guppy's Pond (information kindly supplied by B. Coombes at Haddenham Local History Group).

This is another example of a former industrial area being reused and reclaimed as a recreational or natural area. The woodland on the former clunch extraction pit at Reach, near Bulwell, is a further example (HER MCB16607).

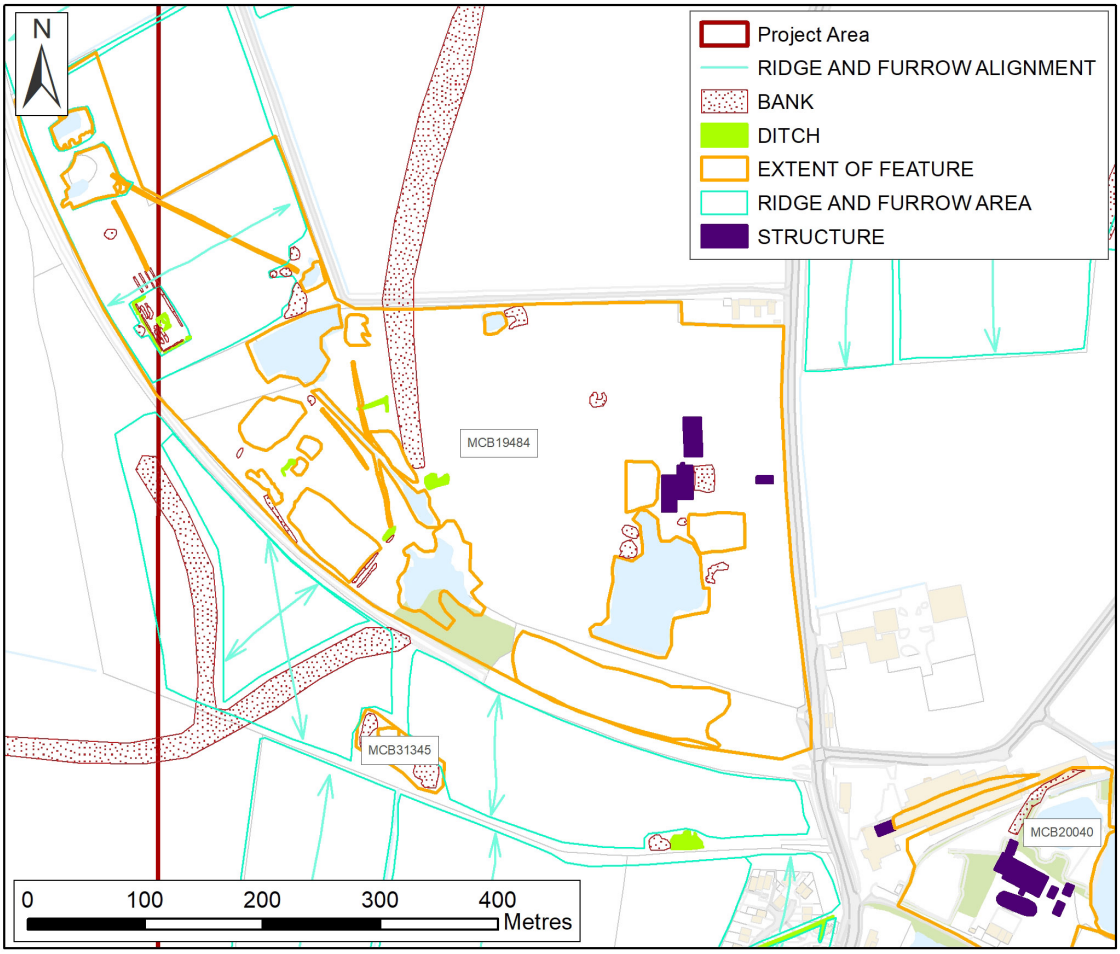

Figure 63. Mapped features at Haddenham Brickworks. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Reuse of the brickworks site at Haddenham also appears to include an area of landfill when viewed on the lidar Digital Terrain Model (DTM); it shows as a mound but is shown as a clay pit on historic maps and aerial photographs; it is shown on the 1976 Ordnance Survey map as a land fill site. This area is a long subrectangular area immediately to the north of the disused railway (included within the area for HER MCB19484, Fig 65 and Fig 66).

The features mapped at the brickworks include a probable tramway and other linear features which may have been the places where bricks were stacked to dry or even fired in a clamp kiln. These linear features can be seen as earthworks on 1940s aerial photographs and on a lidar DTM of the area but are not clear on modern aerial photographs due to vegetation growth. The historic aerial photographs are useful for showing features that have since been removed through increasingly intensive agricultural land use in the second part of the 20th century (Fig 67).

A black and white vertical aerial photograph taken in 1947 showing the Haddenham brick works with a Hoffmann kiln, tall chimney, railway sidings and clay pits

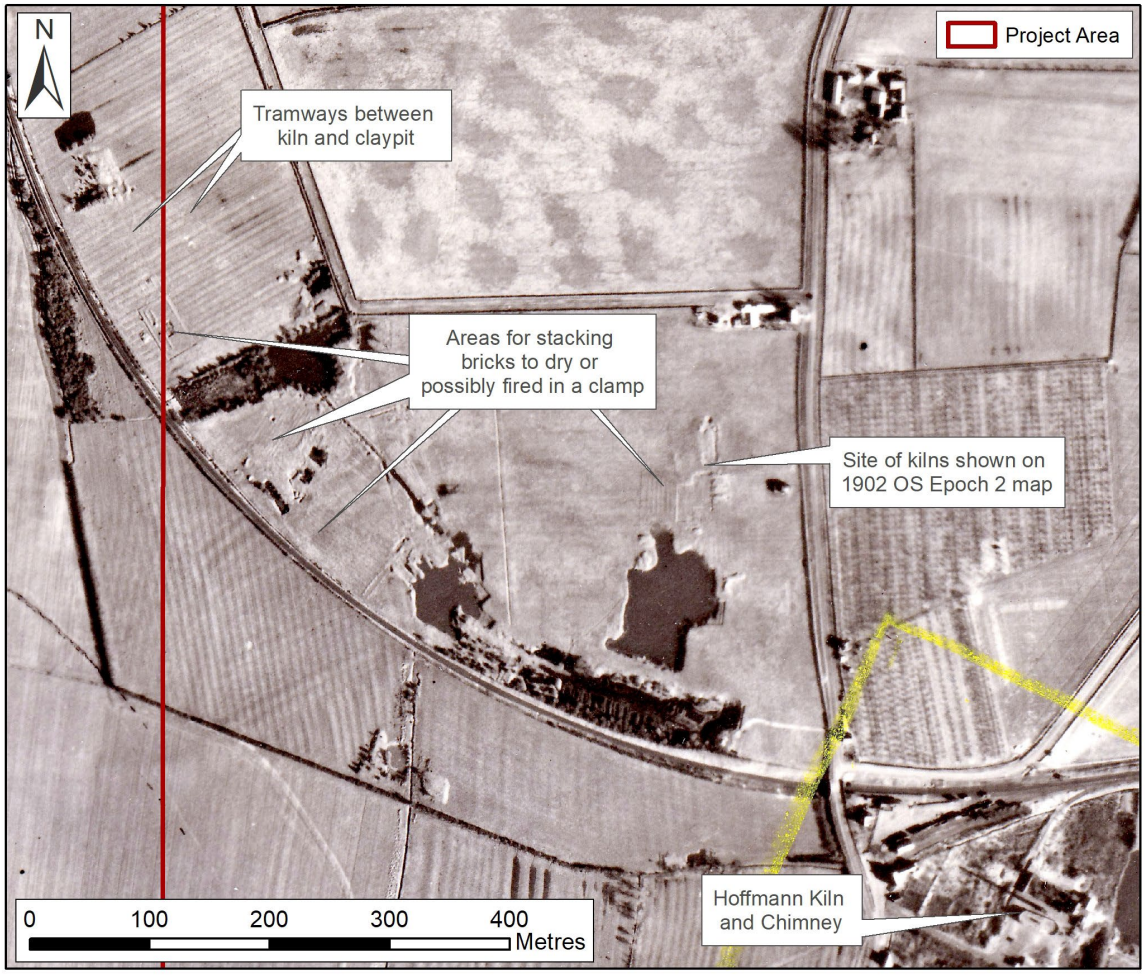

Figure 64. Detail of Haddenham brickworks with clay pits, areas where bricks appear to have been stacked to dry, railway sidings, a Hoffmann Kiln and tall chimney. RAF-CPE-UK-1952 RP 3238 25-Mar-1947. Historic England RAF Photography.

The Wartime Military Presence in East Cambridgeshire

Global conflicts of the 20th century have greatly affected the landscape of East Anglia, which is reflected in the project area. In particular, the numerous large military installations created during the Second World War dominate. The impact of such 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

The project mapped some examples of First World War activity. Located across the eastern boundary of the project area, the most significant First World War features

recorded by the project are part of an extensive training trench system across Redlodge Warren, much of which lies outside the project area boundary (Fig 68).

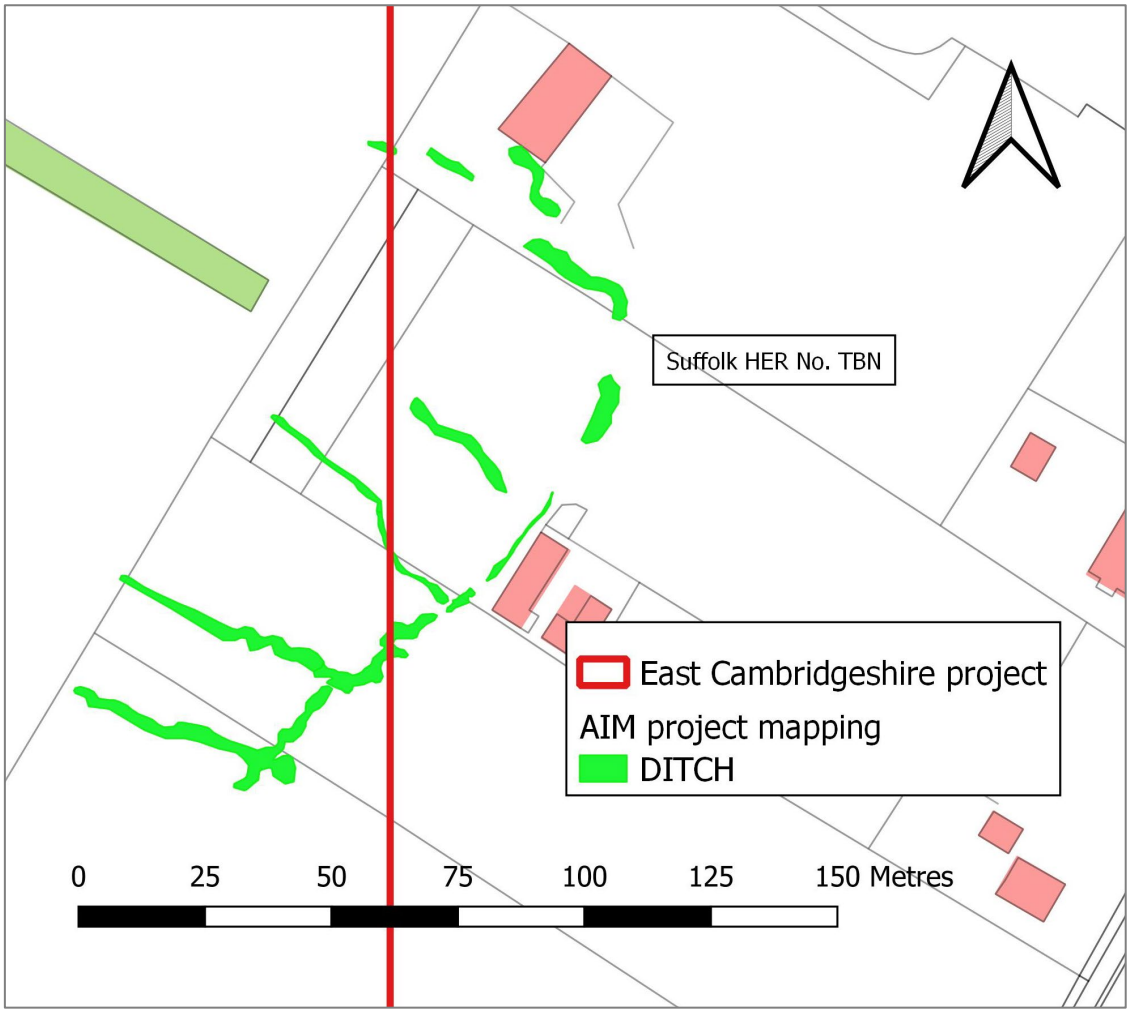

Figure 65. Mapping of First World War practice or training trenches at Redlodge Warren. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Figure 66. An extensive system of World War One training trenches on Redlodge Warren with mapped features on boundary of project area ringed in red. RAF/106G/LA/124 FS 2045 09-FEB-1945 Historic England RAF Photography.

In the War Office's 1916 publication, 'Notes for Infantry Officers in Trench Warfare' (General Staff 1916), 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. The aerial photograph taken in 1945 shows this system of trenches laid out across the Warren (Fig 69), much of which still remained extant in 1974, but subsequently have been levelled or destroyed by a modern landfill site and by the construction of the A11(T) bypass.

Second World War

There was a significant military presence across the project area in the Second World War (Fig 70). Royal Air Force (RAF) operational airfields dominate, with the largest being RAF Waterbeach.

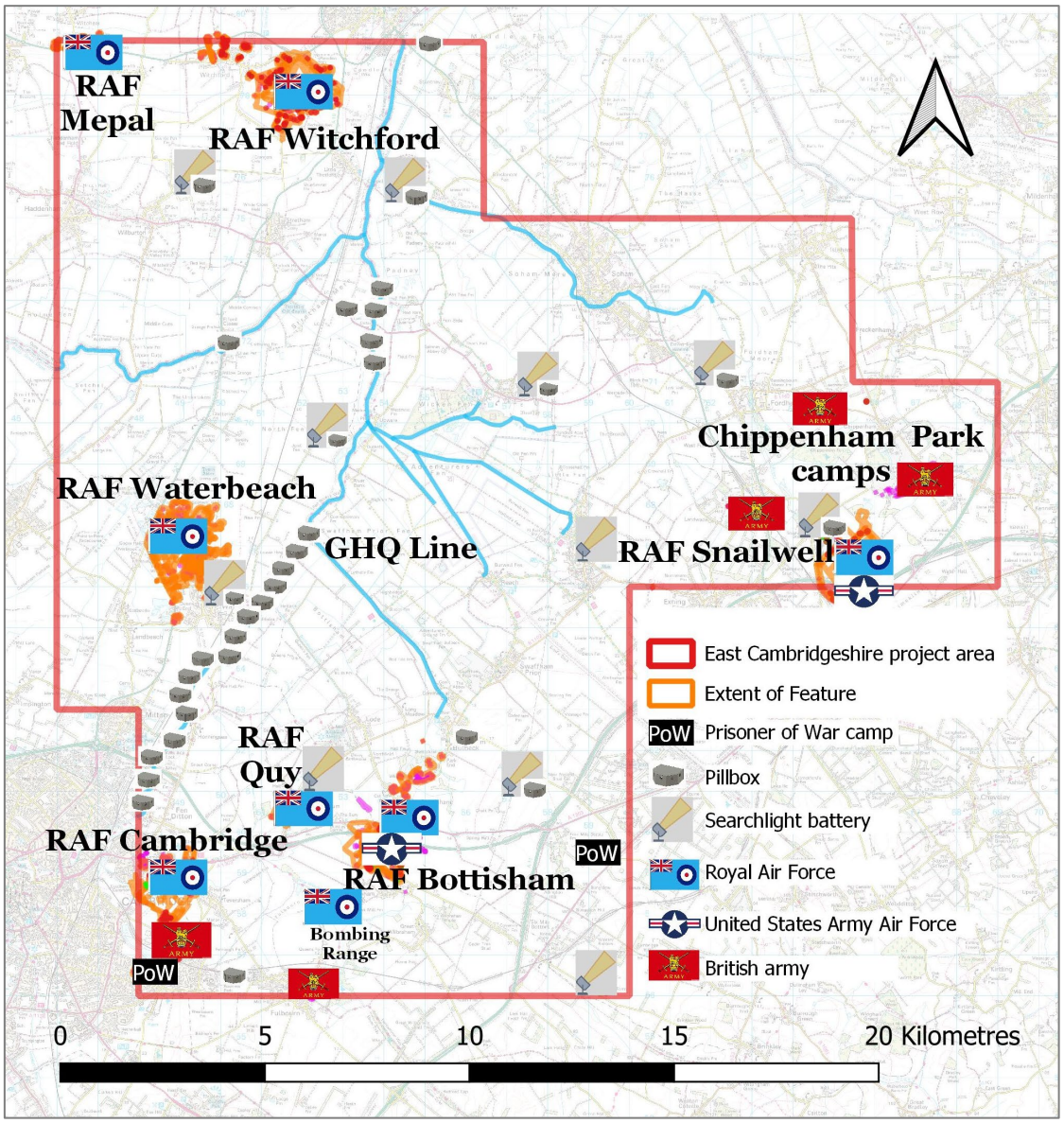

Figure 67. Main Second World War RAF airfields, army camps, POW camps, searchlight site and pillboxes in the project area. Archaeological mapping © Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900.

Only one of these airfields remains extant in the modern day, that being Cambridge City Airport. Formerly known as Marshalls Airport, it hosted RAF Cambridge and RAF No. 82 Maintenance Unit (MU) during the Second World War. On the fringes of the airfield are two unusual aircraft salvage or scrapyards visible on aerial photographs taken in 1945 (HER Nos. MCB30668 and MCB30669). Spreading out along the central reservation of the (then) newly constructed dual carriageway, now the A1134 Barnwell Road (Fig 71), one extensive scrapyard comprises neatly stacked wings, fuselages, tails and other aircraft parts, these appear to be former British aircraft of differing types, as several bear RAF roundels and camouflage patterns. They are likely to be early war bomber and other aircraft types no longer in active RAF service. It was the job of the RAF Maintenance Unit at the airfield to

recover wrecked aircraft from across the region for their parts and material to be cannibalised or repurposed (Osborne 2013). Not present on aerial photographs taken only a year before in 1944, both scrapyards have been entirely cleared away by 1946.

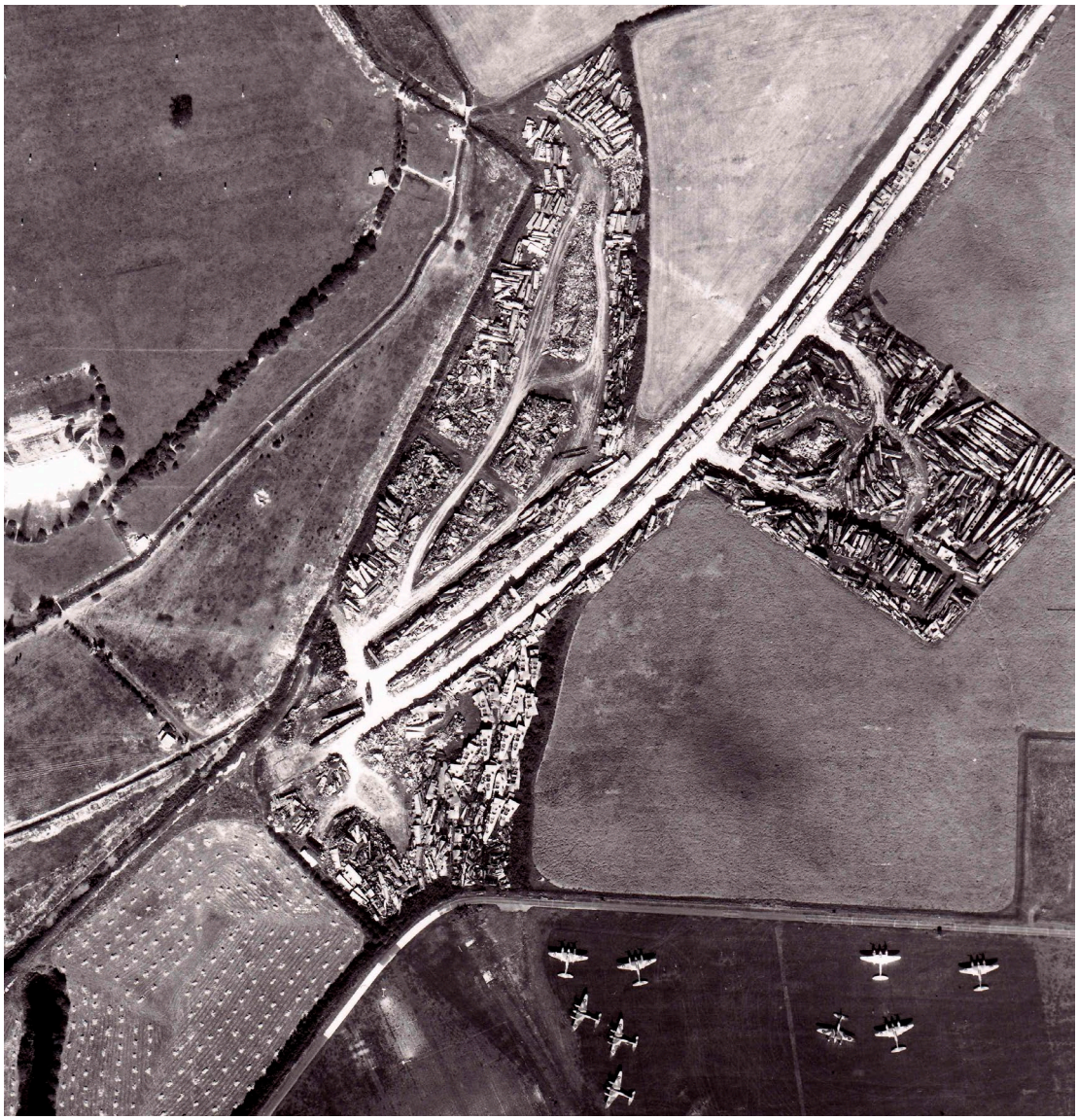

Figure 68. Aircraft scrap yard on the edge of RAF Cambridge/Marshall Airfield. RAF/106G/UK/1557 FP 3311 07-JUN-1946 Historic England RAF Photography.

However, there are a number of both large and smaller military installations, such as army camps, prisoner of war camps and searchlight batteries, that have been newly identified, mapped and recorded by the project.

A large army camp was created within the grounds of Chippenham Park, south of Chippenham village, which operated throughout the war hosting multiple military units, many of which were armoured formations (Fig 72). Within the park there were three camps: Chippenham Camp North, Centre and South. In the post-war

period 1946-1948, North and South Camps went on to accommodate army units in the Polish Resettlement Corps (Ramiles 2019).

Many of the camp buildings are hidden within the canopy of the parkland trees on the available historic aerial photographs dated between 1942 and 1946, making complete mapping problematic. Clearly visible, however, is the concrete roadway constructed along the southern boundary of the park by the military, a firing range (centre right), as well as the camp's sewage works (far right). Although the camps have been demolished, part of the firing range and the military road system appear to have survived to the present.

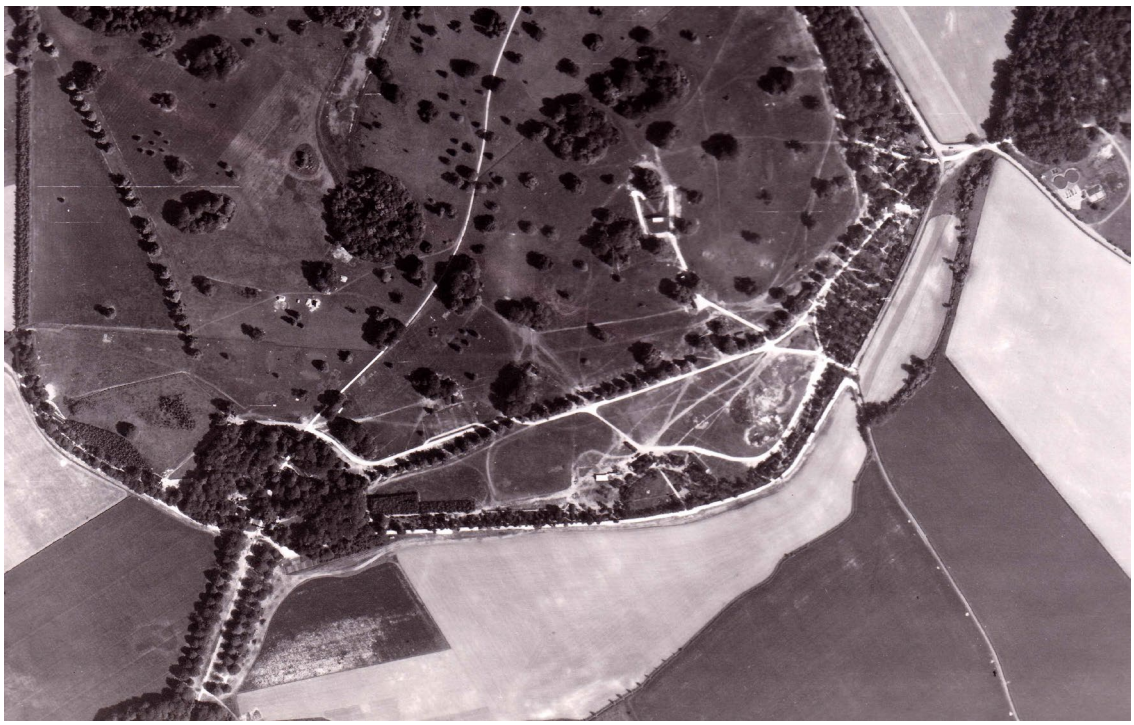

Figure 69. The British army's WW2 South Camp in Chippenham Park. RAF/106G/UK/1557 FP 3311 07-JUN-1946 Historic England RAF Photography.

Figure 70. A WW2 prisoner of war camp housing Italian troops. RAF/106G/UK/1718 RP 4081 06-SEP-1946 Historic England RAF Photography.

Located in a field west of Cherry Hinton Hall, the thirty-three rectilinear buildings of POW Camp Number 150 housed Italian Prisoners of War (POWs) (HER No. MCB30696) (**Fig** 73). Also visible within the camp are rectangular plots of ground that appear to be cultivated. The Italian POWs would whittle toys from pieces of wood brought to them by local children (Knights 2016). New post-war housing is just being set out in the adjacent field. In 1947, the camp remained extant but additional 'prefab' type housing had been erected on site, suggesting it was no longer housing prisoners by then, but perhaps rehoming bombed-out civilian families and returned servicemen or refugees. By 1951, most of the military buildings had been demolished and by 1953 new residential housing in Walpole Road had been constructed over the former camp and none of its features remained visible.

During the early years of the Second World War, the British home forces created a defensive plan with over 50 defensive lines to counter the threat of German invasion and delay enemy forces should that happen. The Coastal Crust defences were the primary defensive element, followed by the defensive lines created to compartmentalise the country and slow the enemy's advance until British Forces could organise a response. The General Headquarters (GHQ) Line was a series of anti-tank barriers using natural features such as rivers, supported by static defensive fortifications and pillboxes that would be manned by regular troops and Home Guard when the invasion took place. The GHQ Line ran from The River Brue in Somerset to the Medway in London, then up through Cambridgeshire along the River Cam through the Fens and from there continued up the country along the Trent through Yorkshire and towards Scotland (Osborne 2013).

Although there are a few surviving pillboxes recorded within the project area, a line of newly recorded pillboxes has been identified, snaking their way along the west bank of the River Cam. Fig 70 shows a notable gap in these supporting defences of about 5 km of the Cam's riverbank between Swaffham Bulbeck Lode and Upware, coinciding with the extensive fenlands of Swaffham Prior's Fen, Adventurers' Fen and Wicken Fen located immediately to the east. This large gap in the defensive line of structures exemplifies the GHQ Line's use of natural features such as fens as effective anti-tank measures.

Hundreds of pillboxs were constructed by the War Office's Directorate of Fortifications and Works (DFW3) under the command of the British Army's Royal Engineers, using standardised designs and making use of the limited materials available in the early war period. In 1940 alone, over three hundred pillboxes were built in Cambridgeshire, of which very few survive in the project area to the present (Osborne 2013).

The project identified and recorded fifty pillboxes of various types within the project area, most of which have since been demolished. Of this number, three are previously unrecorded pillboxes that survive to the present day but appear not to have been recorded by the Defence of Britain project. A type FW3/22 pillbox is located in a back garden in Barway (HER MCB30838) (Fig 74). Visible on aerial photographs taken in 1944, this pillbox had been constructed adjacent the site of a searchlight battery (HER MCB30837), whose remains are no longer visible. As can be seen in the recent Next Perspectives aerial photograph, the pillbox remains clearly visible. Similarly, a newly recorded type FW3/22 pillbox remains hidden on a field boundary at Fordham (HER MCB31106), next to the former site of a searchlight battery (HER MCB31108).

Figure 71. A newly recorded WW2 searchlight battery and an extant type FW3/22 pillbox (ringed in red) at Barway. US/7PH/GP/LOC267 V 5058 10-APR-1944 Historic England USAAF Photography and Next Perspectives APGB Imagery TL5475 24-JAN-2019.

Within the project area, eleven searchlight battery sites were mapped and recorded, of which eight were adjacent to a concrete pillbox, including that at Barway and Fordham as described. This association was a deliberate early-war strategy of fortifying these static defences and designating them as 'strong points' to resist invasion.

The searchlight battery sites are visibly set out in lines, of which four and probably part of a fifth line is visible at Fig 70, aligned west-east across the project area. During the war's course, these batteries were often redeployed around the county, sometimes splitting them into single lights and then clustering them in threes. After 1941, searchlight batteries were declustered and redeployed into three belts on the approach to Cambridge: Indicator, Killer and Gun Defended Areas (GDAs). The Indicator belt gave advance warning of approaching enemy aircraft with single searchlights spaced about 10,000 yards (9,144 m) apart: a 16 miles (25.7 km) deep Killer belt with single lights spaced 6,000 yards (5,486 m) apart, equipped with radar or locators to aid RAF night fighter interception: and the GDA, which had single lights spaced 6000 yards (5,486 m) apart to locate and illuminate enemy aircraft to provide targets for the heavy anti-aircraft gun defences (Dobinson 2000, 2; Dobinson 2001, 345).

Later in the war the City of Cambridge was encircled by searchlight batteries comprising a total of 24 lights in an inner and outer ring (Osborne 2013). The pattern of searchlight batteries recorded by the project likely reflects these constant movements and tactical changes over the whole wartime period, rather than representing one point in the war or one specific deployment strategy.

No heavy anti-aircraft artillery defence sites were recorded within the project area, though batteries were visible on the historic aerial photographs available only metres outside the project boundary on Cambridge city's eastern outskirts.

REVIEW OF SCHEDULED MONUMENTS

There are 40 scheduled monuments for the whole of the project area (Crowther and Noke 2019). Of the scheduled monuments that were suitable for assessment from aerial photographs and lidar, the AI&M 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. Monuments obscured by dense vegetation on available images were not assessed and identified as such.

Historic England's aerial investigation and mapping methodology is able provide accurate information on the location and the extent of archaeological features and may be used to inform a reassessment of designated monuments that fall within a project area.

Neolithic causewayed enclosure, Great Wilbraham

For example, Fig 75 shows those cropmark features mapped by the project of National Heritage List for England (NHLE) site No. 1009103, a Neolithic causewayed enclosure near Great Wilbraham. The project mapping (HER 06468; NHRE 374466) demonstrates that the monument features extend beyond the current scheduled area.

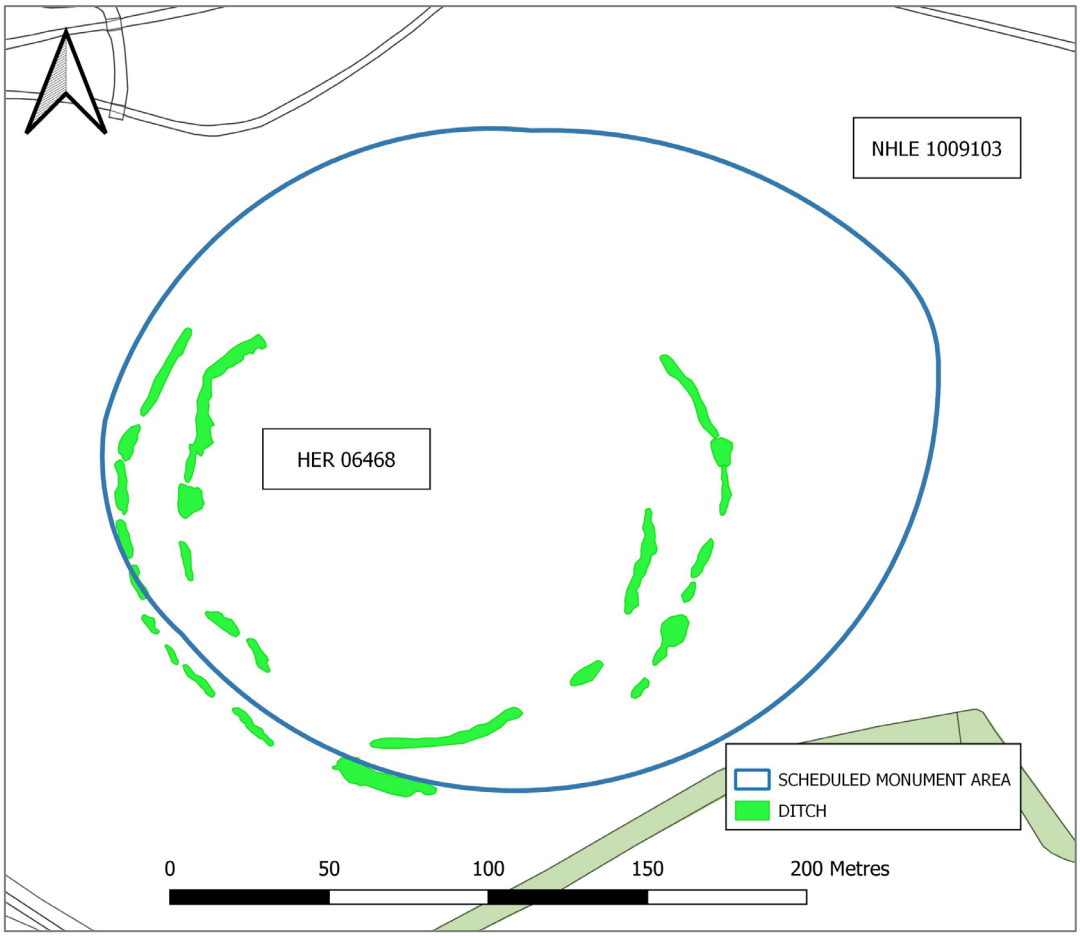

Figure 72. Scheduled Neolithic causewayed enclosure (NHLE 1009103) at Great Wilbraham. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Neolithic long barrow, Partridge Hall Farm

Fig 76 shows the current extent of NHLE site No. 1020842, a Neolithic long barrow located in a field on a low chalk rise between the A14 and Partridge Hall Farm, Swaffham Prior. The listing details state that the ploughed-out encircling ditch and barrow mound is 66 m long and 30 m wide and aligned east-west (Historic England 2003). The project mapping (HER 10282, NRHE 374954), however, indicates that the scheduled monument area does not fully contain the long barrow, whose long side lies on a west-south-west to east-north-east alignment, and so extends beyond the northern boundary of the schedule area.

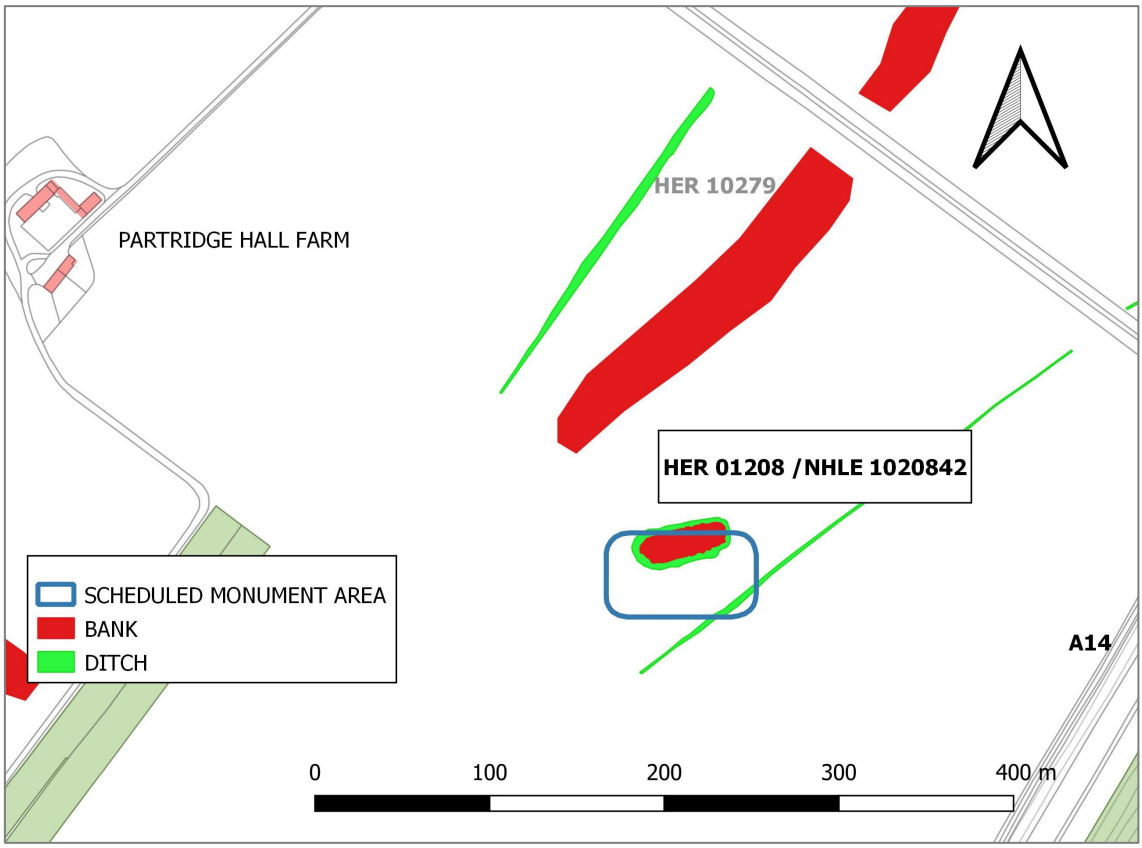

Figure 73. Scheduled Neolithic long barrow (NHLE 11020842) at Swaffham Prior. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Romano-British settlement at Old Fordey Farm, Padney

The scheduled area for the remains of the Romano-British settlement at Old Fordey Farm, Barway (HER 07045; NRHE 375090; NHLE 1006885; OCN CB47), is shown in Fig 77. No scheduling description is available as the age of the monument's scheduled status falls under the 'old county number' (OCN) system (Historic England 2022b). However, as shown, the AI&M survey mapping has recorded archaeological features that extend well beyond the current scheduled area. It is suggested that the scheduling be reappraised.

Figure 74. Scheduled Romano-British settlement (NHLE 1006885) at Old Fordey Farm, Barway. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Romano-British settlement on Bullocks Haste Common, Cottenham

The scheduled area for earthworks and buried remains of the Romano-British settlement, field systems and dyke at Bullock's Haste Common near Cottenham (HER 05495; NRHE 372111; NHLE 1006897) is shown in Figs 78 and 79. The scheduling description also outlines the buried remains droveways and small enclosures visible as cropmarks (Historic England 2022a). As can be seen, however, the project mapping has recorded a significant area of cropmark features extending well beyond the current scheduled area that appear to form part of the same cohesive settlement. It is suggested that these features be reappraised in light of this evidence.

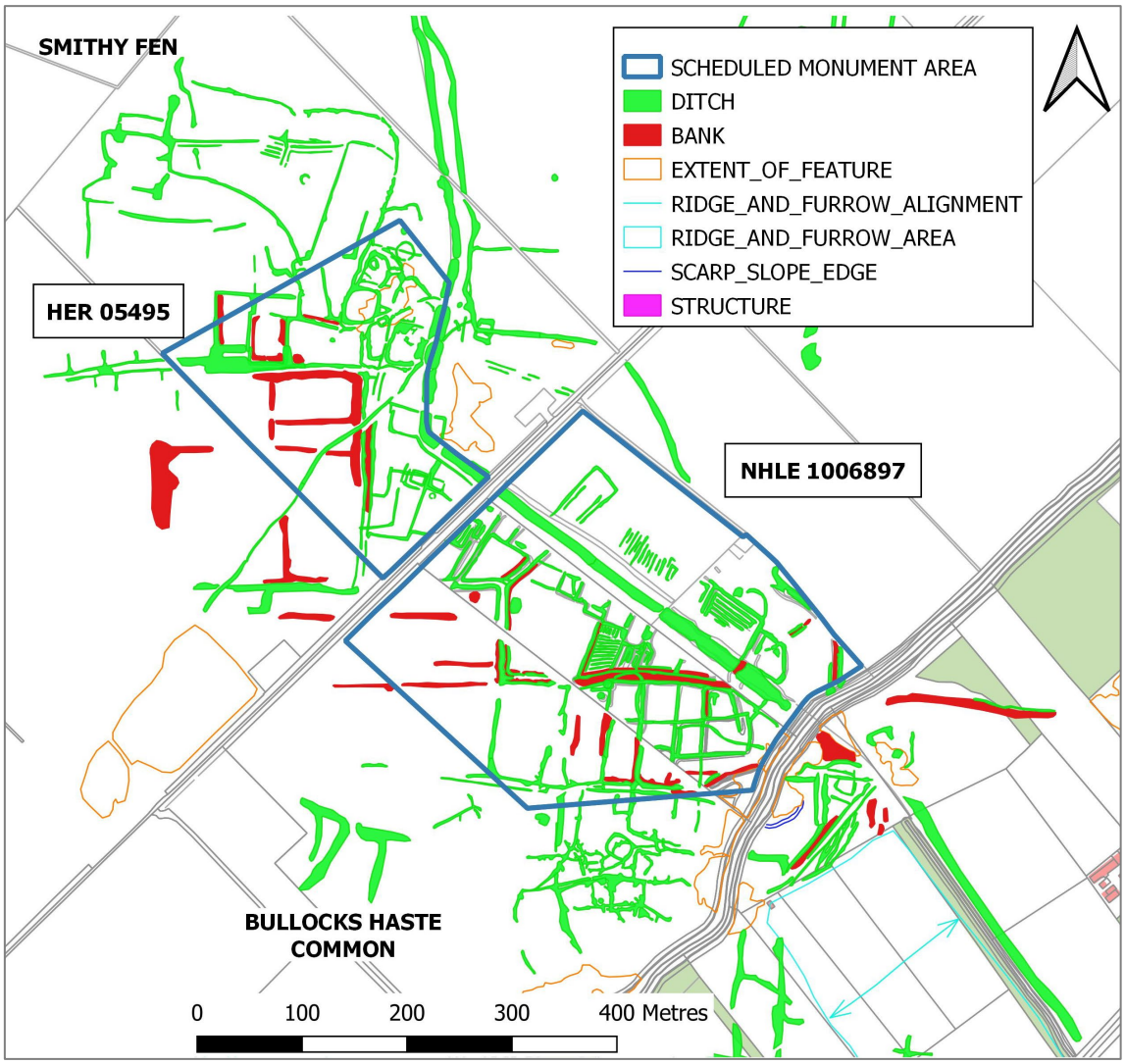

Figure 75. Scheduled Romano-British settlement (NHLE 1006897) at Bullocks Haste Common. Archaeological mapping ©Historic England. Base map © Crown Copyright and database right 2021. All rights reserved. Ordnance Survey Licence number 100024900. Contains OS data © Crown copyright and database right (2021).

Figure 76. Lidar showing the scheduled Romano-British settlement (NHLE 1006897) at Bullocks Haste Common. Lidar TL4676 Environment Agency DTM 1m Composite 2004-2017. © Historic England; source Environment Agency.

Neolithic henge, Fulbourn

New archaeological information may lead to a reappraisal or reinterpretation of some sites. For example, the scheduled Neolithic henge (HER 09292; NRHE 1084756; NHLE 1011716) near Fulbourn is defined by concentric banks and ditches. It was identified from the air and the scheduling description is chiefly based on aerial photographs taken in the mid-1960s (Historic England 1995). However, the aerial photographs and lidar available to the project suggest that the earthworks are more consistent with nearby geological features (Fig 80). The archaeological features as described in the designation document are potentially visible but are not clearly anthropogenic in origin.

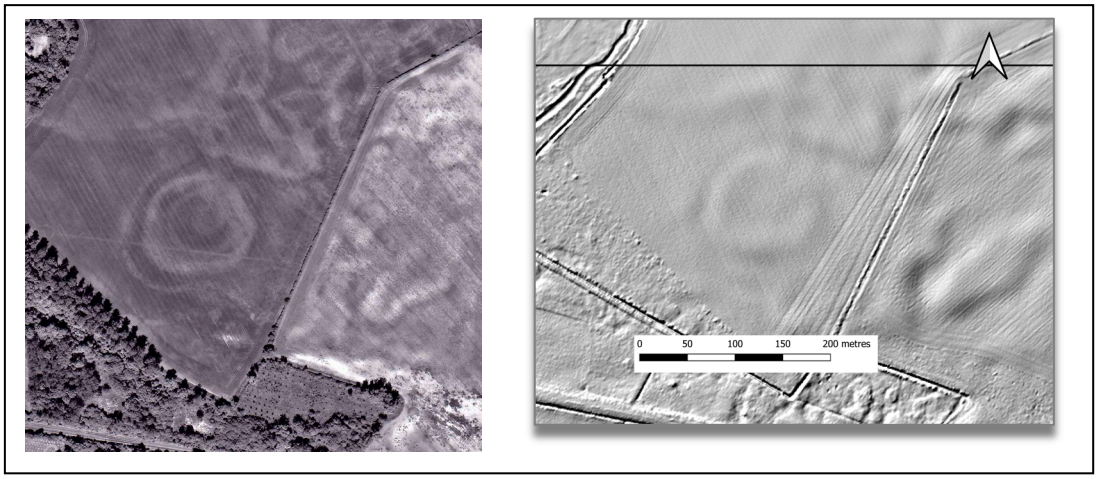

Figure 77. Site of scheduled Neolithic henge. Extract from OS/96169 V 019 16-JUN-1996 Historic England (OS Photography) & LIDAR TL5356-TL5357 Environment Agency composite 1m DTM. © Historic England; source Environment Agency.

REVIEW OF ARCHAEOLOGICAL SIGNIFICANCE

During the project, archaeological features, sites and monuments were briefly assessed in terms of potential national or local significance (DCMS 2010). The East Cambridgeshire AI&M project design (Adams & Crowther 2018 unpublished, para 9.1.4) states that the project aims to contribute to the work of Historic England's Listing Group (the functions of which now lie within the Policy and Evidence, and Regions Groups) by producing some recommendations for further consideration, with a view to potential designation.

Of the 40 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 project including a significant number of prehistoric and Romano-British settlements visible as cropmarks, along 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). 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 any potential qualification for designation.

The remains of 19th century Coprolite Mining, Stow cum Quy fen

The most striking industrial impact within the project area is the extensive coprolite workings, the extraction of phosphatic nodules derived from marine molluscs and other organisms deposited during the Jurassic Period, which were mined from the mid-19th century to early-20th century for use as fertiliser and then during the First World War for munitions production. The workings are part of an industry that exploited a 1m thick coprolite layer that lay about 6 m below the surface in a ribbon of Cambridge greensand that extended from Barton in Bedfordshire to Soham in Cambridgeshire (Grove 1976, Freshwater Habitats Trust 2017).

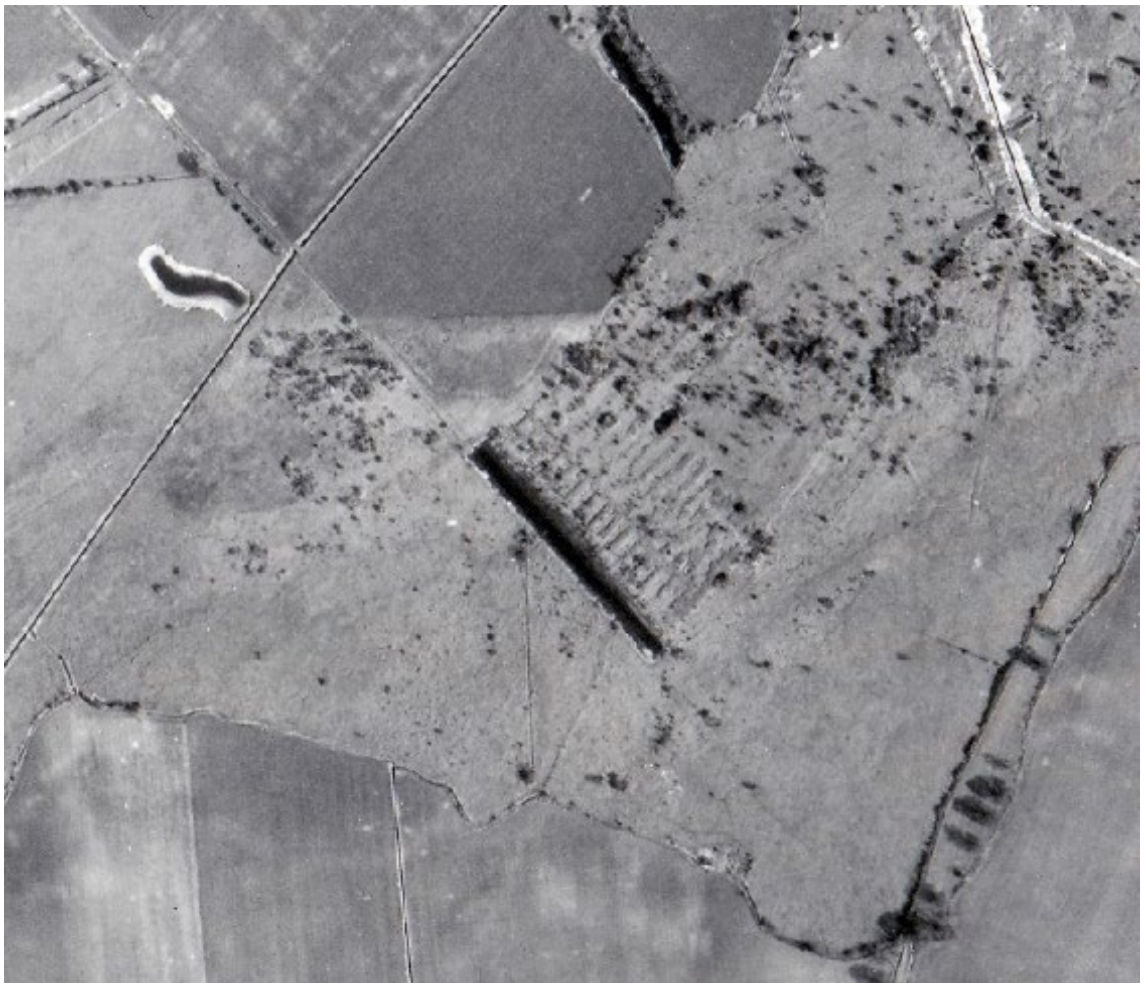

Figure 78. Extant earthworks of coprolite workings. US-7PH-GP-LOC285 6914 5052 10-Apr-1944. Historic England USAAF Photography

Save one site within the project area (Fig 81), no evidence of the numerous former coprolite workings is now visible except as cropmarks, all having been levelled or infilled as 'restored' lands. The Stow cum Quy earthworks have been preserved by sheer chance because the company excavating them in the late 19th century was wound up after four years, having fallen into debt and thus having no funds to

reinstate the soil after excavation (Cambridgeshire Federations of Women's Institutes 1999, 209).

The earthworks of the former coprolite extraction trenches at Stow cum Quy include a possible tramway, the remains of spoil heaps, narrow linear ponds and other linear features (HER MCB16580). The ponds formed by the workings and the area is now a Site of Special Scientific Interest (SSSI No 1002332) notified in 1955 and revised in 1986 for calcareous loam pasture and numerous uncommon aquatic plants (Freshwater Habitats Trust 2017 Natural England 2013c). The coprolite workings have been preserved through the SSSI, but no mention of the origin of these features is recorded. No other sites for coprolite mining could be found on the National Heritage List for England. Designation considerations for industrial site (as set out in Historic England Scheduling Selection Guidance (Historic England 2018c, 22)) include "*being a rare survival of a site-type may strengthen the case for scheduling*". Moreover, a potential site's significance may increase where new industrial processed were pioneered (*ibid*, 23). The processing of the coprolite nodules for agricultural and military use was a unique and short-lived industry whose discovery was almost accidental. The SSG states that "*where a site has good documentation, either contemporary (such as historic plans or descriptions), or recent (such as archaeological surveys or excavations), this may enhance its claims to national importance*" (*ibid*, 23). The project has mapped the earthworks of the surviving workings, which together with a written account of the history of the site (O'Connor 2011), may qualify this site for further assessment.

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 monuments mapped by the project team within the project area warrants further detailed archaeological study, particularly on Iron Age and Roman sites. Whilst some of the features can be attributed to specific periods with a high degree of confidence by morphological signature (Roman villas), much of the settlement evidence has been attributed both an Iron Age and a Roman date where morphology alone cannot confidently date a monument. Further investigation is suggested to provide more secure dating. This would greatly enhance 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).

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APPENDIX A. SCHEDULED MONUMENTS ASSESSMENT

List Entry Number	OCN No./Legacy ID	Historic England Research Record UID	HER UID	NHLE Site Name	Type	Suffered Damage/Destruction? (Y/N)	Does the SM polygon need redefining? (Y/N)	Latest evidence/notes
1003262	CB 5	1043028	07801	Devil's Ditch, Reach to Woodditton	Earthworks	Y	N	Next Perspectives APGB Imagery TL5863, 5963, 5864, 5764, 5765, 5665, 5666 24-JAN-2019 - monument ditch visible but bank obscured by hedge and shrub/scrub undergrowth. Recorded as earthworks from Next Perspectives APGB Composite Digital Terrain Model TL5863, 5963, 5864, 5764, 5765, 5665, 5666 24-JAN-2019
1003800	SF 241	377364	EXG050	Moated site E of church, Landwade	Earthworks	N	N	Next Perspectives APGB Imagery TL6268 24-JAN-2019 - monument mostly visible within grassed enclosure but partially obscured by secondary woodland. Mapped from Environment Agency lidar TL5770 Composite DTM 1 Metre dated 2004-2017
1006793	CB 254	375007	06865	Roman settlement	Cropmarks	Y	Y	Cropmarks within the scheduled area are not clear on photos viewed as part of this project and most features mapped were outside this area. Large farm building constructed at north of site between 1969 and 1996. Cropmarks extend outside the current scheduled area to the south and to the west. Land use is arable - cropmarks are visible on aerial photographs - OS-96169 15092 143 19-Jun-1996, MAL-69070 7126 187 22-Jul-1969, EARTH.GOOGLE.COM 01-Dec-2012 date accessed 08-Oct-2019, EARTH.GOOGLE.COM 03-Jul-2018 date accessed 08-Oct-2019. The area should be reviewed.
1006795	CB 257	375172	06916	Settlement site S of Tiled House Farm	Cropmarks	N	N	Next Perspectives APGB Imagery TL5273 24-JAN-2019 - monument under arable crop and the cropmark features are visible. Other features visible on images from GOOGLE.EARTH.COM dated 28-MAY-2020 (not available to the project for mapping) and 03-MAY-2011. Wider monuments features mapped from aerial photographs taken in 2003.
1006813	CB 224	1034661, 1034621	05405	Length of Car Dyke between Green End and Top Moor	Earthworks	?	N	Earthwork ditch is visible on lidar visualisation to the north of the current extent of the shape. The line of the canal continues to the north and south of this but mainly as field boundaries and continues into the Scheduled earthworks at Bullock's Haste Roman Settlement

List Entry Number	OCN No./Legacy ID	Historic England Research Record UID	HER UID	NHLE Site Name	Type	Suffered Damage/Destruction? (Y/N)	Does the SM polygon need redefining? (Y/N)	Latest evidence/notes
1006868	CB 80	377396	07483	Roman villa S of Snailwell Fen	Surface finds	?	?	Next Perspectives APGB Imagery TL6368 24-JAN-2019 - monument under arable crop and no features were visible on any of the source material available to the project
1006870	CB 82	371806	01262 08855	Shrunken medieval village of Landbeach	Earthworks	N	N	Earthworks are clearly visible on lidar visualisation, it is not clear how their condition has changed due to the direction of the sunlight on the photograph that shows the earthworks.
1006871	CB 83	377698	MCB30177	Lime kilns on E side of High Street, Isleham	Structures	N	N	Next Perspectives APGB Imagery TL6474 24-JAN-2019 - earthworks and structures visible in grassed area
1006875	CB 87	374665	06809, MCB31042	Roman villa and Iron Age settlement N of Reach Bridge	Excavation and cropmarks	?	N	Next Perspectives APGB Imagery TL5765 24-JAN-2019 - monuments in field under arable crop and not visible. Current condition unclear
1006878	CB 95	374477	06315	Settlement site by Caudle Corner Farm	Cropmarks	?	?	Next Perspectives APGB Imagery TL5056 24-JAN-2019 - monuments in field under arable crop and not visible. Current condition unclear. Mapped from aerial photographs taken in 1973. Features extend just beyond current scheduled area.
1006885	CB 47	375090	07045	Roman site near Old Fordey Farm, Barway	Cropmarks	?	Y	Next Perspectives APGB Imagery TL5475 24-JAN-2019 - monument under arable crop and no features were visible. Features were mapped from aerial photographs taken in the 1940s that extend well beyond the area current under scheduling
1006888	CB 52	371810	05309	Waterbeach Abbey (site of)	Earthworks	N	Y	Earthworks extend outside the current scheduled area, into an area of woodland where the earthworks are visible on lidar. This area of woodland is shown on historic mapping and all aerial photographs available to this project, from 1942 to the present day. Any change in condition of these earthworks cannot be determined from the information available.
1006893	CB 60	375226	N/A	Stretham pumping engine	Building	N/A	N/A	N/A.
1006895	CB 64	371897 1582100	05546	Horningsea kilns, site of	Cropmarks and earthworks	Y	Y	Some earthworks of extraction pits remain, outside the Scheduled area. Complex cropmarks of Iron Age/Romano-British enclosures, including a large rectangular enclosure and probably earlier curvilinear ditches forming other enclosures, and possibly a banjo enclosure, are visible to the west of the current Scheduled area, in an arable field. Damage is from current and future ploughing if arable land use continues. Record description is very

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								basic, from an old record, needs updating. This site also has medieval remains nearby (NRHE 371969, HER 05555)
1006897	CB 66	372111	05330, 05495, 08858	Romano-British settlement on Bullocks Haste Common	Earthworks and cropmarks	?	?	The earthworks are still very clear on lidar visualisation and are mainly within the Scheduled area. The earthworks of the canal (Car Dyke 1034661, 1034621) also continue through the scheduled area. The Scheduled area does not include cropmarks of enclosures and features which appear to be the earliest part of settlement in this area, which are just to the south of the current southernmost boundary of the Scheduled area. Cropmarks also extend outside the Scheduled area on all sides and include further enclosures, lazy beds, and field boundaries, and a large oval enclosure with internal features (subcircular enclosure and subrectangular enclosure). Further features are recorded on the HER, to the south, of the watercourse but were not clear on the photos consulted as part of this project.
1006900	CB 71	375011	01124	Deserted medieval village in Bottisham Park	Earthworks	?	Y	Significant earthworks visible extending beyond current Scheduled area on lidar coverage (lidar TL5461 Environment Agency 2004-2017) to the south, also recorded on earthwork plan in VCH (Vol2 pp1-18, fig23). The area is in Parkland at Bottisham Hall so aerial photographs are obscured by tree cover in places. lidar shows more earthworks than are mapped on the VCH plan that also extend outside the current Scheduled area
1006901	CB 72	374383	06834	Romano-British settlement 200m west of Allington Hill	Cropmarks	N	N	Next Perspectives APGB Imagery TL5758 24-JAN-2019 and EARTH.GOOGLE.COM dated 21-APR-2021 - cropmarks just visible in arable crop.
1006930	CB 3	1034826, 1034621, 1034661	05405	Car Dyke	Earthworks	?	N	Car Dyke is still clearly defined as an earthwork on lidar visualisation, how this compares to preservation in the past is unknown, but the earthworks are still very clear. Pottery finds and cropmarks along its length may warrant inclusion in the Scheduled area. This record is created from an old county record and needs updating
1009103	20449	374466	06468	Causewayed enclosure 900m west of Great Wilbraham parish church	Cropmarks	?	?	Next Perspectives APGB Imagery TL5357/5457 24-JAN-2019 - cropmarks just visible in arable crop. Monument mapped from aerial photograph taken in 1972. Features not visible on any other aerial photographs available. Monument features and scheduled area appears slightly unmatched.

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1011716	24421	1084756	09292	Henge 220m ESE of Herring's House	Earthworks and cropmarks	?	?	Next Perspectives APGB Imagery TL5356 24-JAN-2019 - monument as described not visible. Current condition unclear. Monument mapped from aerial photograph taken in 1965 that was not available to this survey for assessment. Features as described not definitively visible on any other aerial photographs available. This monument may be geological in origin.
1012622	11552	374874	01130	Swaffham Bulbeck moated site	Earthworks	?	N	Next Perspectives APGB Imagery TL5562 24-JAN-2019 - monument mostly obscured by secondary woodland. Current condition uncertain. Mapped from Environment Agency lidar TL5562 Composite DTM 1 Metre dated 2004-2017.
1012770	13219	371795	05394	Denny Abbey	Earthworks	N	N	Earthworks of water channels, roadside ditches, a possible causeway from the north east, moats and fishponds clearly visible on lidar visualisation at the site of Denny Abbey. Some features that are shown on historic mapping have not been mapped as part of this project. Cropmarks of the causeway feature shows it extended further to the south. Geological features immediately to the north may confuse recording of other features.
1013278	27101	377667	07528	Isleham priory: an alien Benedictine priory 100m west of St Andrew's Church	Earthworks	N	N	Next Perspectives APGB Imagery TL6474 24-JAN-2019 - earthworks visible in grass pasture
1015243	27177	377328	04465	Bowl barrow 630m SE of Waterhall Farm, part of the Chippenham barrow cemetery	Earthworks	N	N	Next Perspectives APGB Imagery TL6866 24-JAN-2019 - monument covered with trees. Recorded as an earthwork on Next Perspectives APGB Digital Terrain Model TL6866 24-JAN-2019
1015244		377336	04424	The Rookery bowl barrow, part of the Chippenham barrow cemetery, 250m south of Waterhall Farm	Earthworks	N	Y	Next Perspectives APGB Imagery TL6766/6767 24-JAN-2019 - monument surrounded by trees. Recorded as an earthwork on Next Perspectives APGB Digital Terrain Model TL6766/6767 24-JAN-2019. The mapped earthwork suggests it extends outside the current scheduled monument area
1015245	27179	377339	04425	Hilly Plantation bowl barrow, part of the Chippenham barrow	Earthworks	?	Y	Next Perspectives APGB Imagery TL6766 24-JAN-2019 - monument partly on field boundary and partly within secondary woodland and not visible. Recorded as an earthwork

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				cemetery, 500m south west of Waterhall Farm				on Next Perspectives APGB Digital Terrain Model TL6766 24-JAN-2019. The mapped earthwork suggests it extends outside the current scheduled monument area
1015246	27180	377342	07448c-f	Four bowl barrows north of the A11/A14 junction, part of the Chippenham barrow cemetery	Earthworks	?	N	Next Perspectives APGB Imagery TL6766/6767 24-JAN-2019 - monuments in field under arable crop and not visible. Three recorded as levelled earthworks on Next Perspectives APGB Digital Terrain Model TL6766 24-JAN-2019 but fourth on Next Perspectives APGB Digital Terrain Model TL6767 24-JAN-2019 could not be identified
1015596	29382	374655	01775	Burwell Castle	Earthworks	N	?	Next Perspectives APGB Imagery TL5866 24-JAN-2019 - earthworks visible in grass enclosure, though obscuring secondary woodland covers much of the moat ditch and platform. Mapped from Environment Agency lidar TL5866 Composite DTM 1 Metre dated 2004-2017 showing some earthwork features extending outside the current scheduled area.
1016818	33341	374428, 374422, 374375, 374349, 374378	06743, 06742, 06741, 00009, 06739	Five bowl barrows 270m north of Hare Park Stud	Cropmarks	?	N	Next Perspectives APGB Imagery TL5759/5859 24-JAN-2019 - cropmarks under arable crop and two barrows visible, though location of one does not match the scheduled area. Third scheduled barrow not visible on any aerial photographs available. Two barrows clearly visible on Google Earth imagery dated and 11-MAY-2007, but no evidence of third monument at scheduled location.
1016819	33342	374346	06738, 09328, 06747	Three bowl barrows 640m north west of Hare Park Stud	Cropmarks	?	?	Next Perspectives APGB Imagery TL5759 24-JAN-2019 - cropmarks under arable crop and not visible. Some barrows visible on Google earth imagery dated and 03-JUL-2018 and 22-APR-2021. One barrow under perimeter fences of newly constructed paddock/training area adjacent buildings and condition unclear
1016820	33346	374370, 374359, 374397, 374394	06751, 06752, 00001, 06753	Four bowl barrows at Allington Hill, 420m south west of Allington Hill Farm	Cropmarks	?	?	Next Perspectives APGB Imagery TL5758/5858 24-JAN-2019 - only two of the three of the barrows under arable crop could be mapped, the third not being visible. The fourth lies within the woodland on Allington Hill but could not be identified from the aerial photography or remote sensing data available. Two barrows last clearly visible on Google Earth imagery dated 09-APR-2015.
1017845		375135	01067	Moated site 215m south of Chancel Farm	Earthworks	?	N	Next Perspectives APGB Imagery TL5770 24-JAN-2019 - moated site partially obscured by significant woodland cover and not clearly, visible so current condition uncertain.

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								Mapped from Environment Agency lidar TL5770 Composite DTM 1 Metre dated 2004-2017.
1019175	33269	374998	01120	Moated site 90m south of Bendyshe Farm	Earthworks	N	N	Site is in a green space on the edge of a housing estate, constructed after 2008, site visit in July saw vegetation in the moat, but not overgrown. Area inside the moat was mown and interpretation boards were present. Molehills showed no evidence of finds. Earthworks for the fishpond appear to extend beyond the Scheduled area on the south side slightly. Earthworks very clear on lidar coverage, not visible on aerial photographs due to tree and vegetation cover. Earthworks clear on 1944 aerial photograph (US-7PH-GP-LOC285 6914 5050 10-Apr-19442) when there was hardly any woodland and the farm was still a working farm.
1019180	33278	1387300	01198	Moated site at Manor Farm	Earthworks	?	N	Next Perspectives APGB Imagery TL6769 24-JAN-2019 - moated site under heavy woodland canopy and not visible so current condition uncertain. Mapped from Environment Agency lidar TL5770 Composite DTM 1 Metre dated 2004-2017.
1020395	33372	377313	08107	Lumber Hill bowl barrow, 720m ENE of Chippenham Stud	Earthworks	?	N	Next Perspectives APGB Imagery TL6769 24-JAN-2019 - monument under arable crop and not visible. Only recorded as a levelled earthwork on Next Perspectives APGB Composite Digital Terrain Model TL6769 24-JAN-2019
1020842	33382	374954	10282	Long barrow 410m south east of Partridge Hall Farm	Cropmarks	?	Y	Next Perspectives APGB Imagery TL5862 24-JAN-2019 - monument under arable crop and not visible. Current condition unclear. Last visible as a cropmark on Google Earth 03-JUL-2018. The alignment of the mapped monument does not match the scheduled area.
1020843	33384	1381663	11549	Long barrow 650m NNW of Lythel's Farm	Cropmarks	?	N	Next Perspectives APGB Imagery TL5266 24-JAN-2019 - monument undercover of plastic sheeting and not visible. Current condition unclear. Last visible as a cropmark on Google Earth 03-JUL-2018.
1457437		371907	5865, 08322, 17819	Multi-period site at Milton	Cropmarks	?	?	Evidence of Romano-British settlement/activity extends all along this gravel ridge, which runs parallel to the River Cam. Possibly needs further assessment. Cropmarks not visible to the east where the geology changes to alluvium

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1012359	13505	372116	05703	Romano-British Settlement at Chittering, Cambs	Earthworks	?	N	Earthworks of enclosures and pits and a trackway, cropmarks of a trackway continue to the south east.
1015010	27168	377650	07515	Moor Farm bowl barrow	Earthworks	N	N	Next Perspectives APGB Imagery TL6273 24-JAN-2019 - earthworks visible in grass pasture