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Cheshire
Cheshire Aerial Investigation and Mapping Project: the Chester environs

Joel Goodchild

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SUMMARY

This report describes the methodology and discusses the results of the Cheshire Aerial Investigation and Mapping Project: the Chester environs. Aerial photographs and lidar images were used to map archaeological features surrounding the city of Chester. The project was completed to Historic England (HE) standards and was funded by HE through the National Heritage Protection Commissions Programme (NHPCP).

The project was carried out by an Archaeological Research Services Ltd (ARS Ltd) Assistant Projects Officer, based with HE's Aerial Investigation & Mapping Team (North) in York.

The survey covered a total of 218 Ordnance Survey kilometre grid squares around the city of Chester. This includes the Cheshire Plain incorporating the Dee valley south of Chester and the northern extent of the Mid-Cheshire Ridge. These areas were chosen because of their archaeological significance, with evidence for continued human occupation stretching back to the Mesolithic period, and the risk posed to this resource by proposed development. Project highlights include the identification of a number of Roman enclosures and extensive medieval field systems covering much of the Cheshire Plain.

The main products of the project were digital transcriptions of the form and extent of archaeological features seen on aerial images with supporting descriptions in the National Record of the Historic Environment (NRHE). These are available from the HE Archive and were supplied to the Cheshire Historic Environment Record (HER). Monument records are available online on the Pastscape website (http://pastscape.org.uk/). The project was carried out between September 2018 and December 2019.

CONTRIBUTORS

Mapping was undertaken by Joel Goodchild (ARS Ltd), while the project was managed by Robin Holgate (ARS Ltd).

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Thanks are due to the Historic England Archive for the supply of aerial photographs, in particular Luke Griffin and the rest of the Archive Services Team.

Quality Assurance and continual guidance was supplied by members of Historic England's York-based Aerial Investigation & Mapping Team (North): Matthew Oakey, Dave Knight, and Sally Evans.

CONTACT DETAILS

Historic England, 37 Tanner Row, York, YO1 6WP

Joel Goodchild
joel@archaeologicalresearchservices.com

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INTRODUCTION

Cheshire is a county with a rich archaeological resource, yet aerial investigation and mapping to consistent standards has been limited. Previous projects covering Cheshire include the North-West Rapid Coastal Zone Assessment Survey (Bacillieri, Knight and Williams 2009) and the Cheshire National Mapping Programme (NMP) Aerial Photographs and Lidar Mapping Project: Sampling the Peak Fringe, Cheshire Plain and Mersey Valley (Hardwick 2017). The latter project sampled four areas across Cheshire to establish how conducive each would be to further aerial investigation and mapping (AI&M) work.

The Cheshire Aerial Investigation and Mapping Project: the Chester Environs was developed by ARS Ltd. and Historic England in consultation with the Cheshire Archaeology Planning Advisory Service (CAPAS). The project provides a number of benefits: to update and enhance the Cheshire Historic Environment Record (HER) with improved spatial data; to update and enhance the National Record of the Historic Environment (NRHE); to assist with maintaining the Heritage at Risk Register and National Heritage List of England for monitoring of scheduled monuments. The project partly mitigates a number of threats to the county's archaeological resource by identifying and mapping archaeological remains within the study area. Threats include expansion of infrastructure, light industrial and housing development, changing farming practices, aggregate extraction and forestry across the county as a whole (Holgate 2018). As well as helping mitigate risk to the archaeological resource, the project was considered to have the potential to increase our understanding of the following areas (Holgate 2018):

- The Roman Fortress and medieval Chester's hinterland.
- The development of the Eaton Estate.
- The hinterland of the hillforts and promontory forts.
- The development and utilisation of the landscape of the Royal Forest.

The size and location of the project area (Fig 1) was chosen with reference to proposed development in the county and the results of the Cheshire NMP Aerial Photographs and Lidar Mapping Project (Hardwick 2017) that identified extremely good earthwork survival in the Farndon-Tilston area. It ties together the results from the Cheshire Plain and the Mid-Cheshire Ridge, providing mapping from which the archaeology of these landscapes can be evaluated. The project area meets the North-West Rapid Coastal Zone Assessment Survey in the north and west, extending along the Welsh border around Chester to meet the Farndon-Tilston area of the Cheshire NMP Aerial Photographs and Lidar Mapping Project in the south, covering 218km^2.

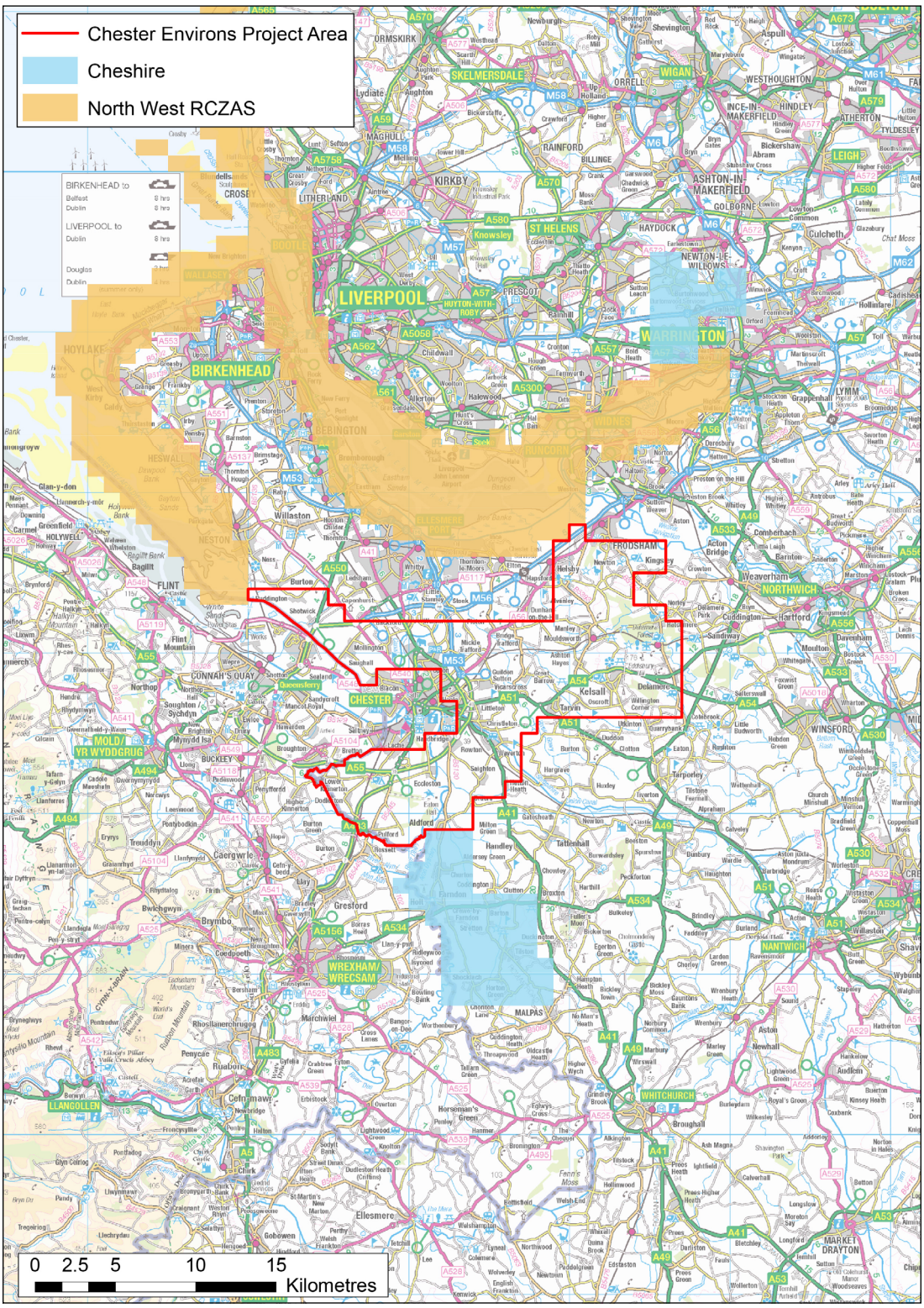


Fig 1: Cheshire Aerial Investigation and Mapping Project: the Chester Environs project area and previous AI&M projects © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

SCOPE OF THE SURVEY

Geography and Implications for Aerial Survey

The project area encompasses the city of Chester comprising a total of 9.3% of the county (218 km^2) in areas where known and unknown heritage assets were judged to be at risk from development and changing farming practices. The following overview of the physical geography of the area covered by the project has been written with reference to the Natural England National Character Area profiles, together with geology data obtained from the British Geological Survey's online Geology of Britain viewer, examined at a scale of 1:50,000, and soil data from the Cranfield Soil and Agrifood Institute (NRSI) Soilscapes Viewer, accessed online, at a scale of 1:50,000.

The project area falls into four of Natural England's National Character Areas (Fig 2): the west falls into NCA 59 (Wirral); the centre within NCA 61 (Shropshire, Cheshire-Staffordshire plain); the east within NCA 62 (Cheshire Sandstone Ridge); the north intrudes slightly into NCA 60 (Mersey Valley). The area can be split into two distinct landscapes: the Cheshire Plain and the Cheshire Sandstone Ridge.

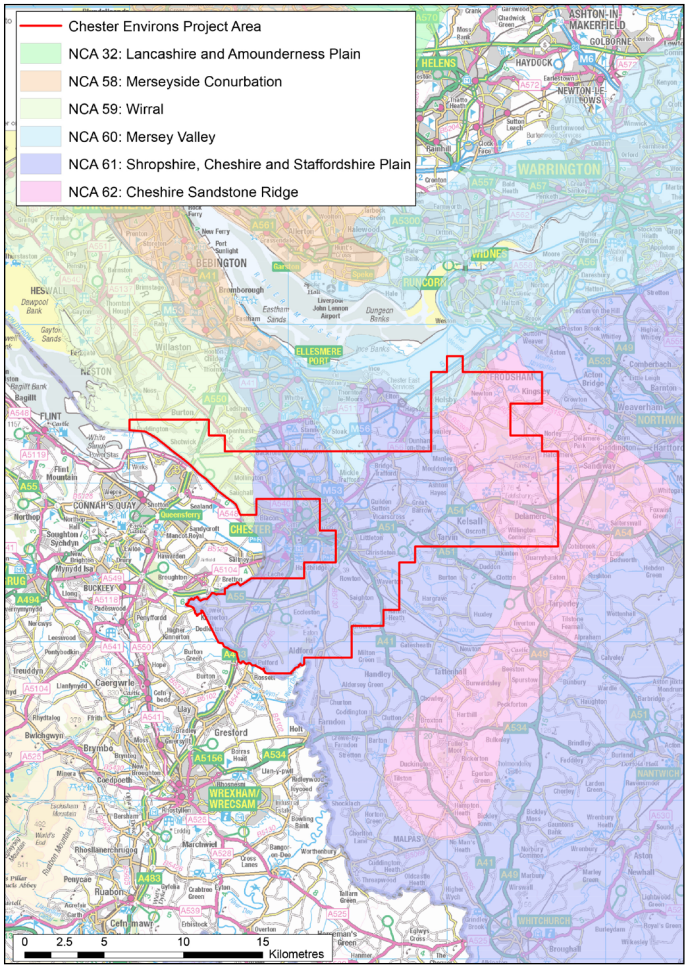


Fig 2: Geographical scope of the Cheshire Aerial Investigation and Mapping Project © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

The majority of the area lies within the Cheshire Plain, 'a quietly undulating country, with many stream flowing gently in wide valleys' (Trueman 1938,) and is devoted to a mix of dairy and arable farming (Natural England 2018a). The geology of the Cheshire Plain is made up of Permian and Triassic interbedded Sandstone and Conglomerate, overlain by glacial till interspersed with alluvium secreted along the river valleys (British Geological Survey 2018a). While

the clay soils of the area result in impeded drainage (Cranfield Soil and Agrifood Institute 2018), the soils create rich pasture for a largely pastoral land-use (Natural England 2018a). Lack of ploughing in the area has proven important for the preservation of earthworks. Aerial reconnaissance conducted in the area around Chester has yielded mixed results. Despite a number of cropmarks relating to Roman camps having been identified around Chester, the soils of the plain are generally ill-suited to cropmark formation in all but the driest years and the overall number of sites identified through cropmarks is low.

The Mid-Cheshire Sandstone Ridge is made up of Triassic mudstone, siltstone and sandstone overlain by glacial till and glacial sand and gravel (British Geological Survey 2018a). Soils in this area are a mix of clay soils with impeded drainage and freely draining sandy soils (Cranfield Soil and Agrifood Institute 2018). Land-use is characterised by low-density pastoral farming with arable farms on the gentler slopes (Natural England 2018b). In theory the geology and nature of soils in the area should make cropmark formation more likely, though in practice few cropmarks have been identified from aerial reconnaissance in the area. This may to some extent be a result of the landscape historically being dominated by the royal forest of Mara (now Delamere) that may have contributed to lower monument density in the medieval period. This does not explain the lack of visibility of monuments from earlier periods that may result from unknown factors making the soils unconducive to cropmark formation or less focus being paid to the area by aerial reconnaissance.

The nature of settlement within the project area has been shaped by the city of Chester that has dominated the area politically and economically since its foundation in the Roman period. Settlement across much of the area is nucleated and tends to be focussed on manorial centres that date back to the Anglo-Saxon and Norman periods. This differs from the east of the area where settlement patterns are much more akin to the rest of the Cheshire Plain and much of the rest of North West England with mainly dispersed settlement patterns in the form of scattered farmsteads and hamlets (Roberts and Wrathmell 2000).

Expansion of housing since 1945 has been particularly pronounced around villages such as Saughall and Mickle Trafford, as well as to the north and north-west of Chester encompassing the villages of Upton and Blacon. Other villages such as Shotwick and Pulford have seen little development in the post-war period and retain their historic character. For this reason historic aerial photography was thought to have great potential for identifying earthworks and cropmarks around villages that have seen significant post-war urban expansion.

Archaeological Scope

The aim of the project is to increase understanding and protection of Cheshire's historic environment by providing a comprehensive dataset of mapped features from aerial sources to the Cheshire HER to help inform the planning process. This was achieved by mapping and recording all archaeological features (earthworks, crop-

marks, soilmarks, parchmarks and structures) visible on aerial photographs and lidar imagery where this was available. The sphere of interest for the project follows AIM guidance (Winton 2018) and is summarised in Appendix 4.

Summary of Sources

Sources consulted as part of the project include all readily available aerial photographs, together with 16-direction hill-shaded lidar (where coverage was available). The HE Archive was the primary source of vertical and oblique aerial photography in both digital and print formats. The vertical photographic coverage from the archive was comprehensive across the project area, ranging in date from 1940 to 2000. The loan consisted of 3730 vertical photographs and 727 obliques, separated into three loans for ease of use. Cheshire HER kindly provided rectified RAF vertical photography covering the entire project area taken between 1945-48. Other sources of vertical photography included orthophotography supplied to HE by Next Perspectives™ through Aerial Photography for Great Britain (APGB), Google Earth™ imagery and Bing Map™ imagery. Oblique photography was provided by the HE Archive and oblique photography from the Cheshire HER was also consulted. Unfortunately the Cambridge University Collection of Aerial Photography (CUCAP) is not currently operational and could not be consulted. CUCAP contains 52 oblique and 235 vertical photographs within the project area. Reference to the CUCAP catalogue shows that obliques within the collection focus on known sites and it is therefore unlikely that sites have been missed by this project as a result of lack of access to the collection. Lidar data provided by the Environment Agency at 50cm, 1 and 2 meter resolutions was consulted and covers *c.* 72% of the project area, 44% of which is at 1m resolution. This was augmented by lidar commissioned for The Habitats and Hillforts Project at 50cm resolution which covers *c.* 65km² of the Mid-Cheshire Sandstone Ridge section (i.e. 24% of the study area). The NRHE database, AMIE, together with HER monument records and Scheduled Monument data, were consulted regularly during the interpretation, mapping and recording programme. The nature of underlying bedrock and surface drift geology, as well as soil types, were used to inform interpretation, with online maps available from the British Geological Survey's 'Geology of Britain viewer' and 'The Coal Authority Interactive Map viewer', and the Cranfield Soil and Agrifood Institute (NRSI) 'Soilscapes Viewer'.

Coverage of historic vertical imagery was geographically and temporally consistent across the project area, maximising the opportunity for cropmark and earthwork identification. It should be noted that the quality of vertical imagery, though good overall, was variable. Adverse weather conditions in which photographs were taken will always have a negative impact on feature visibility across some runs. The effect of this in terms of earthwork identification is negated by the exceptional quality of some of the 1940s photography, in which earthwork features were particularly visible. Mapping of earthworks across the project area is thought to be comprehensive as a result of this. When combined with lidar imagery this provides an excellent resource for evaluating the extent to which medieval ridge and furrow has been levelled since the 1940s. Laser copies were provided for frames where the archive does

not hold a negative of the print. The number of laser copies across the project area was minimal, with little impact on the survey. Few cropmarks were identified in the project area, probably due to a combination of factors but mainly the lack of arable agriculture and presence of poorly draining soils that are less conducive to cropmark formation. This may have contributed to many of the archaeological features identified by the project being visible as earthworks and structures. Therefore, most archaeological features identified by the project were seen as earthworks and structures. It is possible that the extensive earthworks of medieval and post-medieval ridge and furrow across the project area overlie and mask prehistoric and Roman archaeological deposits.

Summary of Methodology

The methodology centred on the systematic study of all aerial imagery covering the project area, adhering to the AI&M standards and methodology (Winton 2019). Vertical and oblique aerial images were analysed under magnification and stereoscopically, where possible, to identify archaeological features in the landscape. Frames in which features were identified were scanned at a resolution of between 400-600dpi and rectified using the specialist AERIAL 5.36 software, with control derived from Ordnance Survey MasterMap® 1:2,500 scale digital maps or 25cm resolution APGB orthophotography. Lidar data was supplied by the Environment Agency in the form of 1km² ASCII files that were processed in Relief Visualisation Toolbox 1.1 to produce 16-direction hill-shaded images. Rectified images, georeferenced orthophotography, and lidar imagery were inserted into ArcMap 10.4 where they were analysed and mapped from. The mapping conventions and layer structure used in the drawing files are summarised in Appendix 2. Details of each feature were recorded as monument data in an object data table attached to each shapefile, along with an NRHE number allowing each feature to be identified in the national and local historic environment records (Appendix 3). Archaeological features were also recorded in AMIE, the NRHE maintained by Historic England. Records consist of an interpretation, assignation to a period, the location, a description and sources from which a given feature was identified. New records were created for previously unrecorded sites and those with existing records were updated. A list of the monument types used for this project is compiled in Appendix 5. APGB orthophotography was used to record the latest monument condition for earthworks and structural elements, unless more recent lidar imagery or photography was available. In addition, the corresponding HER number for a feature (where existing) was included in the attached mapping data to aid concordance between local and national records (Appendix 3). The monument types conformed to the Historic England thesaurus and are listed in Appendix 5. Copies of the digital drawing files were deposited in the HE Archive in Swindon and are shared with the Cheshire HER.

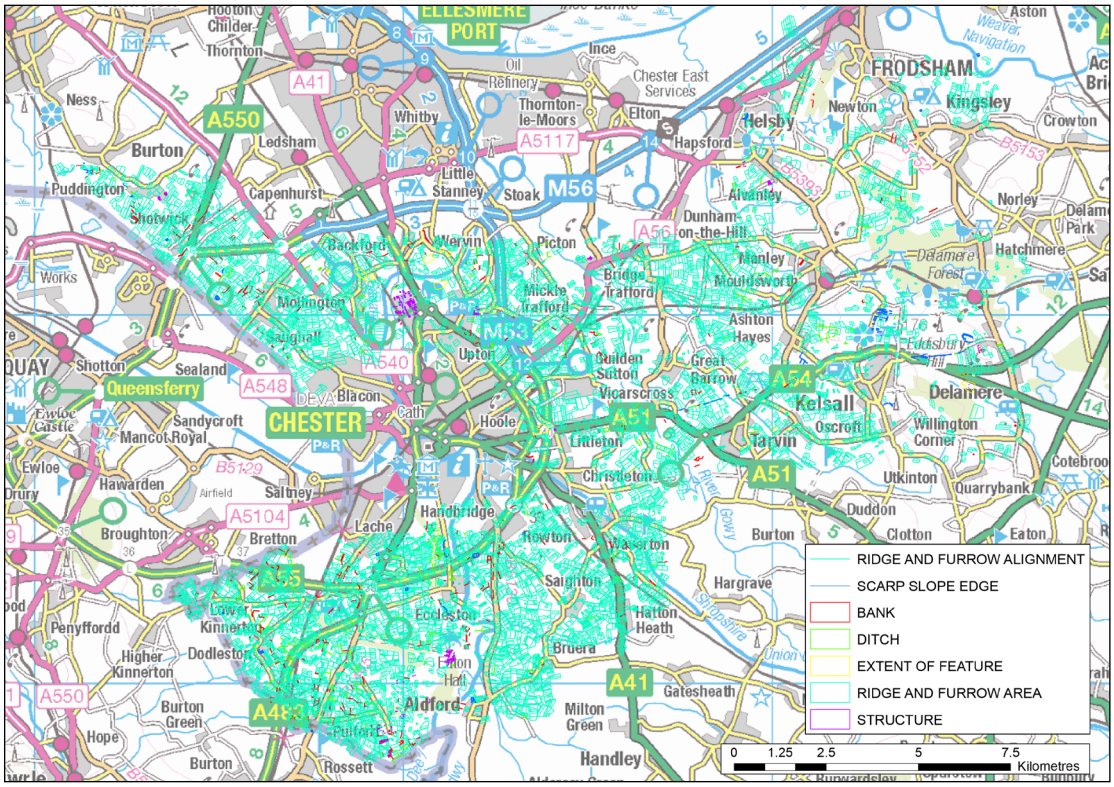


Fig 3: Cheshire Aerial Investigation and Mapping Project: the Chester Environs project mapping. © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

HIGHLIGHTS OF THE PROJECT
SUMMARY OF PROJECT RESULTS

A summary of the results of aerial investigation and mapping of archaeological features across the project area is presented below on a broad period-by-period basis. This section is intended to highlight the key discoveries of the project, as well as providing the reader with a more general sense of the nature of archaeology in the study area and how this is visible in aerial evidence. It establishes the themes to be addressed in subsequent chapters as well as highlighting where features were already known to the HER and where they represent new discoveries.

A total number of 233 new records were created in the NRHE database and a further 40 existing records were updated and enhanced. As a result, 85.3% of the records produced comprised new monuments in the NRHE. In addition, 171 of the records were new to the HER and 62 existing entries were updated (63.7% of the total therefore being new to the HER).

Archaeological sites within the project area span the Bronze Age to the Second World War (Fig 3). Archaeological features relating to medieval/post-medieval agriculture are spread most widely across the area, the most common being ridge and furrow, survival of which was found to be extensive across the project area as evidenced in historic vertical photographs.

Bronze Age

Around 30,000 Bronze Age round barrows have been identified across Britain (Parker Pearson 1993, 91) and, though these monuments are equally common in Cheshire, they are somewhat unusual in that they tend to occur in isolation from one another and rarely in groups. These monuments are particularly conducive to identification by aerial survey as a result of their visibility, often surviving in the landscape as distinct earthworks.

The Seven Lows barrow cemetery was first depicted by George Ormerod in his *History of Cheshire* (1882) as seven distinct round barrows in the vicinity of Fishpool Lane, in the south-east of the parish of Delamere. The site represents one of only two scheduled barrow cemeteries in Cheshire. The project identified and mapped six barrows (71169) as earthworks, cropmarks and soilmarks in the vicinity of Fishpool Lane Farm (Fig 4). The reason for variability in the visible evidence of these monuments is the denuded nature of many of the earthworks, some of which have been totally levelled by ploughing resulting in them only being visible as soil and cropmarks. Recent research of the site (Garner 2021) has used map regression to elucidate which of the surviving earthworks relate to those mapped by Ormerod. This concluded that a saucer barrow identified and excavated by Dan Garner in 2012 was not one of those mapped by Ormerod. The saucer barrow was mapped by this project as earthworks visible in lidar imagery. A probable barrow (71169), newly identified by this project, is visible as a cropmark and does not align with

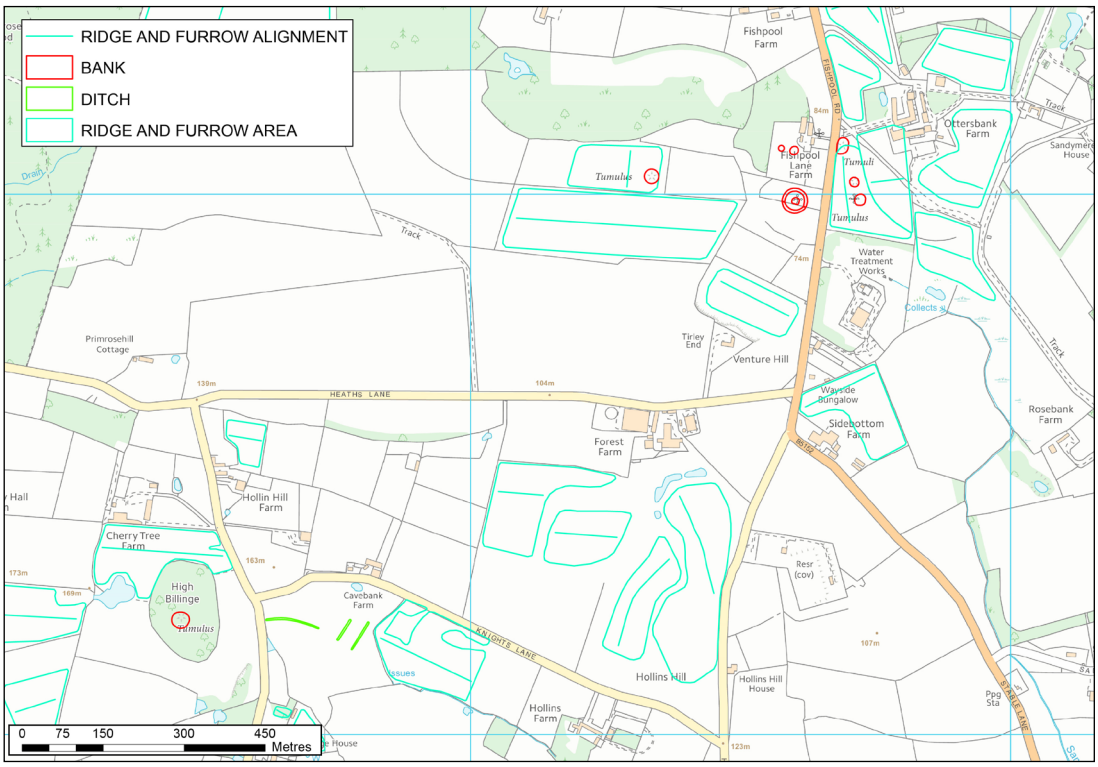


Fig 4: Project mapping of Seven Lows barrow cemetery and High Billinge bowl barrow, centred at SJ 561 666 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

those mapped by Ormerod. Three other known Bronze Age barrows were mapped as isolated earthworks within the project area: a barrow (71228) is situated at the peak of High Billinge 1.4km south-west of the Seven Lows barrow cemetery, a barrow (71169) situated 230m west of the Seven Lows cemetery but included in the same NRHE record, a barrow known as Gallowsclough Cob Tumulus (71597) on the north side of Gallowsclough Lane, in the north-west parish of Oakmere.

Iron Age/Roman

Monuments relating to the Iron Age are well represented in the project area with five hillforts surviving as earthworks, all of which are situated on the Mid-Cheshire Ridge. These sites have been the subject of much archaeological interest and investigation over the years (see Garner 2016 for a full account) and very few of the Iron Age features mapped by this project had not been recorded previously. Kelsbarrow promontory fort (71310) lies 500m south-east of the village of Kelsall. Mapping of this monument included a newly identified rampart, visible as a 15m wide earthwork bank in historic vertical photographs that forms an annex to the main enclosure. This feature is not visible in the latest lidar images of the site and was not identified by earthwork or geophysical survey carried out by the Habitats and Hillforts Project (Garner 2016). It is therefore assumed to have been levelled since 1947 when the aerial photographs were captured, though a site visit would be need-

ed to confirm this which was not possible in the limited amount of time set aside for this project. While aerial survey of these sites revealed few new features, mapping produced by the project for the first time allows for the hillforts of the Mid-Cheshire Ridge to be viewed alongside one another in a single dataset along with surrounding archaeology such as the Chester-Nantwich Roman road that runs past Eddisbury.

Evidence for Iron Age/Roman settlement deriving from aerial imagery is limited to two sites. A cropmark relating to a curvilinear enclosure (1622998) identified from aerial photography adjacent to Puddington Lane. An Iron Age/Roman date for the enclosure was confirmed through excavation and it is closely associated with a possible Roman farmstead in an adjacent field 160m to the north. There is a distinct lack of evidence for Prehistoric and Roman settlement across the project area. In part this is a result of destruction of earlier earthworks by medieval ploughing that has been shown to have covered much of the project area. In areas of poor earthwork survival identification of sites relies on the formation of visible cropmarks. The soils in the Dee Valley are unconducive to cropmark formation due to their clayey composition, resulting in impeded drainage that makes cropmark formation unlikely in all but the driest of summers. This combination of factors has resulted in the poor representation of Prehistoric and Roman settlement in the project mapping that does not reflect an accurate picture of the archaeological record, as evidenced by the number of prehistoric and Roman settlements identified through excavation.

Arguably the most significant contribution of the project is the mapping of 20 probable Roman enclosures, visible as earthworks and cropmarks around Chester. Sixteen Roman enclosures had previously been identified by ground survey and aerial reconnaissance in the area. Seven of these enclosures (1031510, 1083052, 1083047, 1302525, 69053, 1623657; Fig 5), were identified in the parish of Upton-by-Chester, largely as a result of aerial reconnaissance undertaken by Robert Philpott and Dr Jill Collens during the particularly dry summers of 1994 and 1995 (Philpott 1998). These enclosures have been interpreted as practice camps constructed as a means of drilling legionaries stationed at the fortress at Chester in the art of camp construction (Philpott 1998). Mapping of these features has highlighted enough morphological variety among these enclosures to question a single interpretation of the enclosures. A prime example of this is Enclosure 2 (1031510) a double banked rectangular enclosure which, given the substantial nature of the surviving earthworks, may represent a more permanent camp.

Sections of the Chester to Manchester and Chester to Middlewich Roman roads (1623691, 1626122, 1626127, 1626176) were identified and mapped as earthworks from historic aerial photography and lidar imagery. The roads are visible in two sections: the first (1623691) runs 800m north-west of the village of Tarvin; the second (1626112, 1626172, 1626176) runs through the parish of Delamere beginning with the junction of the Chester to Manchester and Chester to Middlewich Roman road visible as well-preserved earthworks in Nettleford Wood past the south side of Eddisbury Hillfort.

Nine probable Roman enclosures (1623690, 1629055, 1629053, 873484,

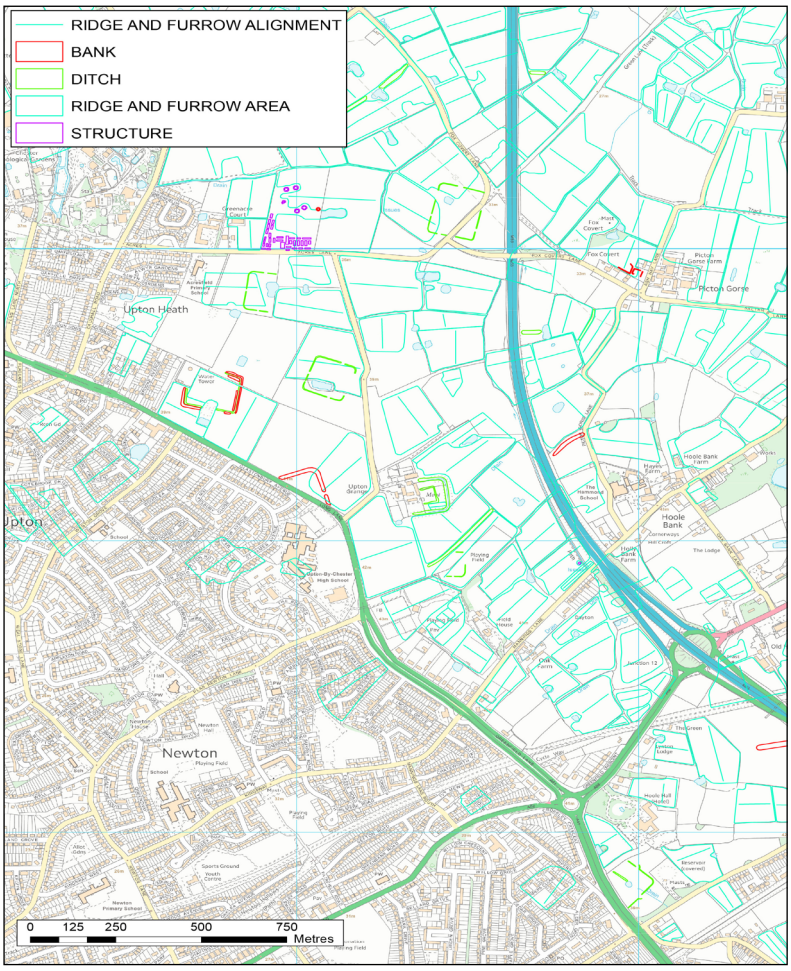


Fig 5: Project mapping of Roman camps, the moated site at Upton Grange and a heavy anti-aircraft battery, centred at SJ 423 691 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

1083033, 873484, 873485, 1629063, 1629065) are visible as earthworks in lidar and historic aerial photographs in close proximity to the Chester to Manchester Roman road (1165058). On the north side of the Chester to Manchester road three newly identified enclosures (1623690, 1629053) have been mapped as earthworks visible in lidar imagery. Two of these enclosures (1623690) are located just over 1km south-east of Great Barrow in the parish of Barrow and are located directly adjacent to the other (Fig 6), while the other (1629053) is located 1.43km west of these overlooking the point at which the Roman Road crossed the River Gowy, now Stamford Bridge. On the south side of the road six enclosures (873484, 873485, 1083033, 1629055, 1629063, 1629065) have been mapped as earthworks, three of which are newly identified (1629055, 1629063, 1629065). The most significant new discovery is Enclosure 16 (1629065), a newly identified rectangular enclosure visible as a fragmented 5m wide bank and external ditch that encloses an area of 1.2 hectares. This enclosure appears to be set in the corner of a larger rectangular enclosure (1629065) visible as a far more substantial 13m wide bank that encloses an area of approximately 3 hectares. The smaller enclosure appears to truncate the larger, making this a good candidate for further archaeological investigation given the stratigraphic potential of the site.

Excavation of Enclosure 1 (1302525) by Nick Higham (1987) highlighted the stratigraphic potential of these sites to contribute to our understanding of the development of Roman camps in Britain. The presence of such a large number of morphologically varied enclosures in the area presents a unique opportunity for further archaeological investigation of these sites make a significant contribution to our

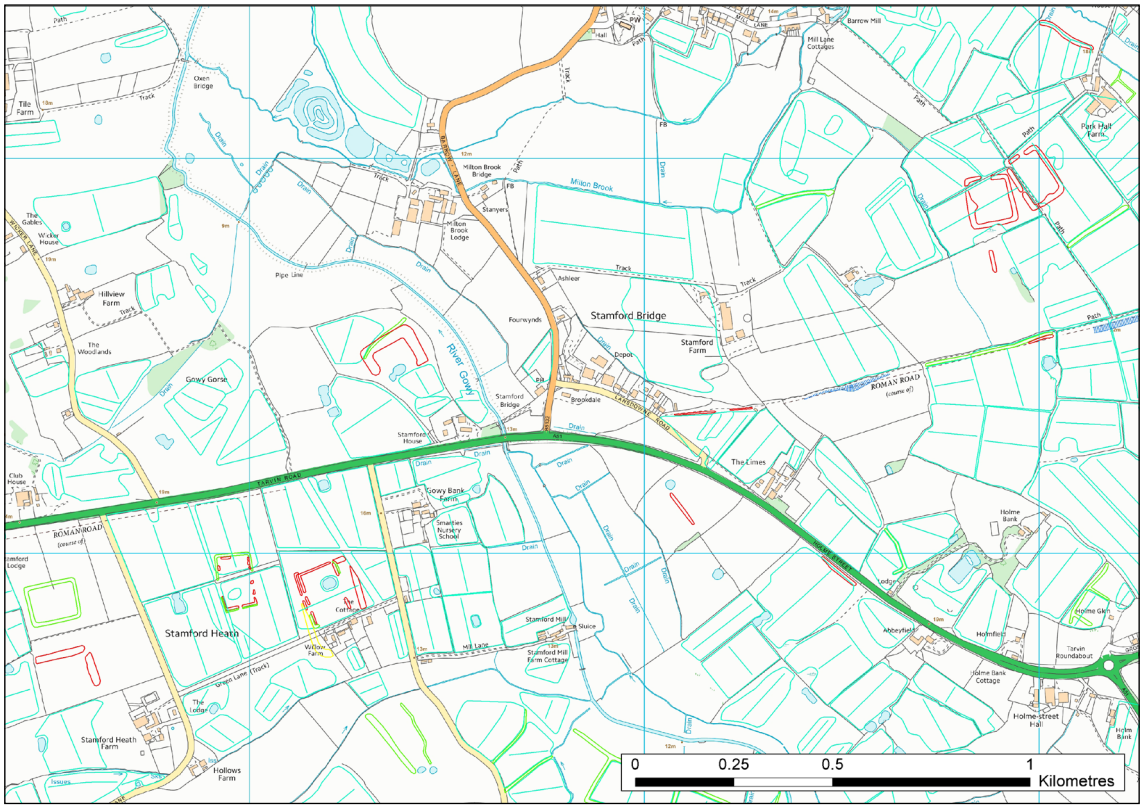


Fig 6: Project mapping of Roman camps adjacent to the Chester-Manchester Roman road, centred at SJ 467 673 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

understanding of how these sites developed and functioned.

Medieval Period

Medieval earthwork survival was found to be extensive across much of the west and south of the project area, mostly consisting of earthworks relating to field systems visible in historic aerial photographs and lidar images (Fig 7). Mapping produced by this project highlights how the largely pastoral farming landscape of today marks a distinct shift from the medieval period when the west Cheshire hundreds of Wilaveston and Dudestan are described as being home to the lion's share of the county's plough teams and lands (Higham 2007, 60). This is borne out by the archaeological evidence for extensive survival of medieval earthworks related to arable agriculture mapped by the project. The mapping data produced identifies areas of surviving ridge and furrow, allowing for targeted management of earthworks and analysis of areas where earthworks have been levelled since its capture in historic photography. A large number of medieval manorial centres have been identified and mapped. Together with extensive mapping of medieval field systems around these manorial centres, mapping provides an excellent opportunity for this data set to be interrogated to assess how the landscape was managed in the medieval period and how this varied between estates.e
A newly identified moat (1623020) is visible as earthworks in lidar imagery in the

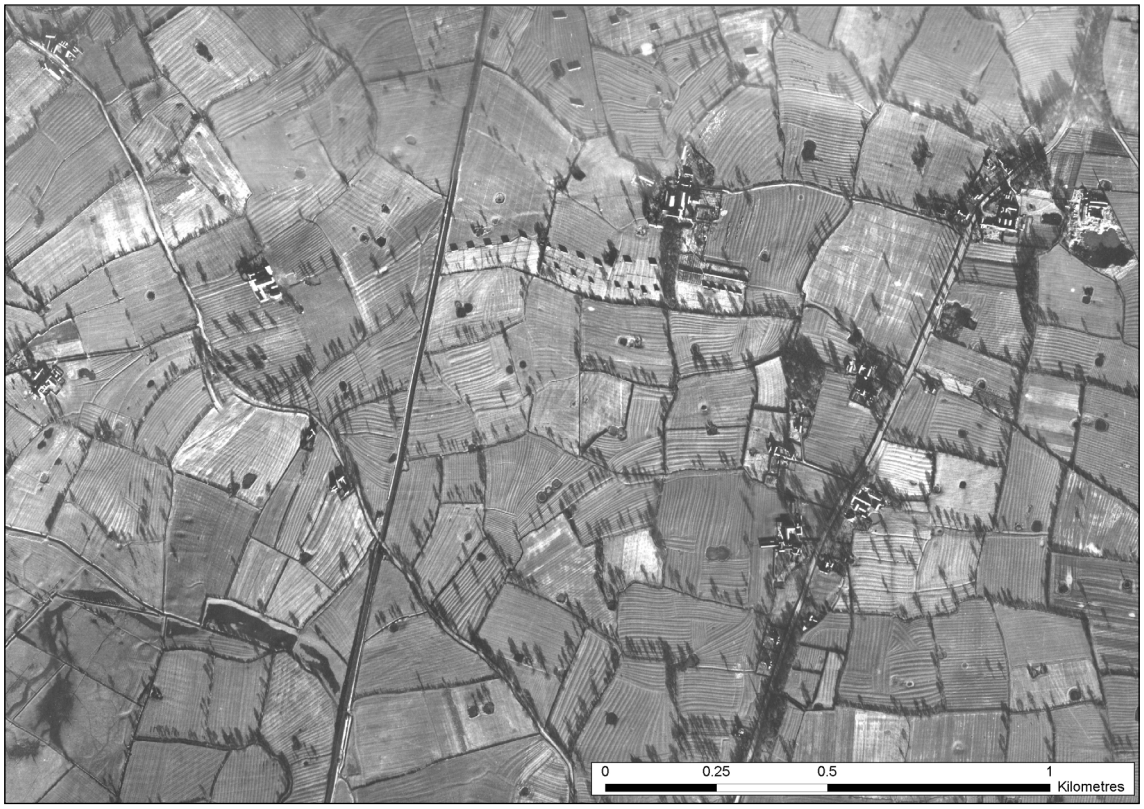


Fig 7: Vertical aerial photograph showing the extent of earthwork survival visible in historic photography in the project area (part-frame), centred at SJ 377 594. RAF/CPE/UK/1935 FP 1217-1221 17-JAN-1947 Historic England Archive (RAF Photography).

grounds of Puddington Old Hall Farm in the parish of Puddington (Fig 8). This is in addition to the known moat (1623017) that surrounds the Old Hall alongside rectilinear earthworks that likely represent garden terraces (1623014). A newly identified moat (67131) is visible as earthworks in lidar in the grounds of Shotwick-lodge Farm that may relate to the medieval hunting lodge that existed there or the manor house that succeeded it. Shotwick Castle (67153) is visible as earthworks in lidar and extensive medieval field systems survive as earthworks visible in historic aerial photographs and lidar in the vicinity of the castle and surrounding the village of Saughall. These consist of medieval ridge and furrow (1623066, 1623121, 1623105), hollow ways (1623048, 1623066) and plough headlands (1623145, 1623048).

The remains of a probable structure (1625899) are visible as rectilinear earthworks 160m north of Woodhouse hillfort. This has the potential to be significant: the lack of any evidence of a farmstead or other building on historic mapping suggests this substantial structure may be medieval/post-medieval. Six mounds were mapped in the north and south-west of the project area (1623044,1623046, 1629007, 1629031, 1629030) that were interpreted as windmill mounds as a result of their integration into surrounding medieval/post-medieval field systems. It should be noted that these earthworks retain the possibility of being barrows but this cannot be established without excavation.

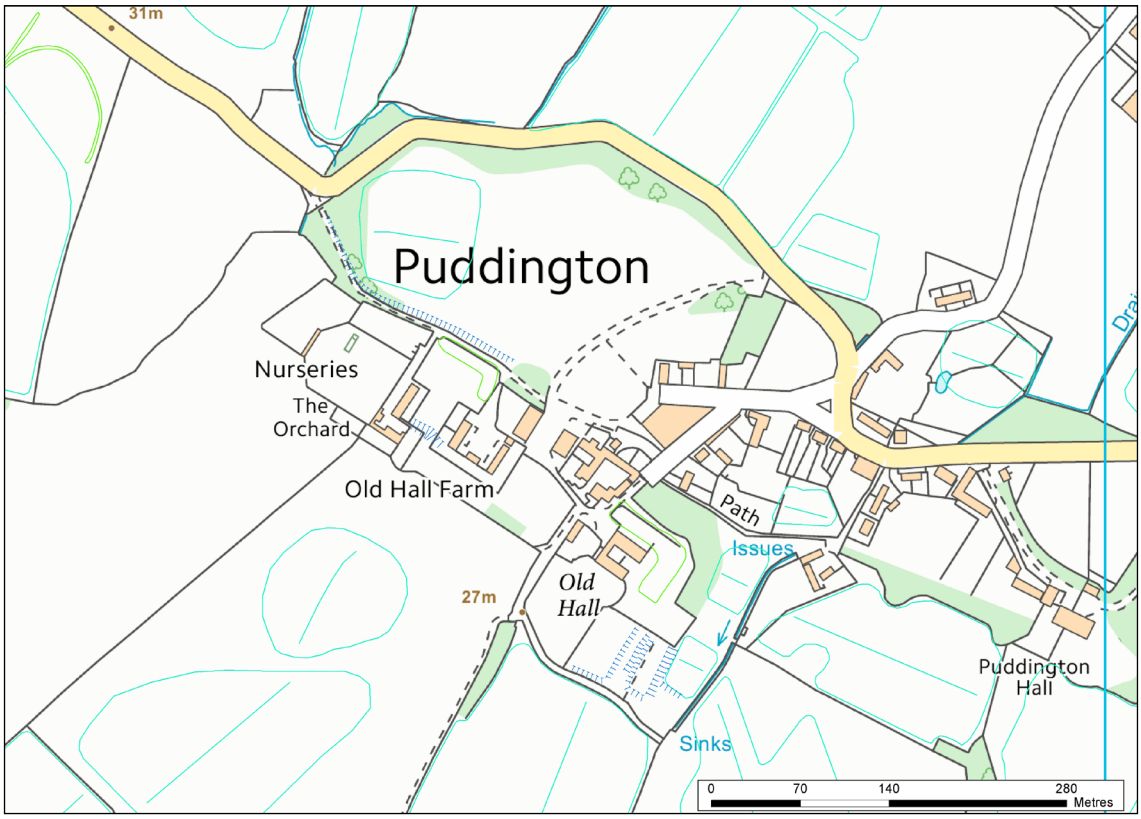


Fig 8: Project mapping of two moats visible as earthworks in the village of Puddington, centred at SJ 325 733 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

Medieval lynchets (71636) are visible as earthworks on lidar imagery adjacent to Longley Wood in the parish of Kelsall (Fig 9). The field system is scheduled, but this project has mapped the lynchets extending far beyond the scheduled area. A medieval field system survives as earthworks visible on historic aerial photography and lidar imagery in the north of Delamere Forest and the New Pale. This consists of medieval ridge and furrow (1925993, 1925996), hollow ways (1626009), field boundaries and plough headlands (1626012) that have been protected from destruction by tree cover and the earthworks are well preserved. Survival of ridge and furrow in this area is significant given the lack of evidence for medieval field systems in the area. This suggests ridge and furrow may have been just as extensive in this part of the project area and the lack of surviving earthworks is a result of levelling by modern ploughing.

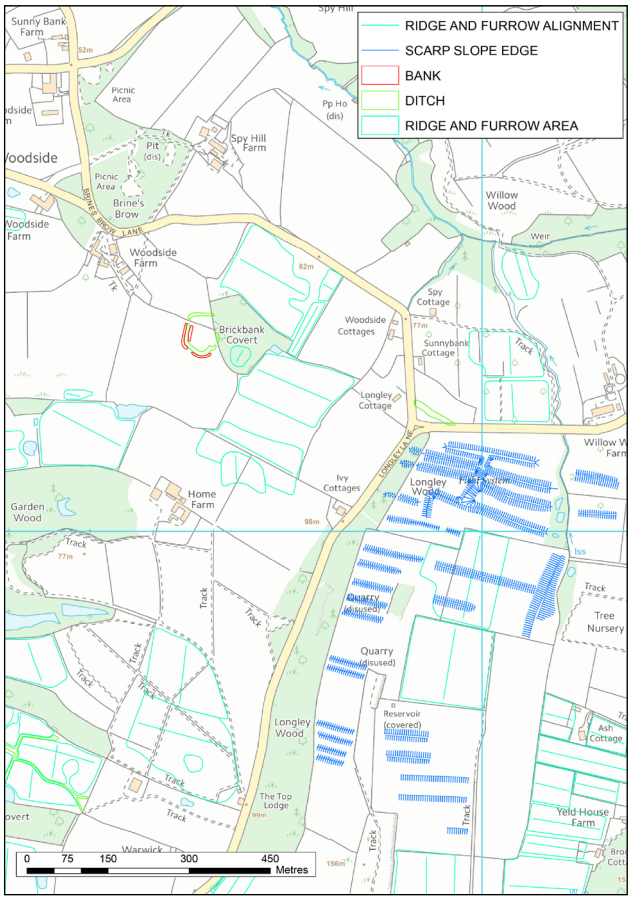
A moated monastic grange and two associated fishponds (71498) are visible as earthworks in lidar imagery *c.* 850m south-west of Parkside Farm in the parish of Aston. Earthworks associated with the site are notable for their excellent state of preservation, surviving under the tree cover of Moat Wood.

A motte and bailey (67153) is visible as earthworks in historic aerial photography

and lidar imagery in the village of Dodleston. Aerial mapping of the motte and bailey earthworks from lidar has provided more detailed mapping of the moat surrounding the monument.

A moated site (66972) is visible as earthworks in historic aerial photography and lidar imagery at Dodleston Hall, north-west of the village of Dodleston. This site is significant as it highlights the shift in seignorial power from the castle at the centre of a planned medieval village to more peripheral moated sites (see discussion p37). Medieval field systems survive as earthworks visible in historic aerial photography and lidar imagery surrounding the village.

A churchyard surrounded by an oval bank (69347) is postulated as being early medieval and is visible as earthworks in lidar imagery in the village of Eccleston. Though previously identified as being of potential archaeological significance and having previously been mapped as a field boundary by the Ordnance Survey, mapping by this project is the first time surviving earthworks depicted as an archaeological feature. It has been suggested that oval-shaped churchyards represent early medieval Christian sites aligned with the western Celtic tradition of Christianity that was prevalent in Wales and Ireland in the period and this example can be viewed alongside similar oval-shaped churchyards recorded in Shropshire and Herefordshire (Gelling 1992, 86-92).



A second oval-shaped churchyard is recorded in the Cheshire HER (1951/1/3) as surrounding St. Mary's church in Bruera. A site visit conducted as part of the project identified the former oval-shaped churchyard boundary surviving as a slight bank planted with Yew trees that surrounds the church. As a result of a gap in lidar coverage around Bruera this feature was not mapped by the project. A moated site (69422) is visible as earthworks on the west side of Chapel Lane in Bruera opposite

Fig 9: Project mapping of a rectilinear enclosure and medieval lynchets, centred at SJ 527 701 © Crown Copyright and database right 2019. All rights reserved. Ordnance Survey Licence number 100019088.

the church. This site is scheduled along with the medieval field systems associated with it, all of which were surveyed by the Royal Commission on the Historical Monuments of England (RCHME) in 1986. This project found that earthworks relating to the moat and its associated field systems were well defined in historic vertical photography, allowing for mapping of these features despite a lack of lidar coverage of the area.

A known moated medieval grange (69302) is visible as earthworks in historic aerial photography and lidar imagery in the parish of Huntington 1.25km north-east of the village of Eccleston. Lidar showed that earthworks relating to the site are particularly well-preserved. These consist of a series of ditches and escarpments that partition the 3ha area enclosed by moat, as well as three fishponds that were mapped by the project.

Post Medieval

Few post-medieval features were identified by the project, the majority of features consisting of post-medieval ridge and furrow spread across the project area. Earthworks relating to a narrow-gauge railway line (1381018) associated with the Eaton Hall estate are visible in lidar imagery running through the village of Belgrave. This was constructed in 1896 to improve efficacy in the transport of coal and other building materials to Eaton Hall. A newly identified mound (1629007) is also visible in the grounds of the Eaton Hall estate in historic aerial photographs. A temple depicted on an 18th century illustration of the grounds appears to correlate with the location of the mound (see Plan of Eaton Hall and Park c. 1740 by Badeslade and Thom).

Second World War/Cold War

Features relating to the Second World War mostly consist of anti-air defence sites, with relatively little evidence of civil defence in the form of air-raid shelters. Four heavy anti-aircraft batteries and two searchlight batteries have been identified in the project area serving to defend the city of Chester and the southern approach to Merseyside. A heavy anti-aircraft battery and associated military camp (1019848) are visible as structures and earthworks in historic aerial photography and lidar imagery on the north-east side of the village of Puddington (Fig 10). The battery itself is a scheduled monument while the camp (now levelled) lay outside the scheduled area. A heavy anti-aircraft gun emplacement and associated military camp (1412953) are visible as structures and earthworks in historic aerial photography in fields east of the village of Upton Heath. A heavy anti-aircraft gun emplacement and associated military camp (1625980) are visible as structures and earthworks in historic aerial photography south-east of the village of Alvanley. A searchlight battery and associated military camp (1625976) are visible as structures and earthworks in historic aerial photography west of the village of Alvanley, which are situated on higher ground that constitutes the western extents of the Mid-Cheshire Ridge. A heavy anti-aircraft gun emplacement (1412960) is visible as structures on historic aerial photography in the village of Lower Kinnerton.

A military camp (1629052) is visible as structures and earthworks in historic aerial photography north of the village of Bridge Trafford. A military depot and camp (1626221) are visible as structures in historic aerial photography north of the village of Littleton. The depot seems to have continued in use after the war, still being present in aerial photography taken in 1952 with military vehicles lined up in the camp. Very few air raid shelters have been identified in the project area. This is almost certainly a reflection of the rural nature of the area covered by the project and it is likely far more were present in Chester. An air-raid shelter (1625983) is visible as a structure and earthworks in historic aerial photography behind a school in the village of Alvanley. Four air-raid shelters (1625957) are visible as structures and earthworks in historic aerial photography in the village of Helsby. A rifle range (1625905) is visible as structures and earthworks in historic aerial photography in Dunsdale Hollow between Helsby and Frodsham. A searchlight battery and associated military camp (1626133) are visible as structures and earthworks in historic aerial photography in the village of Delamere. A camp (1626141) was identified as structures in historic aerial photography on the south side of the Middlewich Road at the junction with Stoney Lane. This appears to have functioned as a timber yard harvesting trees from nearby Delamere forest.

RAF Poulton (1629029), a military airfield, is visible as structures and earthworks in historic aerial photography to the east of the village of Poulton alongside three military camps

Fig 10: Vertical aerial photograph showing a heavy anti-aircraft battery and associated military camp by the village of Puddington (part-frame), centred at SJ 334 371. RAF/581/682 F22 97 14-MAR-1955 Historic England Archive (RAF Photography).

visible as structures and earthworks in historic aerial photography in the village of Poulton. It is likely these camps are associated with the airfield. A military training site, the Royal Naval College (1629012), is visible as structures and earthworks in historic aerial photography at Eaton Hall. The college was relocated after sustaining bomb damage in Dartmouth in 1943. Practice trenches and a blast pen are visible as earthworks in historic aerial photography on the north side of Saighton Camp (1629020).

MAKING A MARK: MONUMENTALITY IN THE LANDSCAPE

Nine Bronze Age barrows have been mapped within the project area, one of which is newly identified. The majority of these are located in the east of the project area among the steep hills of the Mid-Cheshire Ridge, though it is possible that some of the six windmill mounds identified in the north-west of the project area may in fact be barrows. These monuments were differentiated by their relationship with surrounding medieval field systems, which does not preclude medieval utilisation of barrows as windmill mounds. Where this may have been the case it has been made clear in the corresponding NRHE records. The only Bronze Age site mapped by the project is the barrow cemetery at Seven Lows. This is significant as one of only two barrow cemeteries thus far identified in Cheshire.

The cemetery is located on a slight natural mound within a meander of Sandyford Brook. The site is traditionally thought to have consisted of seven barrows first mapped by George Ormerod in his *History of Cheshire* (1882), published between 1816 and 1819 (Garner 2021). The denuded nature of the earthworks has resulted in confusion as to the location and number of surviving monuments at the site, culminating in one of the barrows being descheduled by English Heritage in 1994. Garner's (2021) report on the site combines map regression with archaeological investigation of the descheduled barrow to reconcile historic mapping of the site and assess the survival of monuments. The descheduled barrow was excavated by the Habitats and Hillforts Project in August 2012 and was interpreted as being of either saucer or disc type (Dodd 2012). Finds from the barrow included the remains of four Bronze Age Collared Urns, which appear to have been deposited as cremation

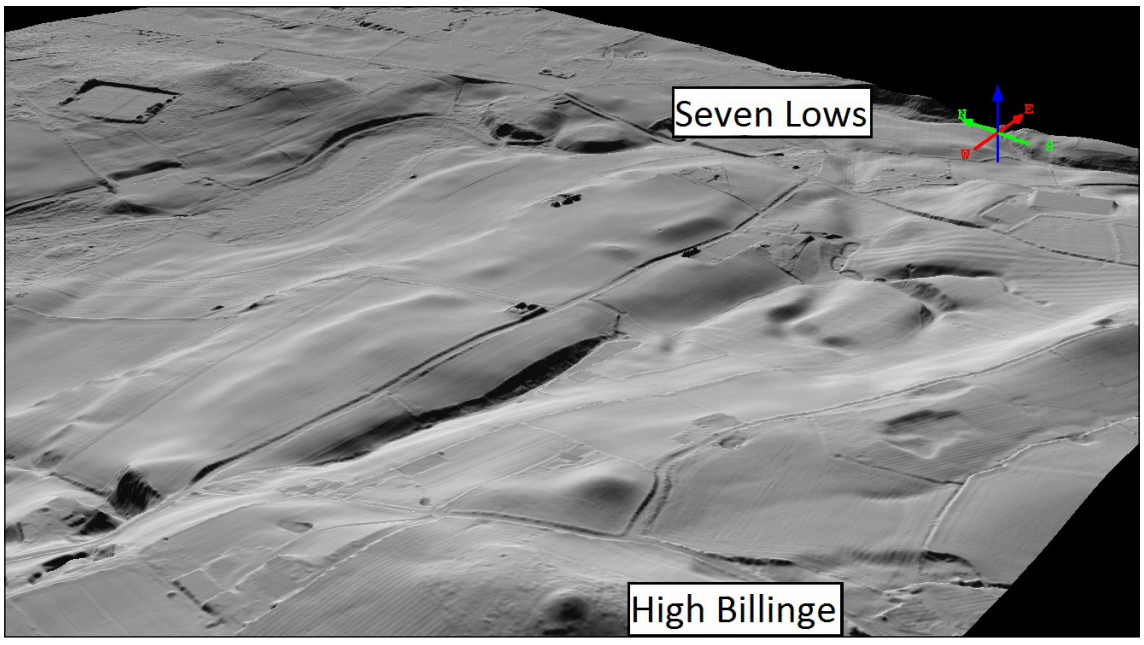


Fig 11: Lidar imagery showing High Billinge bowl barrow in the foreground and Seven Lows barrow cemetery in the background, centred at SJ 559 665. LIDAR SJ 5566, 5567, 5666, 5667 Environment Agency FIRST RETURN 21-Nov-2015 © Environment Agency copyright 2022. All rights reserved.

vessels, and an assemblage of Mesolithic flint, the profile of which indicates the site had been used for flint knapping (Dodd 2012). Study of aerial images as part of this project resulted in the identification of six barrows on the northern side of Sandyford Brook that survive as earthworks, cropmarks and soilmarks visible in lidar and aerial images. If we accept Garner's (2021) conclusion that the excavated barrow does not relate to those mapped by Ormerod, then four of the six barrows mapped by this project relate to those mapped by George Ormerod. The two additional barrows consist of that excavated by Garner and a potential newly identified barrow, mapped by this project as a cropmark 40m south-west of Fishpool Lane Farm.

Recent studies of barrows in Britain have highlighted mounting evidence for pre-mound activity at these sites. This is often represented by pre-existing ditched enclosures that provide a focus for human activity and burial for an extended period of time before being 'closed' through construction of a barrow mound (Last 2007, 173). Given the recovery of a scatter of Mesolithic flints during Garner's excavation, along with a Neolithic and Bronze Age pottery (Dodd 2012), further archaeological investigation of the cemetery may prove useful in elucidating how ritual significance came to be attached to sites that provided a focus for human activity over an extended period of time.

An interesting counterpoint to the Seven Lows cemetery is provided by the scheduled bowl barrow at High Billinge, located at the summit of a hill overlooking Seven Lows in the valley bottom (Fig 11). Lewis' (2007, 82) discussion of the setting of round barrows on the Mendip Hills highlights the importance that may have been attached to barrows located in prominent places and the potential significance attached to what could be seen looking from these places rather than looking to them. The barrow at High Billinge is the only barrow in the project area located in such a prominent position, with views from the monument extending at least as far as Northwich 8 miles to the north. Along with further archaeological investigation, study of the inter-visibility between the barrows of the Cheshire Ridge may improve our understanding of the Bronze Age funerary landscape in the region.

The hillforts of the Mid-Cheshire Ridge have been important features of the landscape since the Bronze Age and remain so to this day. Five hillforts have been mapped as part of the project; four promontory forts at Helsby, Kelsbarrow, Woodhouse, Bradley, and a multi-vallate hillfort at Eddisbury. Hillforts are thought to have fulfilled a range of functions and may represent centralised control of the local economy through redistribution of goods by a tribal elite (Cunliffe 1995). The close proximity and distinct morphologies of these hillforts provide an opportunity to better understand how they functioned and perhaps establish a chronology for their development. This was recognised and incorporated into the research aims of The Habitats and Hillforts Project (Garner 2016) which found evidence for middle and late Bronze Age occupation and enclosure at each of the hillforts in the project area. Eddisbury provides evidence for occupation over the most prolonged period, stretching from the Bronze Age through to the Anglo-Saxon period, with rampart construction and enclosure of the hill established to have taken place in the early Iron Age through radiocarbon dating (Garner et al 2016). Due to the shallow nature

of soils at Eddisbury, the only surviving archaeological remains within the hillfort were an alignment of five post-holes dated to the middle Iron Age and found to contain seeds such as barley, wheat and a prunus fruitstone (Garner 2016, 169). Evidence for hillforts providing central points for the storage of grain is widespread, with storage pits and granaries identified at a number of sites (Cunliffe 1995, 376). While there is no direct evidence of grain storage from Eddisbury, the contents of the postholes show that cereal was being cultivated in the vicinity and brought into the hillfort for processing and presumably storage, highlighting the central role the hillfort would have played in the economy of the region during the Iron Age. The central role Eddisbury played within the local economy during the middle Iron Age is further highlighted by the five or six entrances that have been identified at the site facing in every direction. In this respect the architecture of the site during this period appears to reflect that of a communal gathering place as opposed to one designed to regulate and control movement through a single entrance (Pope *et al.* 2020).

While the hillforts in the project area are well-documented through detailed earthwork and geophysical survey undertaken by RCHME and The Habitats and Hillforts Project (2016), reference to historic aerial photographs as part of this project has allowed for new features to be identified and mapped. A secondary rampart approximately 15m wide was identified from historic aerial photographs at Kelsbarrow hillfort and appears to enclose an area to the east of the main promontory fort enclosure. This feature is not visible in the most recent lidar and is likely to have been levelled by episodes of ploughing that are known to have occurred since the 1950s when the feature was visible (Garner 2016, 217). The discovery of a secondary rampart at Kelsbarrow hillfort is significant for the interpretation of the site that has been shown to date to the late Bronze Age and represents a rare early type of hilltop enclosure (Garner 2016, 233). Whether the secondary rampart is contemporary with this early phase of occupation or represents a later Iron Age addition to the monument can only be answered by the recovery of dating material from the rampart through excavation.

DEFENSIVE AND MILITARY SITES

The number of defensive and military sites identified in the project area reflects Chester and its hinterland's history as a frontier region from the Iron Age to the late-medieval period. Chester and its port have been strategically important since their foundation in the Roman period, providing a base from which power could be projected along the west coast of Britain and across the Irish Sea. The earliest defensive sites within the region do however pre-date the establishment of Chester itself; the hillforts that occupy the Mid-Cheshire Ridge. The impressive ramparts of developed hillforts such as Eddisbury had a clear defensive function, providing protection for the communities that resided in and around these sites. The size of the surviving ramparts and the gatehouse uncovered during the excavation of Eddisbury (Varley 1950) demonstrate the importance attached to defence of the site by its inhabitants. The architectural evolution of Eddisbury hillfort suggests an increasing concern with defence during the second and first centuries BC with the closure of most of the earlier entrances as well as a narrowing and lengthening of the north-west entrance (Pope *et al*. 2020). Varley's discovery of a pile of slingstones by one of the entrance further reinforces the defensive nature of the site and a possible increase in conflict during the late Iron Age (Varley 1950).

The arrival of the Romans and the foundation of the legionary fortress of Deva marks a distinct shift in how defensive sites functioned in the region. The fortress functioned as a legionary base on the frontier of the empire from which the Roman navy could project power over the Irish Sea and the Roman army could exert control over north Wales and north-west England. The fortress was established as part of the Roman advance into north-west England and was a key component of Julius Agricola's strategy for the conquest of the North, acting as the naval base from which Agricola's legion XX Valeria Victrix could be supplied and supported by sea as it advanced north along the western foothills of the Pennines (Shotter 1973, 41).

20 probable Roman enclosures have been mapped from cropmarks and earthworks surrounding Chester, the largest concentration of which are situated in the parish of Upton-by-Chester (Fig 12). 16 Roman enclosures had previously been identified around Chester, the majority as a result of aerial reconnaissance in the area undertaken by Robert Philpott and Dr Jill Collens during the particularly dry summers of 1994 and 1995 (Philpott 1998). Of the 16 enclosures identified by Collens and Philpott, 13 were identified by this project and mapped accordingly. This excludes Philpott's Enclosure 7, a scheduled moated monastic grange that may have Roman origins, as well as enclosures 10 and 11 for which no evidence could be found in the images referred to as part of this project. Of the remaining six probable Roman enclosures mapped by this project one was recently identified from lidar imagery by Rob Edwards of Cheshire Archaeology Planning Advisory Service while the remaining five are thought to have been newly identified by this project.

For ease of discussion these enclosures will be split into two spatially distinct groups: the enclosures concentrated in the parish of Upton-by-Chester (Fig 12, enclosures 1-8); the enclosures that survive as positive and negative earthworks

alongside the Chester-Manchester Roman road and a possible road partially visible as earthworks running south through Huntington (Fig 12, enclosures 9-19).

The morphology of the enclosures visible as cropmarks concentrated in Upton-by-Chester is typical of Roman camps (RCHME 1995, 10-15). The features that are visible in the cropmarks identified and transcribed by Philpott were so clear as to allow for adjacent enclosures to be more firmly attributed to the Roman period. Traditionally, camps located in close proximity to forts have been interpreted as practice marching camps constructed by legionaries based in the fort. The relative proximity of these enclosures, which lie a little over 3 miles north-east of the legionary fortress at Chester, has resulted in them being interpreted as practice camps in their associated NRHE and HER records. This interpretation seems to have been adopted from Philpott's note on the enclosures, where he draws a parallel with the seven or eight enclosures reported in the 18th century on Bootham Stray, 1.5 miles north of the legionary fortress at York. Although the precise function and dating of these camps are questions that will only be resolved through excavation, aerial mapping of these features does allow something to be said of their morphology. Enclosure 7 has cropmark evidence of external claviculae, ditches that curve in front or behind the entrances to the camp to inhibit frontal assault on the weakest points in a camp's defences. The presence of claviculae at one of the enclosures (1095456) allows the camp to be broadly dated to the late first century based on excavated

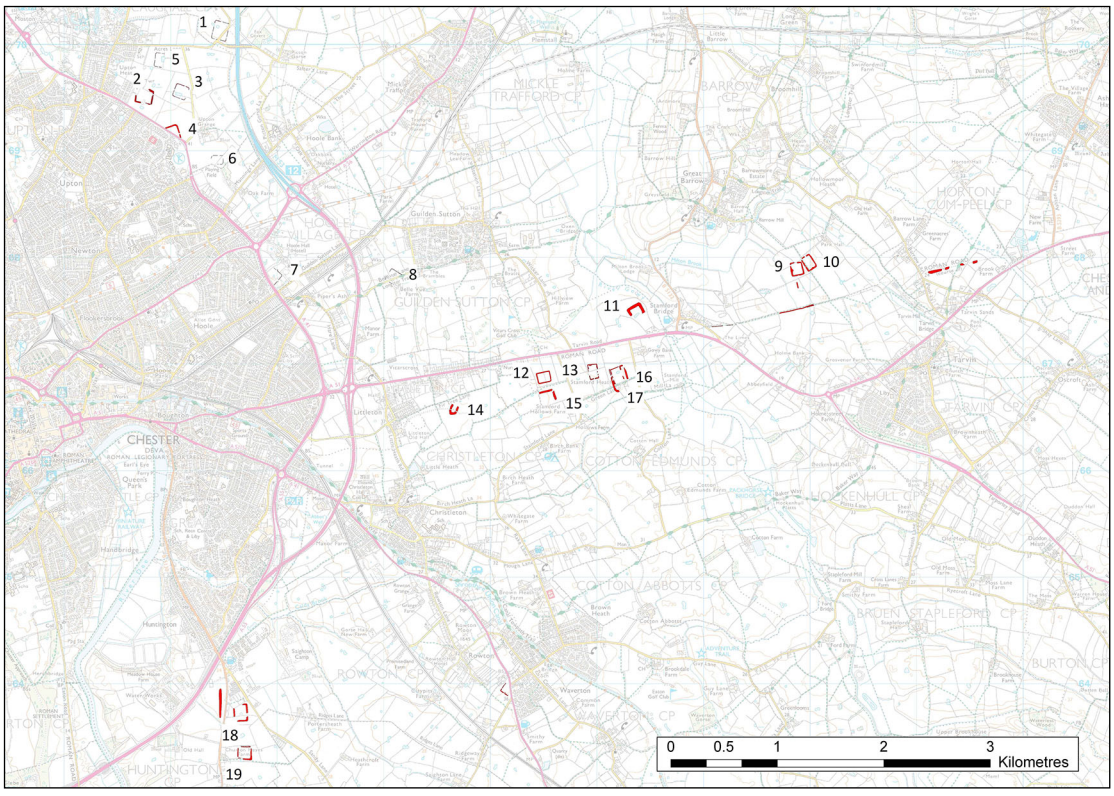


Fig 12: Project mapping of probable Roman enclosures east of Chester, centred at SJ 459 669 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

examples (Bédoyère 2013, 117).

Enclosure 2 (1031510) survives as a double banked rectilinear enclosure with an external counterscarp visible in lidar imagery. The earthworks associated with this enclosure are more substantial and elaborate than those typically associated with marching camps, suggesting they may represent a more permanent fortification than the camps visible as cropmarks that surround it. Earthwork survey of Enclosure 1 carried out by the RCHME in 1989 (Wilson-North 1990) also found evidence of an external counterscarp that was not identified by this project, likely as a result of an absence of lidar coverage of the monument. Enclosure 4 (69053) is visible as a much more substantial earthwork with a 12m wide bank forming the corner of the enclosure. A possible entrance is visible in the earthwork that allows for the total size of the enclosure to be estimated as having covered a minimum area of approximately 4ha. This would make it the largest enclosure mapped within the project area and among the larger camps identified across the country (RCHME 1995).

The second group consists of nine rectangular/rectilinear enclosures of probable Roman date identified in close proximity to the Chester-Northwich Roman road and a possible Roman road running south through Huntington. The enclosures are all roughly the same size as the first group of camps and may represent marching camps or more permanent defensive sites, possibly associated with defence of the road or the regulation of traffic. Enclosure 9 (1623690) is a newly identified banked enclosure overlooking the Chester-Northwich Roman road, 1.7 km south-east of the village of Great Barrow. Directly adjacent to this and almost touching the enclosure's north-east corner is Enclosure 10 (1623690) a newly identified banked rectangular enclosure set at an angle to the first. Enclosure 11 (1629053), a newly identified rectangular enclosure, is visible as an earthwork bank overlooking the River Gowy and the fording point of the Roman road at Stamford Bridge. Five other rectangular enclosures (12-16) are visible as earthworks on the south side of the Roman road to the east of the village of Littleton. Enclosure 12 (873485) is visible as a ditch with no associated bank visible in lidar imagery, though this may have been levelled by ploughing. Enclosure 13 (873484) is visible as an earthwork ditch with fragmentary survival of an internal bank. Enclosure 14 (1629055) was identified by Philpott (1998) as a rectangular ditched enclosure with five entrances visible as cropmark, the location of which corresponds with a diffuse 16m wide banked enclosure visible in lidar imagery. The photograph of the cropmark referred to by Philpott is missing so that project mapping of this monument relied on lidar imagery, resulting in a discrepancy between the form of the monument as mapped by Philpott and this project. Enclosure 15 (1629063) is a newly identified rectangular enclosure consisting of a diffuse 18m wide bank that has been truncated by a pipeline and overlain by field boundaries on its west and south sides. Enclosure 16 (1629065) is a newly identified rectangular enclosure visible as a fragmented 5m wide bank and external ditch that encloses an area of 1.2 hectares. This enclosure appears to be set in the corner of Enclosure 17 (1629065), a larger rectangular enclosure visible as a far more substantial 13m wide bank that encloses an area of approximately 3 hectares. Earthwork evidence for phasing of these features, with the smaller en-

closure appearing to truncate the larger, makes this a good candidate for further archaeological investigation given the stratigraphic potential of the site. Enclosure 18 (1629023) is a rectangular banked enclosure visible to the south of the Chester Road and Sandy Lane junction which, given its size, likely represents a camp. Enclosure 19 (1629026) is an approximately square banked enclosure of similar size and supposed function is visible 260m south of this.

Interpretation of the precise function of these sites remains largely speculative. Limited excavation has taken place at two of the Upton-by-Chester enclosures: a section was excavated through Enclosure 1 by Nick Higham (1987) that recovered no dating evidence; at Enclosure 6 three sections were cut across the ditch that produced a detailed stratigraphic sequence for the enclosure (Philpott 1998). Archaeological investigation has highlighted the potential for these sites to contribute to our understanding of Roman camps in Britain and the presence of such a large number of enclosures in the area presents an opportunity to develop our understanding of how these sites developed and functioned.

East of the junction with the Chester-Middlewich Roman road in Nettleford Wood, the Chester-Northwich road runs within 200m of Eddisbury hillfort. The road's proximity to Eddisbury is most likely to have been determined by the relatively low lying gap at Kelsall that the road takes advantage of; however, there is evidence for Roman occupation of Eddisbury along with other hillforts such as Helsby (Garner 2016) and it may be that the defensive potential of these sites was utilised by the Roman military, if only to prevent them from being occupied by a hostile force or as a symbol of Roman dominance over pre-existing elites.

At Heronbridge, *c.* 1.5 km south of Chester, substantial earthwork banks are visible between Eaton Road (formerly Watling Street) and the River Dee (Fig 13). These banks form a curvilinear enclosure that encompasses an area of *c.* 6 hectares, utilising the River Dee as its eastern boundary. The ramparts of the enclosure (965212) were mapped from lidar along with a medieval road and field systems, all of which survive as earthworks. As can be seen in the digital terrain model produced by the lidar data (Fig 13), the ramparts do not extend to the riverbank, particularly at the southern end of the enclosure where they take advantage of a natural knoll. Reference to lidar images suggests this gap is likely the result of the river migrating east away from the earthwork over time. At its southern end the enclosure appears to terminate above an area that may have been a mudflat or a former meander of the river.

Heronbridge is the site of a Roman settlement discovered in 1929 by W J Williams as part of excavations carried out by the Chester Archaeological Society (Hartley 1952). Follow-up excavations conducted by James Petch of Manchester University between 1930-31 revealed twenty inhumations found inserted into the remains of the Roman buildings, which had been robbed out to form a revetment for the earthen rampart of the enclosure (Petch 1933). Radiocarbon dating of two of the individuals buried within the Roman buildings provided dates between the 6th - 7th centuries AD. This discovery has led to speculation that the earthworks may be associated

Fig 13: Lidar imagery of the earthwork enclosure at Heronbridge. LIDAR SJ 4063, 4064, 4163, 4164 Environment Agency FIRST RETURN 06-Dec-2008 © Environment Agency copyright 2022. All rights reserved.

with the Battle of Chester in c. AD 615, the earthwork constituting an attempt by the Northumbrian forces to consolidate their position after the battle (see Mason 2007).

Tying archaeological features to specific historic events that have for so long been evidenced only in documentary sources should be treated with due scepticism. A prime example of this is provided by historic reference in the Mercian Register to the refortification of Eddisbury hillfort as a burh under Lady Athelfaed of Mercia in AD 914. Excavation of the hillfort by W J Varley (1936-38) revealed two structures described as a 'Saxon Hut' and a 'Dark Age Hut' (Garner 2016). Re-evaluation of the 'Dark Age Hut' as part of the Habitats and Hillforts Project suggested the structure was more likely a corn-drying oven based on its appearance and the description by Varley of a large amount of charred material in and around the structure. The remains of a clay oven in a similar stratigraphic context to that found by Varley were excavated in 2010 and charred layers associated with the oven produced a radiocarbon date of 860 ±70 AD (cal AD 745–980). While dating of the oven does provide the first substantive evidence of a late Saxon presence at Eddisbury, it does not provide evidence for Anglo-Saxon refortification of the site.

Motte and bailey earthworks of the Norman period feature prominently in the landscape of the project area, with four of these sites mapped. Constructed in the latter part of the 11th century, they functioned as fortified manorial centres established by Norman nobility attached to the Earl of Chester, from which their associated estates could be defended and managed. The security offered by these fortifications was particularly necessary in this part of Cheshire, where the threat of Welsh raiding was constant, as demonstrated in 1093 when a Welsh army ravaged the Dee valley (Higham 2004). These earthworks are concentrated in the south-west of the project area in close proximity to the Welsh border, associated with the villages of Dod-

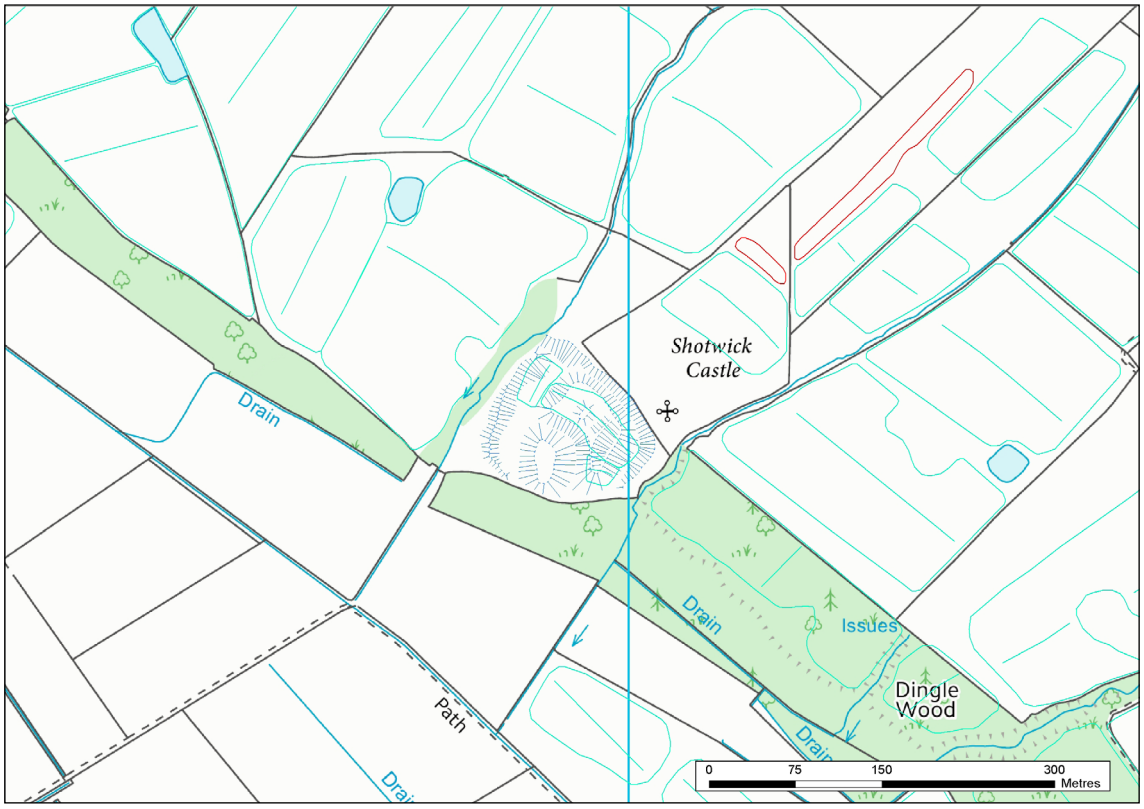


Fig 14: Project mapping of Shotwick motte and bailey, centred at SJ 349 704 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

dleston (67014), Pulford (66937) and Aldford (68791). As the place names suggest, these were strategically located to guard crossings over the River Dee and Pulford Brook. While few new features were identified at these sites, project mapping with reference to the latest lidar has provided more precise and detailed depictions of the earthworks. Perhaps the best example of this is the motte and bailey earthworks at Dodleston (67014, Fig 16) where a newly identified inlet into the moat has been identified and the site has been mapped more precisely.

Shotwick Castle (67513) commands an important fording point on the Dee and the castle's quay was the embarkation point for Henry II for his invasion of Ireland in 1171 (Hughes 1966, 15). Reference to lidar imagery has proved particularly useful in mapping the earthworks associated with the castle and its hinterland. These include a newly identified mound within the bailey that may represent a building platform (Fig 14). After control of the earldom of Chester was taken by the crown along with posession of Shotwick Castle, it was rebuilt in stone reflecting its new-found royal status and strategic importance for the conquest of Wales led by Edward I. The refurbishment saw the construction of a stone keep with an attached ward and six towers. Shotwick castle provides a good example of Creighton's (2002) observation that castles represent responses to the different demands of lordship. In the case of Shotwick the castle functioned as a strategically important defensive position in the wars with the Welsh, forming an important part of the network of castles under the direct control of the Earl of Chester and laterly the crown, rather than being

a seat of lordship in and of itself. This singular function may have contributed to the castle's demise once Wales had been pacified.

A factor that may have been considered equally important to defence against the Welsh in the establishment of these castles was the consolidation of the earldom itself, the power of which was extended greatly by Ranulph de Gernon, the 4th Earl of Chester, in his dealings with King Stephen and Henry Plantagenet, who would go on to take the throne as Henry II (Baines 2012). The power dynamics that existed around Chester in the medieval period were increasingly marked by the mixed loyalties of Anglo-Norman lords in the area. The 13th century is a particularly interesting period in which allegiances between Anglo-Norman lords on the border and their Welsh counterparts were perhaps becoming too close for the comfort of the English king. Ranulf the 6th Earl of Chester entered into an alliance with Llywelyn the Great, King of Gwynedd, whose daughter Elen married Ranulf's nephew and heir, John the Scot before the latter's untimely death. John de Ardene, knight and lord of Aldford castle under the Earl of Chester married Margery verch Gruffydd, daughter of Gruffydd II ap Madog, prince of the Welsh Kingdom of Powys Fadog. It is also a period in which families such as the Grosvenors who first appear to have been resident at the moated site in Bruera (RCHME 1986) sought to establish themselves among the nobility (ie. the heraldic case of Scrope Vs. Grosvenor).

The most widespread defensive features mapped within the project area relate to the Second World War and range from individual air raid shelters to sites of national significance such as the Royal Naval College which was temporarily established at Eaton Hall. The majority of these sites were already known to the HER but this project has provided detailed mapping of their constituent elements that will prove useful for further research into wartime operations in the area. Four known heavy anti-aircraft (HAA) batteries were mapped at Puddington (1019848), Upton Heath (1412953), Alvanley (1473011) and Lower Kinnerton (1412960) with their associated military camps that are newly identified. The Upton Heath battery is recorded as having been significantly upgraded from accommodating two 3.7-inch static guns in 1942 to eight 3.7-inch Mk IIC guns and four 3.7-inch Mk III guns in late 1945 (Defence of Britain Project). The Lower Kinnerton battery (1412960) is recorded as having been unarmed and equipped with GL Mark II radar in 1942 (Defence of Britain Project). This project identified three HAA gun emplacements at the site that are likely to have been later additions. Two known searchlight batteries were mapped at Alvaney (1493628) and Delamere (1626133) with their associated camps.

These sites form a line of anti-air defence that stretches through the Wirral to the Mid-Cheshire Ridge, providing protection for Ellesmere Port and Merseyside. RAF Poulton (Fig 15) served as an Operational Training Unit (OTU) and Tactical Exercise Unit (TEU) for the training of pilots flying Hawker Hurricanes that would also have provided a level of air cover for the area. Structures relating to the airfield were mapped including three military camps to the south-west of the airfield that are recorded in the HER and are likely associated with the operation of the airfield. The Royal Naval College at Eaton Hall is significant at a national scale as the training

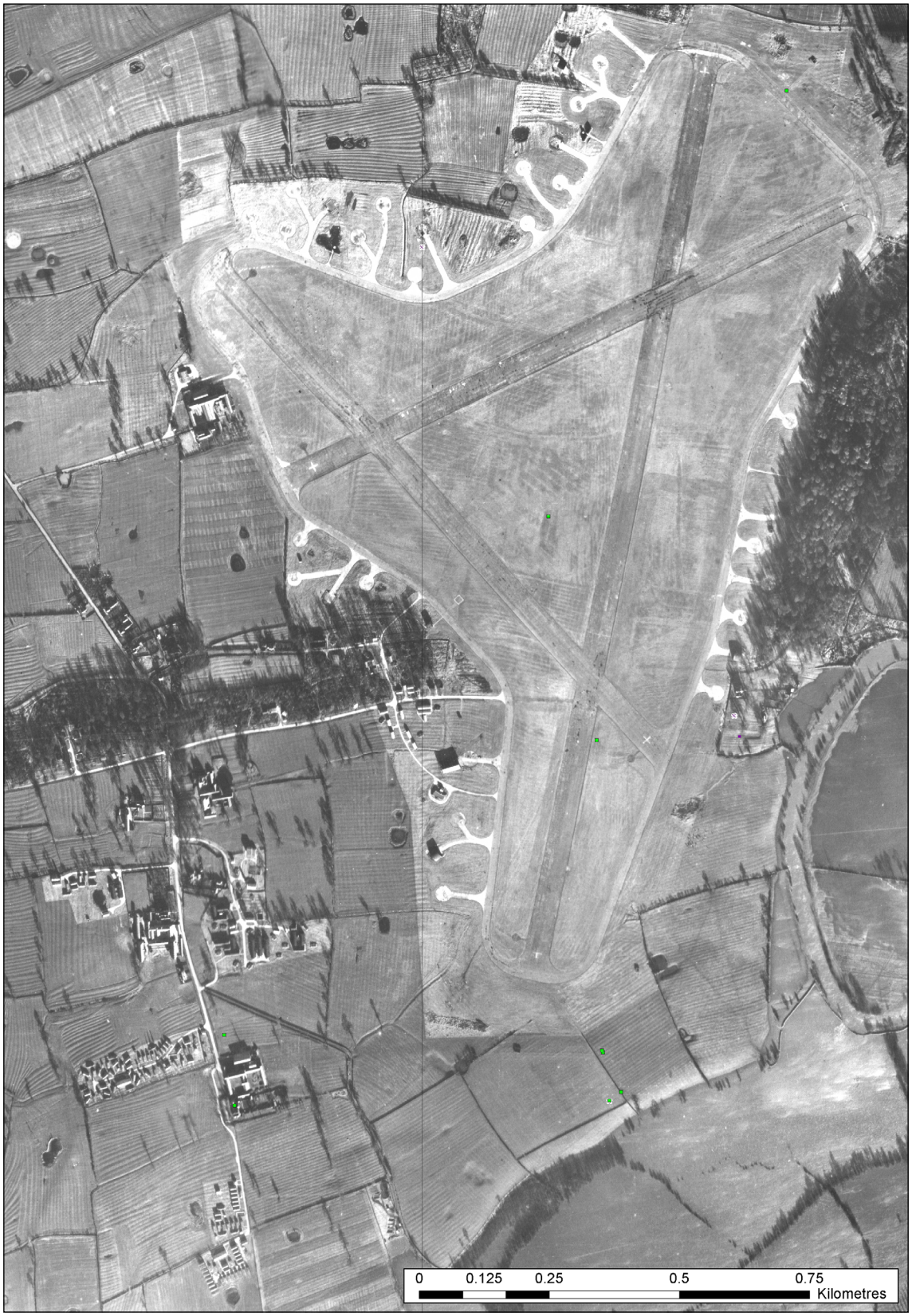


Fig 15: Vertical photograph of RAF Poulton. RAF 30287/ FFO-0077 04-FEB-1945 © Historic England Archive

centre for officers of the Royal Navy following the bombing of the Britannia Naval College in Dartmouth in 1943. The project has mapped 123 temporary military buildings associated with the college centred on Eaton Hall, along with sports pitches and firing ranges.

SETTLEMENT DEVELOPMENT

Archaeological investigation of Eddisbury hillfort has produced the earliest evidence of settlement development within the project area. Excavation revealed Early Bronze Age pits beneath the primary hillfort rampart along with evidence for a palisaded enclosure that produced a radiocarbon date of 730-400 cal BC. (Garner 2016, 196). These provide a useful *terminus post quem* for the construction of the ramparts in the Middle or Late Iron Age. Hillforts represent focal points for the community and regional economy where settlement is likely to have concentrated. A curvilinear Iron Age/Romano-British enclosure (1622998), visible as a cropmark south of Puddington Lane, is closely associated with a Romano-British farmstead excavated on the north side of the road and represents the only early evidence for dispersed settlement identified by aerial mapping in the project area. Excavation of a probable Iron Age farmstead at Poulton (Emery 2014) provides further evidence for dispersed Iron Age settlement in the lowlands of the Dee Valley. The lack of such sites identified by this project is likely the result of soils in the area being inconducive to the formation of cropmarks and the destruction of earthwork evidence for earlier settlement by widespread ridge and furrow ploughing in the medieval and post-medieval period.

More substantive archaeological evidence for settlement development can be found at the Romano-British roadside settlement of Heronbridge that has been the focus of archaeological investigation since the 1930s. Excavation of the site revealed a well-ordered settlement consisting of large strip-buildings extending back in regular plots from the road with dating evidence currently suggesting the site dates to around 90 AD (Hartley 1952). Agricultural processing and industrial activity appear to have taken place at the site with evidence for corn-drying/malting ovens and bronze smithing uncovered during excavation between 1946 and 1948. The quantity of legionary type pottery recovered from the site suggests close links to the legion based at Chester and two theories have been put forward to explain why a roadside settlement would have developed so close to the fortress. Hartley suggests Heronbridge may have developed as a riverside settlement for the transfer of goods between river and road transport as a result of the Dee not being navigable between Heronbridge and Chester during the Roman period. Mason (2001, 118) suggests the settlement may reflect the separation of territorial administration between the *prata legionis* under direct legionary control, while Heronbridge was situated just outside of this area, falling under civil administration that conferred certain commercial advantages to this location. Archaeological investigation of the settlement offers great potential for elucidating how the relationship between civil and legionary settlement operated in the period and the role the local British population may have played in this.

Development of nucleated rural settlement in the project area is thought to have begun in the early medieval period and resulted from the introduction of open-field agriculture around manorial centres (Hooke 2006, 52). Anglo-Saxon charters with boundary clauses provide good evidence of how the landscape was organised in the period, suggesting it consisted of areas of open field agriculture surrounding

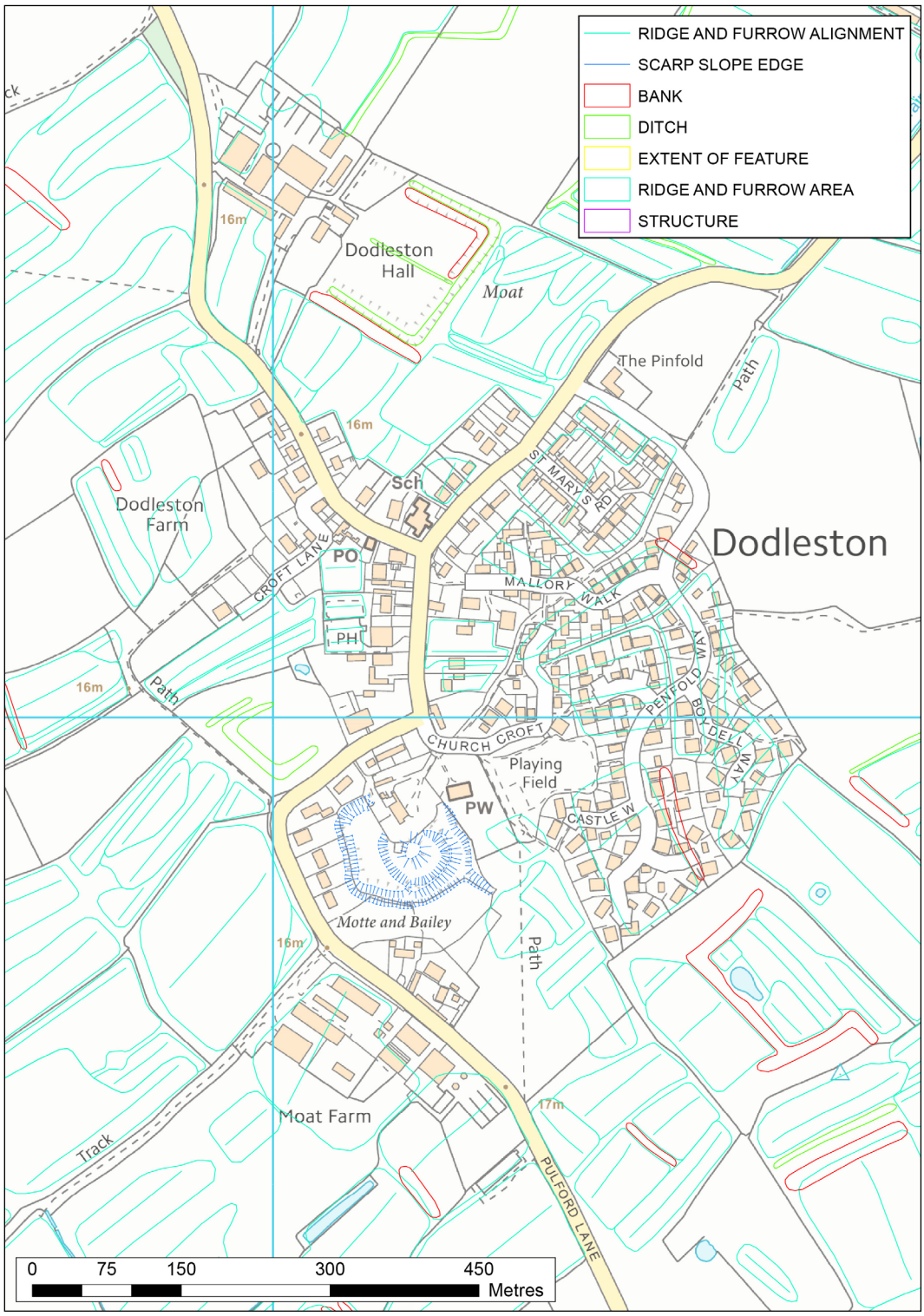


Fig 16: Project mapping of Dodleston motte and bailey and moated site, centred at SJ 361 610 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

settlements with woodland preserved along parish boundaries. The first concrete evidence for nucleated settlement are the planned Norman boroughs at Aldford and Dodleston.

As the Middle Ages progressed castles were abandoned in favour of manor houses which were larger and more comfortable (Gardiner 2007). These would often be surrounded by a moat that, rather than serving a defensive function, began to mark the status of its occupant as the license to fortify one's residence became an important marker of social status (Liddiard 2007). A good example of this shift can be seen in the village of Dodleston, a planned Anglo-Norman settlement with a motte and bailey, adjacent church and high street (Fig 16). To the north of the village is Dodleston Hall, once the site of a timber-framed manor house with medieval origins, this was pulled down in the 18th century to make way for a farmhouse and is located within a large rectangular moated enclosure (Ormerod 1882). At Huntington Hall (69302) earthwork features were mapped from lidar imagery in the interior of the moat including ditches that serve to partition the enclosed area and its three fishponds. These earthworks were mapped by the RCHME in 1985 but the utilisation of recent lidar imagery as part of this project provides a record of the current condition of the earthwork as well as making the data more accessible as part of a larger, standardised dataset. A newly identified moat (1623020) was mapped from lidar imagery in the village of Puddington 160m northwest of a known moated site at Puddington Old Hall. In total, fourteen moated sites were mapped by the project.

The most substantial settlement change evidenced in aerial imagery relates to the temporary settlement of military personnel in the area during the Second World War when large military camps were established at Moston Hall (1629074), Huntington (127555) and Eaton Hall (1629012): the latter becoming home to the Royal Naval College after the Britannia college in Dartmouth was bombed in 1943. Moston Hall became Dale Barracks having been acquired by the War Office in 1938 and acting as the Machine Gun Training Centre during the war. The project identified and mapped 237 military buildings including three firing ranges and two air raid shelters. Nine smaller military camps have been identified across the project area, the majority of which are associated with searchlight batteries and anti-aircraft batteries. Three camps are visible in the parish of Poulton in close proximity to RAF Poulton.

DEVELOPMENT OF THE CHURCH

Church sites mapped within the project area provide a good lens through which the development of Christianity in Britain can be viewed. Chester is known to have been an ecclesiastical centre of some significance in the early 7th century, as evidenced by it hosting a synod of the British Church in AD 601. One of the leaders of the British forces at the Battle of Chester in AD 616 is described as the *'consul urbis'* or 'Consul of the City' (Mason 2007, 26), suggesting the city had some degree of devolved power in the period. Medieval chroniclers believed the church of St. John's Chester was founded in AD 689 by King Aethelred of Mercia and Bishop Wilfred, and there is strong circumstantial evidence that it acted as an early minster (Blair 2005, 309).

The medieval Church of St. Mary lay at the heart of the village of Eccleston. The significance of the 'eccles' prefix to settlements has been the subject of much academic interest, stemming from the latin word *eclēsia*, it is seen as being indicative of ecclesiastical centres or church landholdings that existed prior to Anglo-Saxon expansion in the 7th century (James, 2009). Place names containing the eclēs element are concentrated in two groups: one around the Forth estuary, the other spread across Cheshire, Lancashire and western Yorkshire (Blair 2005, 27). Interest in Eccleston has been compounded by the presence of an oval enclosure constituting the former

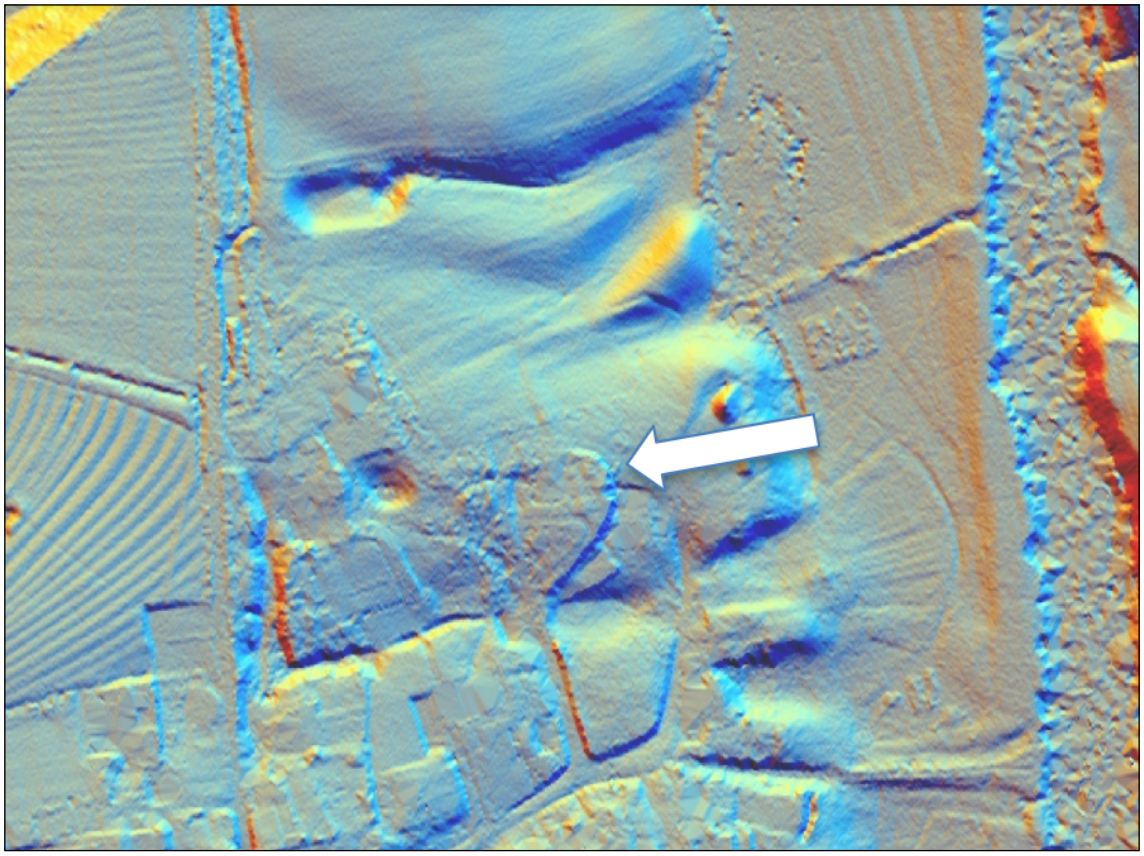


Fig 17: Lidar image of the oval boundary of the Church of St. Mary, Eccleston, centred at SJ 413 627. LIDAR SJ 4162 Environment Agency FIRST RETURN 06-Dec-2008 © Environment Agency copyright 2022. All rights reserved.

Fig 18: Photograph showing the oval enclosure at the Church of St. Mary preserved as a stone-walled revetment, November 2019.

churchyard boundary (Fig 17). The sub-circular shape of the churchyard is akin to the yards/enclosures of early medieval churches in Wales that have also been recorded in Shropshire and Herefordshire (Gelling 1992, 86-92). In Wales such places often possess a 'llan' place name prefix that is in many instances compounded with the names of local saints or founders (Blair 2005, 21).

At Eccleston, the 'eccles' place name and oval shaped churchyard strongly suggest the presence of an early ecclesiastic centre in the 'western tradition' and Blair suggests sites such as these may represent small monastic/clerical settlements of the kind found in Ireland at the time. James (2009, 134) argues that the Battle of Chester in AD 616 represents a successful Anglo-Saxon raid rather than the beginning of Anglo-Saxon hegemony over the area. James' theory proposes continuity of the local elite during this period that may have allowed for continuity in the geography of ecclesiastical administration represented by a site such as Eccleston. In this case Eccleston may be just as likely to have been created during this period as before it.

Eccleston may represent an early Christian site aligned with the western Celtic tradition of Christianity that was prevalent in Wales and Ireland in the Early Medieval period and it is interesting to speculate as to whether there was any connection with the important monastery at Bangor-is-y-Coed that lies further up the River Dee. The relationship between the ecclesiastic site at Eccleston and those of Chester

is certainly interesting to consider in terms of the chronology of their establishment, their respective function and jurisdiction.

An estate map of 1798 depicts the churchyard of the Church of St. Mary, Eccleston, as a smooth oval enclosure truncated at its western end (Cheshire HER 1965/1/1). This enclosure was already included in the HER and mapped as an earthwork from lidar imagery as part of this project, allowing for the current condition of the earthwork to be assessed. The enclosure appears to be in much the same condition as is visible in historic vertical photographs from 1947. Though no evidence of the rest of the enclosure as depicted on the 1798 estate map are visible in lidar imagery, a field visit to the site allowed for the identification of a slight earthwork bank running into woodland to the west of the Churchyard. This diffuse feature was likely obscured by dense vegetation cover in the lidar imagery. The field visit also highlighted that what remains of the enclosure visible in lidar imagery is preserved as a well-maintained stone-walled revetment (Fig 18).

St. Mary's church in Bruera is recorded in the Cheshire HER as having a sub-circular churchyard visible on the Ordnance Survey 1st edition 25 Inch maps. A site visit to the church was conducted as part of the project in order to ground-truth earthwork bank features identified from historic aerial photographs that appeared to surround the south of the churchyard. This visit was judged particularly necessary as the site lies just outside lidar coverage of the area. The visit allowed for the earthwork banks mapped by the project to be interpreted as plough headlands abutting churchyard. The boundary of the churchyard is instead visible as a slight bank surrounding the church in an oval shape, which is planted a line of yew trees (Fig. 19). The place name Bruera is unusual in being of Latin derivation, coming from the word *brueria* meaning heath, a name that ties in well with the name of the adjacent parish of Churton Heath. The sub-oval shape of the churchyard and Latin derived placename may be indicative of an earlier church foundation similar to that as has been proposed for Eccleston.

Domesday shows that monastic landholdings in the project area were extensive at the time of the conquest and likely increased as a result of it. Monastic granges were pioneered by the Cistercians in the 12th century as a means of becoming economically self-sufficient and consolidating their estates into easily managed units (Platt 1969, 12). The grange model was so successful that it was imitated by other orders who were concerned to rationalise their endowments and maximise the productivity of them. There are three monastic granges within the project area: Saighton, Middleton and Upton granges. These formed part of the monastic holdings of the Benedictine Abbey of St. Werburgh in Chester (Platt 1969, 67), serving as estate centres from which agricultural production could be managed and sited within easy reach of the abbey where produce would be sent. The grange at Saighton is listed in Domesday as one of the three richest estates of the Abbey of St Werburgh and was clearly an important holding of the abbey prior to the conquest, later becoming one of three residences of the Abbot of St Werburgh. Saighton is a good example of the importance the Benedictines attached to consolidating land ownership around a central grange that matches Cistercian efforts. The project found excellent earth-

work survival of medieval ridge and furrow within the parish of Saighton (Fig 21), allowing for comprehensive mapping of the medieval open-fields that may prove useful for further study of how the grange was managed.

There is less information available for the smaller granges of Middleton and Upton. Upton Grange consists of a smaller (0.23 ha) roughly square moat (69033) within a larger (1.2ha) rectangular moat (69033) both of which are visible as earthworks in lidar images. The larger moat is roughly the same shape and a slightly smaller size than the Roman practice camps identified in the surrounding fields, leading to its inclusion in Philpott's (1998) note in the Chester Journal of Archaeology as another possible marching camp. Earthworks relating to Middleton Grange, a Benedictine establishment attached to St. Werburgh's, are the most complete. These consist of a smaller (370sq m) square moated enclosure (71498) set in the corner of a larger (2,330sq m) rectangular moated enclosure (71498) both of which are visible as earthworks in lidar imagery. Two fishponds (71498) are visible as earthworks in lidar imagery 170 m to the north-east of the grange. The grange is situated atop a steep bank overlooking the River Weaver. Interestingly Aston Grange, a Cistercian establishment belonging to Whalley Abbey, is located just 1.2 km north-east of the grange within the same parish. Liddiard (2007) discusses the importance placed on the proximity of water to religious establishments in medieval texts. This was considered more than just a practical concern; water was seen as the agent by which all aspects of life in the house was sustained, transforming an otherwise barren landscape into a civilised and godly one.

Fig 19: The sub-circular churchyard of St. Mary's church in Bruera defined by Yew trees and a slight bank, November 2019.

ESTATE AND LAND MANAGEMENT

Earthwork survival relating to the medieval period was found to be extensive across the west and south of the project area. This has allowed for comprehensive mapping of the medieval landscape in these areas. On the face of it, most of this appears to relate to the feudal landscape established following the Norman Conquest. This is characterised by motte and bailey castles with their associated churches and villages, surrounded by open-field ridge and furrow. There is evidence that arable agriculture was established in the area by the Roman period and that it increased throughout the Early Medieval period, as evidenced by the lack of palynological evidence for regeneration of woodland after Roman withdrawal (Rippon *et al.* 2015). The importance of arable agriculture to the local economy is captured in the Domesday Book which describes the west Cheshire hundreds of Wilaveston and Dudestan as being almost devoid of woodland and home to the lion's share of the county's plough teams and lands (Higham 2007).

Medieval moated sites are peppered across much of the project area, often isolated from village settlement and usually interpreted as succeeding motte and baileys as centres of seigneurial power in the high and later Middle Ages. It has been recognised that some of these sites probably originated as the ditched *burhs* or enclosures of the pre-conquest period (Gardiner 2007). The castles of the Norman Conquest were remarked on by contemporaries for being quite different to the residences of the preceding Anglo-Saxon nobility (Williams 1992). An essential component of thegnhood as set out in the 11th century 'promotion law', attributed to Archbishop Wulfstan of York (1002-23), was residence within a *burh:* a manorial complex of buildings within a ditched enclosure (Williams 1992). There are two moated sites in the project area where the possibility of an Anglo-Saxon origin seems worthy of consideration given their historical and landscape context.

The moated site known as Shotwick Hall lies to the north-west of the village of Shotwick. The estate of *Sotowiche* is recorded in Domesday as a possession of the Church of St Werburgh at Chester. In 1093, Hugh Lupus, 1st Earl of Chester, appears to have partitioned the estate, granting the Benedictine monks of St. Werburgh a third of the land that became the parish of Church Shotwick (Stewart-Brown 1912). Interestingly, while the abbey became lord paramount of the manor of Church Shotwick it was in fact held "by a family bearing the territorial name", the manor then passes through marriage to the Hockenhull family in the 13th century "who held it until the eighteenth century, by which time all knowledge of the paramount lordship of the Church had long been lost." (Stewart-Brown 1912). This suggests that although the Shotwick estate was in the possession of the Church of St Werburgh at the time of Domesday, a family sharing the name *Sotowiche* held it under them and had enough of a claim on the manor of Church Shotwick to pass it on through marriage to the Hockenhulls. Given the fact that the Hockenhulls continued to reside at their manor to the south of Tarvin until 1715 when they moved to the newly rebuilt Shotwick Hall, it follows that the moated site was likely in existence prior to the transfer of the estate to the Hockenhulls through marriage, and that the site may have served as the seat of the *Sotowiche* family.

Given Earl Edwin's extensive landholdings around Chester it is likely that a high proportion of adult males in the area fought in the battles that took place between 1066-70 resulting in a high death rate and the dislocation of many estates (Higham 2004). It has been noted that there are substantial omissions in the Domesday Survey for 1066 and 1071 in Cheshire, perhaps implying a patchy knowledge of land ownership, land-use and values at these times (Higham 2004). It is easy to envisage a situation where the Abbey of St. Werburgh, of which Edwin was the patron, took control of the estates of the earl's thegns who lost their lives in battle, perhaps as a means of preserving them for their families in the face of Norman redistribution through Domesday. This may be what occurred at Church Shotwick where the family bearing the territorial name of the parish appear to have retained control over a porton of the manor.

The moated site in the village of Bruera, also formerly known as Buerton, is interesting for two reasons: firstly, the name of the village itself which is first referred to as Buerton in *c.* 1220-30 (Dodgson 1981) while the name Bruera appears to have been associated with the site of the church; secondly, as a result of the unusual relationship between the moated site, the parish church of St. Mary's, and the parish boundary between Buerton and Saighton that follows the road running between the moated site and the church, thereby separating the two sites into different parishes (Fig 20). As the Royal Commission on the Historic Monuments of England (RCHME) (1986) report into the settlement states "The origins of the settlement now known as Bruera are complex and directly affect the form and configuration of the field remains.". Though complex these origins are worth exploring as they reveal an interesting story about the transfer of estates in pre and early post-conquest Cheshire.

The place name Buerton is derived from the Old English word *burhtun* meaning 'fort-settlement' and is often associated with the kind of defensible enclosure occupied by Anglo-Saxon thegns (Williams 1992). Archaeologists have traditionally attempted to recognise the buildings associated with such residences with reference to Archbishop Wulfstan's 'promotion law' which states that a thegn should possess a church and kitchen, bellhouse and an enclosure gate (Gardiner 2011). These descriptions seem to be consistent with a growing body of archaeological evidence from high status Anglo-Saxon residences, particularly at West Cotton (Chapman 2018).

The church at Bruera is first documented in the Chartulary of Chester Abbey as being surrendered by Robert, Steward of Earl Ranulf II, between 1141-57 in return for abbot Ralph ceding to Robert the abbey's claim to the vill of Lea (cum Newbold) (Tait 1920, 286-8). The following entry into the Chartulary records shows Robert de Pulford ceding to the abbey his claim to the church of Bruera and the adjacent croft that lies "between the garden of the said church and the highway going from his house towards the vill of Lea (cum Newbold)." (Tait 1920, 288). The highway referred to likely relates to Platts Lane that runs directly from the moated site through the north of the parish of Lea Newbold, while the croft likely refers to the

Fig 20: Vertical aerial photograph showing parish boundaries around the village of Bruera (part-frame) centred at SJ 437 606. RAF/CPE/UK/1935 FP 1206 and 3206 17-JAN-1947 Historic England Archive (RAF Photography).

glebe laid of the church that Platts Lane circumvents (Fig 20). If this is the case, then the location of Robert de Pulford's house fits with the moated site situated at the end of Platts Lane, providing documentary evidence for the existence of a manor house at the site over two-hundred years earlier than previously recognised by RCHME.

This project has mapped most of the features identified by the RCHME survey, unfortunately the site lies just outside lidar coverage of the area which may have helped elucidate new features. The moat is sub-rectangular in plan, 1.4 m deep and encloses an area of approximately 0.4 hectares. There is no evidence of earthwork features within the enclosure itself which is now partially occupied by semi-detached estate cottages and their gardens at its eastern end. Outside the moat the land appears to be divided by a series of channels and scarps into what RCHME describes as closes forming a *curia* associated with the moat. The RCHME (1986) report suggests that what appear to be ridge and furrow earthworks within the apparent closes may in fact be raised cultivation beds. Aerial mapping conducted by Historic England around Belsay Hall, Northumberland (Oakey 2017) revealed plots containing cultivation ridges at Newham village that were at odds with the alignment of the ridges of surrounding open fields. It was suggested that these may represent the remains of an orchard, the ridges providing drainage for rows of trees (Oakey 2017, 15). Given the reference to an orchard extending to Boat Lane in an assignment of dower dated to *c.* 1430 that includes an entrance bridge (pontem tractabilem), a hall within the main building with an upper room and adjoining rooms forming a suit for the widow, a cow house out-building, *Le Berne* yard and an orchard that extended to Boat Lane (RCHME 1986), it may be that these ridges relate to the orchard and efforts to drain the soil which is prone to being waterlogged (Soilscape)

There is some disagreement about when St. Mary's church in Bruera dates from but Richards (1947) argues that, based on architectural elements, it is of 10th century date, while the proximity of the church to the moated site suggests the two were related. The moated site clearly pre-dates the road (Chapel Lane) that makes an effort to circumvent it, and consequently the parish boundary itself that clearly follows the line of the road. The original course of the boundary of the parish of Saighton, an important demesne property of the Abbey of St. Werburgh, likely continued along Powsey Brook, the present boundary running down Chapel Lane being an extension of church holdings designed to encompass St. Mary's church (Fig 20).

As well as residence within a *burh,* the 'promotion law' of Archbishop Wulfstan stipulates that in order to gain thegnhood a ceorl must own a church. The only surviving depiction of an Anglo-Saxon Manor, that of Bosham on the Bayeux Tapestry, has the church adjacent to a two-storied hall (Williams 1992). Given the 12th century date that can now be assigned to the manor house at Bruera, alongside Anglo-Saxon place name evidence for the manor of Buerton and the close spatial relationship with the 10th C. church at Bruera, the possibility that the moated site itself may have an Anglo-Saxon origin seems worthy of consideration.

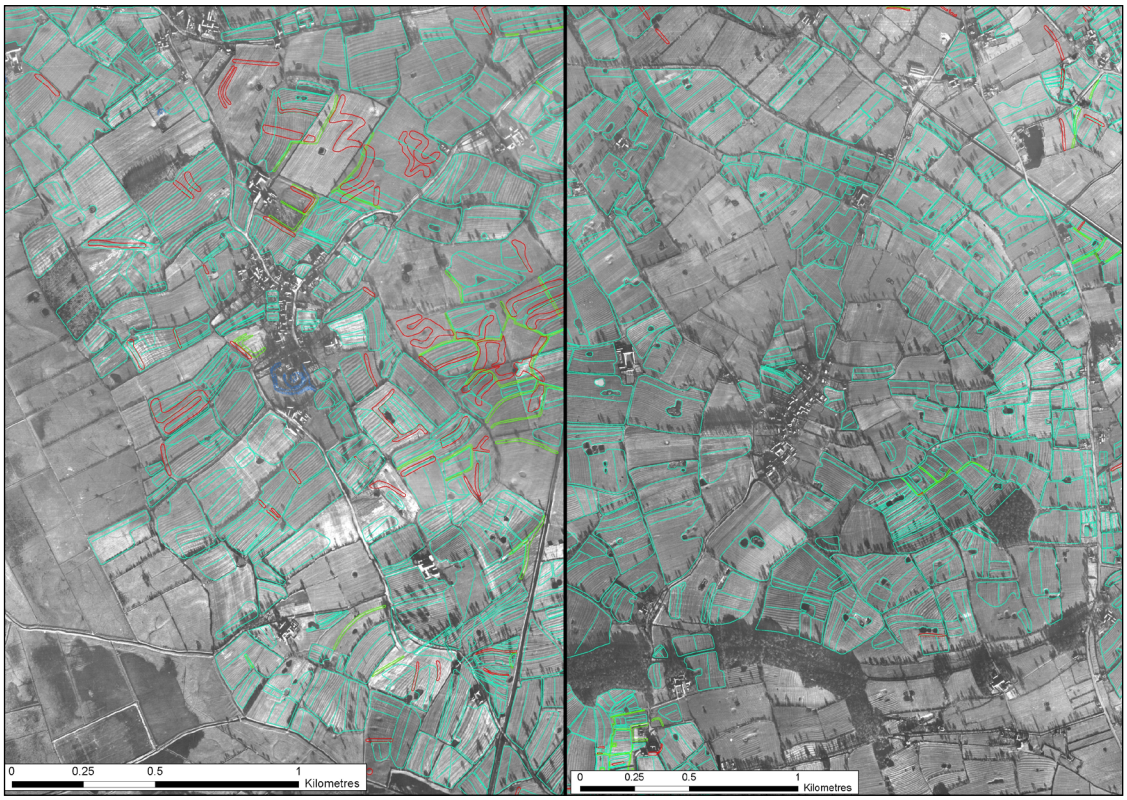


Fig 21: Project mapping of medieval field systems surrounding Dodleston (left) and Saighton (right), centred at SJ 361 608 and SJ 446 620 respectively. RAF/CPE/UK/1935 FP 3223 and 3203 17-JAN-1947 Historic England Archive (RAF Photography).

The extent of medieval earthwork survival visible in the project area makes it particularly amenable to the study of the medieval landscape. The substantial number of secular and religious manorial centres that survive as earthworks alongside ridge and furrow open-field systems provide an excellent opportunity to study land management in the medieval period and how this might have varied between estates as well as how they developed over time. This is perhaps best demonstrated by a comparison of the landscape surrounding the village of Dodleston and the grange at Saighton which formed part of the monastic holdings of the Benedictine Abbey of St. Werburgh in Chester (Fig. 21).

The mapped earthworks surrounding the village of Saighton represent what could be described as a text-book example of a medieval open-field system. The pattern formed by the field boundaries and furlongs is radial and well-ordered, perhaps reflecting the degree of centralised control of agriculture through the grange. There is also a strong suggestion of division of land formed by the contiguous field boundaries that enclose a roughly circular area to the south-east of the village. This may be representative of a process of assarting whereby an earlier in-field was later extended to encompass the whole parish. As stated above, Anglo-Saxon charters with boundary clauses provide good evidence of how the landscape was organised in the Early Medieval period, with a mixed landscape surrounding settlements consisting of pockets of open field agriculture around settlements and woodland along estate

boundaries (Hooke 2006, 53). This description bears a strong resemblance to the landscape around Saughall that may reflect an Early Medieval manorial centre and surrounding estate that sees expansion and the regularisation of agricultural operations under the Benedictines.

Medieval field systems visible as earthworks survive around the village of Dodleston, revealing a landscape in which arable agriculture was just as important as at Saighton. As opposed to the radial pattern of field boundaries and furlongs surrounding Saighton, those at Dodleston in general survive as strip fields perpendicular to the road and the building plots that line it. Individual furlongs are in general smaller and more haphazard than those at Saighton. There appears to be some evidence of land division, with contiguous curving field boundaries encompassing the motte and bailey castle and land to the east of Pulford Lane. This may represent the lord's demesne, under his direct control, and may be evidenced by an absence of burgage plots on the eastern side Pulford Lane by the castle. It is interesting to note that the furlongs in this area are just as small and seemingly haphazard as those elsewhere. Juxtaposing the landscapes surrounding these villages highlights significant differences in their respective field systems. Further study of these differences and comparison with other sites, both within the project area and across the country, provides the opportunity of gaining a greater understanding of how such estates were managed.

Sites representing centres of seigneurial power have been identified across the project area in the form of motte and bailey castles and moated manor houses. Though in some instances these sites may represent a continuation of the centres of Anglo-Saxon estates, most estates have been shown to have been entirely reconfigured under Norman lords following the conquest (Fleming 1991). A good example of the physical effect the imposition of Norman lordship had on the landscape can be found at Shotwick Castle (Fig 22). The motte and bailey castle is thought to have been established by Hugh d'Avranches, Earl of Chester, in the 11th century, serving as an important fortification in the wars against the Welsh that was likely sited so as to command a ford across the River Dee (Cheshire HER 2025/1/1). Interestingly, the castle is entirely separate from the village of Shotwick, 1.8km to the north-west, that functioned as a port in the Middle Ages and was the embarkation point for Henry II on his expedition to Ireland as well as Edward I to Wales (Hartwell et al 2011). This is in contrast to the other mapped motte and baileys that occur alongside planned Norman villages at Dodleston, Pulford and Aldford in the south-west of the project area.

Deer parks feature prominently in the landscape around Chester with three located within the project area. Shotwick Castle most clearly demonstrates the integral relationship between a castle and its surrounding deer park (Fig 22). Enclosed in *c.*1327 under the reign of Edward III and encompassing an area of approximately 370 hectares, the park served as a royal game reserve and a valuable source of timber surrounded by a boundary consisting of a ditch and fence (palings) (Stewart-Brown 1912). The presence of a deer park on a lord's estate was an important indicator that he occupied the highest echelons of society, construction of one need-

ing both royal consent and the expenditure of a great deal of money and power in order to enclose the necessary land. This would often have resulted in the disruption of communities already living in the area and those who had traditionally held common rights to access the area being enclosed and its resources (Creighton 2002). The park provided a means by which a lord could demonstrate command of the requisite resources through the creation of a 'landscape of plenty'; an elite landscape in which the castle itself could be properly approached and appreciated (Liddiard 2007).

At Shotwick, surviving medieval earthworks (1623066) mapped by the project are focussed on a relatively small area to the north and north-east of the castle, with isolated furlongs of medieval rig scattered across the rest of the park. The presence of narrow post-medieval ridge and furrow suggests fragmentary survival across the rest of the park is a result of destruction of earthworks by mechanised ploughing. Whether medieval field systems were abandoned once the park had been established or whether agrarian practices were incorporated into the elite landscape of the park is unknown. Newly identified features associated with the ridge and furrow consist of plough headlands (1623048) visible as earthwork banks, and three hollow ways (1623048) visible as earthwork ditches, two of which appear to run from the vicinity of Shotwick Park Lodge toward the castle. A newly identified mound (1623048) that may represent a building platform was identified as an earthwork from lidar imagery in the bailey of Shotwick Castle. A probable moat (67131) is visible as an earthwork ditch in historic vertical photographs at Shotwicklodge Farm and may be associated with the medieval hunting lodge recorded as having stood on the site.

Another contemporary deer park in the project area is known as the Old Pale. This was enclosed in *c.* 1337-38 by the Black Prince who instructed a chamber and enclosure be made in the forest (Fairhurst 1988). No evidence for the deer park was visible in aerial images consulted by the project. The Old Pale was succeeded by the New Pale that was enclosed at some point in the early 17th century (Cheshire HER, 837/2/1). This deer park is clearly visible as contiguous field boundaries enclosing a roughly spherical area of approximately 112 hectares. Newly identified earthworks within the area consist of medieval ridge and furrow (1625953) and a hollow way (162009) visible as earthworks in historic aerial photographs. Although not directly associated with a deer park, a newly identified feature visible as rectilinear earthworks (1625899) in lidar images on Woodhouse Hill may represent a medieval structure, possibly associated with hunting (Fig 23). The feature covers an area of roughly 40m x 50m. A visit to the site to ground truth the features confirmed the existence of substantial earthwork banks measuring approximately 5m wide and 0.6m high that enclose three levelled areas. The rectilinear nature of the earthworks are indicative of a structure and the lack of any evidence of a farmstead or other building on historic mapping suggests it may be medieval or post-medieval. The site is located on the crest of a ridge, just below the top of Woodhouse Hill and overlooking Woodhouses and Helsby, with the River Mersey beyond. It seems unlikely such an exposed location would have been favoured by farmsteads in the past any more than by modern farms that are set back in a sheltered depression on the east side of

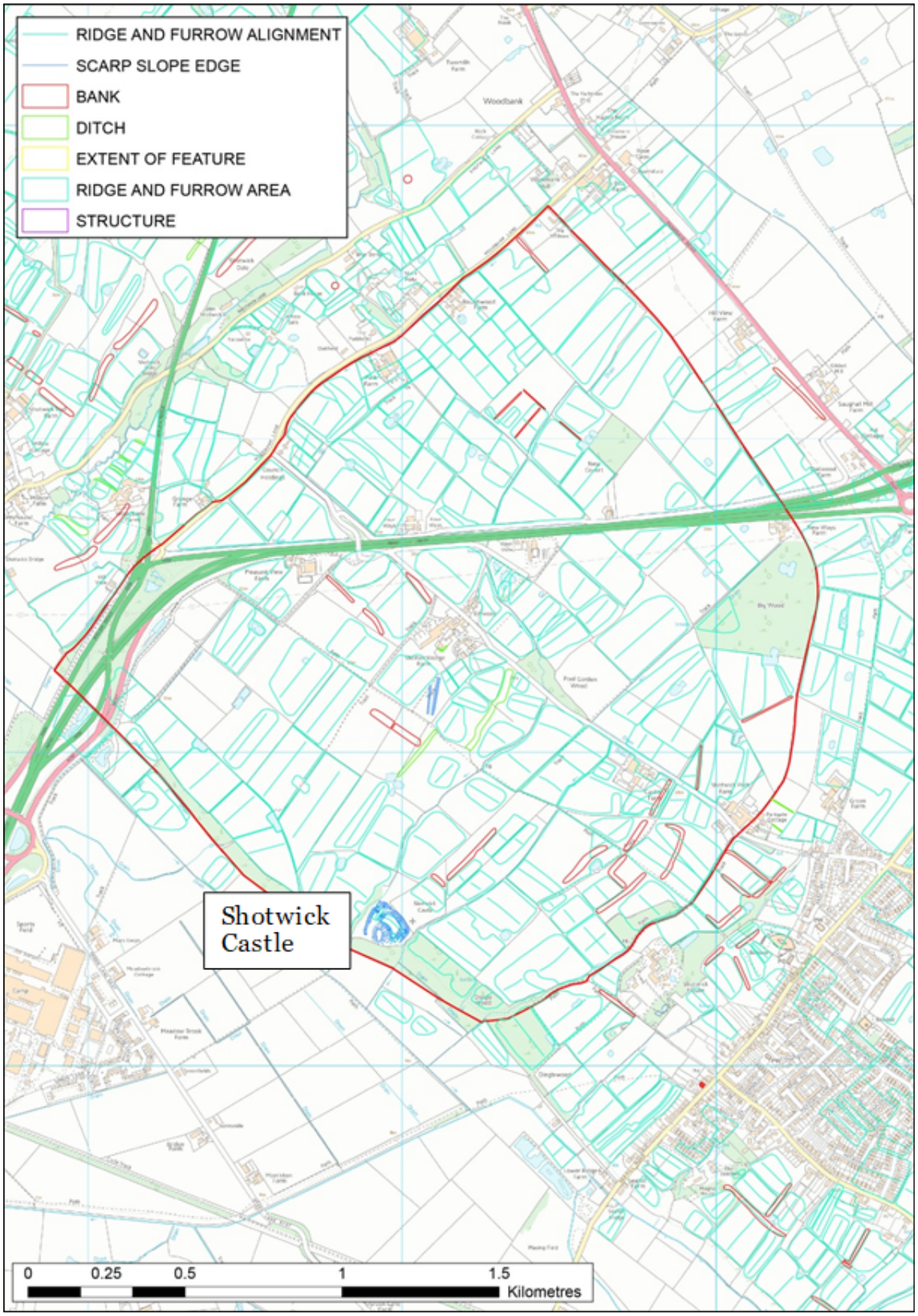


Fig 22: Project mapping of Shotwick Castle and deer park, centred at SJ 353 712 © Crown Copyright and database right 2022. All rights reserved. Ordnance Survey Licence number 100019088.

the hill. Such an exposed location suggests an important element in the siting of the structure was that it could either be seen or offered good views.

The project has also mapped archaeological features related to the development of the Eaton Hall estate. A known moat (162899) was identified as earthworks in historic vertical photographs 300m south of the modern hall. This is the site of a medieval manor house depicted in illustrations of the estate from the 18th century. The illustration also shows a temple in the landscaped grounds of the hall that appears to coincide with a newly identified circular earthwork mound and ditch (1629002) visible in historic aerial photographs. Newly identified earthworks relating to a narrow-gauge railway line (1381018) constructed in 1896 are visible as earthworks in lidar images running through the village of Belgrave. The railway was designed by Sir Arthur Percival Heywood, who had pioneered the 15inch 'minimum gauge' railway, to improve the efficacy of the transport of coal and other materials to Eaton Hall.

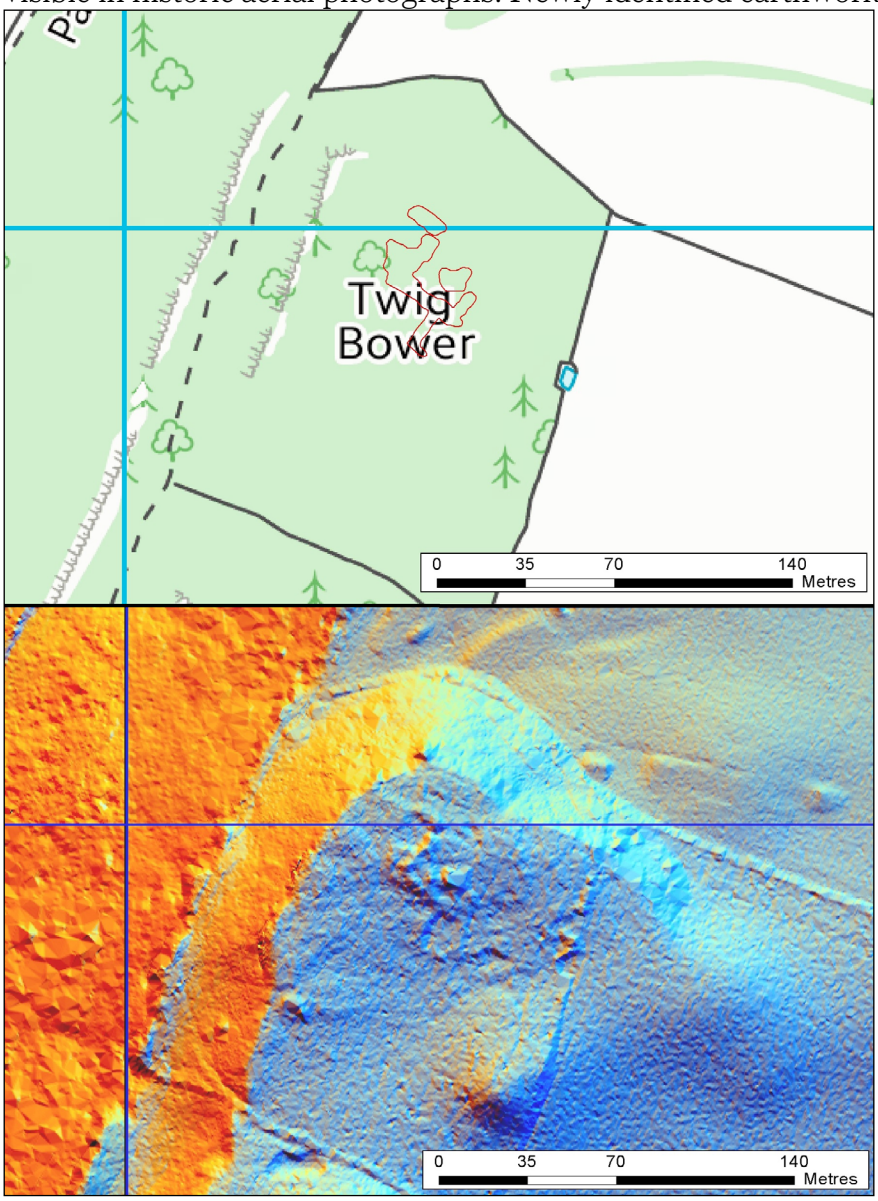


Fig 23: Project mapping of rectilinear earthworks on Woodhouse Hill, centred at SJ 5111 7517 © Crown Copyright and database right 2019. All rights reserved. Ordnance Survey Licence number 100019088. LIDAR SJ 5075, 5076, 5175 and 5176 Environment Agency LAST RETURN 21-Dec-2016 © Environment Agency copyright 2022. All rights reserved.

CONCLUSION

Significance of Results

The project has made significant additions to the number of known heritage assets in the study area. The barrow cemetery at Seven Lows is one of only eight barrow cemeteries identified in the North West and the addition of a newly identified barrow will prove significant for organising proper scheduling and protection of the site. Mapping of these features has also shown that the current scheduled areas should be repositioned to ensure proper coverage of the monuments. The site is of regional significance considering how few barrow cemeteries have been identified in the North West and is certainly worthy of further study on a local and a regional scale.

The identification and mapping of 20 probable Roman enclosures around Chester is of regional and national significance due to the number of sites concentrated around the city, their varying morphology and their level of preservation. They provide a unique opportunity for furthering our understanding of how the Roman army established control over the north-west of England and, given the possibility that they may represent fortifications built over a prolonged period of time, the potential opportunity to better understand the development of forts and camps within Britain. The Roman settlement at Heronbridge provides the opportunity to compare civilian with military settlement in the area and to investigate how they differ.

Brennand *et al*. (2007) called for sites with *Eccles* place-names to be targeted with systematic survey as potential candidates for British ecclesiastical centres. The oval churchyard of St. Mary's Church in Eccleston was mapped as part of the project along with an oval bank surrounding the churchyard of St. Mary the Virgin church in Bruera. There appears to be some consensus that oval-shaped churchyards are characteristic of early British church sites and the 10th century church at Bruera may represent continuity from an earlier period. Further archaeological investigation of these sites could help elucidate a period where there was considerable tension between the 'western tradition' and that of Rome as represented by the Gregorian mission. Given the presence of early medieval architectural elements at St. Mary the Virgin church in Bruera, further investigation of such sites address the Regional Research Framework's objective to examine presumed centres of early medieval activity (The North West England Regional Research Framework 2020). These sites may also help elucidate the extent to which churches became the focus of aristocratic patronage during the Anglo-Saxon period (Blair 2005) and whether pre-existing church sites were co-opted by the Anglo-Saxon nobility by building manor houses in close proximity to them as happened in the Norman period (ie. McDonagh 2007). Such research would be of regional and potential national significance.

The Mercians were well aware of Chester's strategic importance in projecting their power across the Irish Sea in order to disrupt contact between Viking York and Dublin. Anglo-Saxon settlement in the project area remains elusive but this is likely a result of the difficulty of disentangling the pre and post-conquest landscape. The

project suggests that some moated sites, which tend to be attributed to the late-medieval period, may in fact be Anglo-Saxon in origin and has highlighted sites where documentary evidence and cartographic study suggest pre-conquest manorial centres may have existed (e.g. Shotwick Church, Bruera and Saughall). The project has also highlighted the potential for further documentary and cartographic study of sites within the project area to elucidate societal changes throughout the medieval period.

The level of medieval earthwork survival visible in historic photography in the project area makes it particularly amenable to the study of the medieval landscape, with a large number of manorial centres surviving as earthworks together with ridge and furrow open-field systems. Mapping of these features provides an excellent opportunity for this data set to be interrogated to assess how the landscape was managed in the medieval period. This report also sought to illustrate the complex nature of power dynamics within the region during the Anglo-Norman period, with the interests of the nobility increasingly coming at odds with the power of the king, culminating in the signing of Magna Carta as well as increasing links with the Welsh nobility through marriage and formal alliance. Mapping in the project area provides a dataset that can be used to better understand how Anglo-Norman seigneurial power centres in the region related to each other. Ideally this would be complemented by aerial mapping on the other side of the Welsh border for comparison with the data produced by this project, as well as Hardwick's (2017) pilot project that also provided good evidence of medieval ridge and furrow adjoining in the area. Further archaeological investigation of post-conquest manorial centres would help address the lack of research into the 10th to 12th century sites in the region identified by Brennand *et al*. (2007), while also addressing a nationally significant theme by elucidating the processes by which the nations of United Kingdom formed.

Eaton Hall provides an excellent case study of the development of a medieval manorial centre into an aristocratic estate. The project mapped earthworks relating to the medieval manorial centre represented by a truncated moated site, as well as a number of earthwork features within in the vicinity of the hall that likely represent episodes of landscaping. Extensive earthwork survival within the estate allowed for the identification of an earthwork mound depicted as the site of a temple on historic mapping. The combination of aerial mapping with more detailed study of historic estate maps has good potential for further identification of such features and may elucidate developments in the landscaping of the grounds of the estate.

The project mapped six features relating to Second World War anti-air defence in the project area consisting of four heavy anti-aircraft batteries and two searchlight batteries. These sites were significant for the anti-air defence of Chester and the southern approach to Merseyside during the war. While all of these sites were already known, mapping provided by the project makes details as to their composition and spatial relationship with each other available in the one dataset for the first time.

Project Objectives and Contribution

The project has significantly increased the number of known heritage assets within the areas studied. It has provided the HER with a comprehensive resource to manage these sites in future, allowing for more informed mitigation of the potential impact of development in these areas. The project has successfully recorded, characterised and analysed previously unknown heritage assets that are visible on aerial images in the area. This information has been integrated into the NRHE and the HER. Information has been provided on the condition of scheduled monuments within the survey area and interpretation of these sites have been enhanced where applicable with reference to aerial images. As well as identifying new sites, the project has sought to contextualise these within wider themes that are of local, regional or national significance, a number of which fall within the research priorities set out in the *North West Regional Research Strategy* (Brennand *et al.* 2007) and *The North West England Regional Research Framework* (2020). Dissemination of project results has been achieved through a talk given at the Council for British Archaeology North West Autumn meeting in Nantwich and at the Northern Prehistory Conference at Tullie House Museum, Carlisle. A note summarising the findings of the project, along with directions on where to access this report, will be published in the journal published by the Chester Archaeology Society. The project report will be distributed among local bodies and academic institutions in order to disseminate the project's findings as widely as possible and promote the adoption of further research based on these findings.

Recommendations for Further Work and Designation

Recommendations for Further Work

The project opens up a number of possibilities for further research. There is the potential to make significant contributions to our understanding of the region's past through 'proactive' research as defined by the North West England Regional Research Framework (2020). This includes a number of sites representing transitional periods that illustrate the changes that shaped the region as we see it today. The barrow cemetery at Seven Lows is one of only eight barrow cemeteries identified in the North West. Further research into this site is being carried out following excavation by Dan Garner and there is scope for a landscape study comparing the setting of barrow cemeteries in the region and exploring similarities with other cemeteries in the UK and in Ireland. This could be tied in with possible Bronze Age settlement sites identified in the region through excavation and aerial mapping. Iron Age and Roman sites mapped as part of the project offer great potential for further research. Recent archaeological investigation and scientific dating of a number of hillforts in the project area has established good chronologies for these sites (see Garner 2016), providing a unique opportunity to better understand the development of hillforts between the Bronze and Iron Age, as well as how societal changes may have influenced their development. The majority of enclosures mapped as part of the project are probable Roman camps or fortlets, all of which would have fallen within the area Mason (2001) proposes as the *prata legionis*, under the direct control of the

legion. When juxtaposed with the civil settlement at Heronbridge, project mapping allows for further landscape study and comparison with other Roman military sites and closely associated civil settlement across Europe. Such a concentration of Roman enclosures of varying morphologies provides a unique opportunity for a project similar in scope to the Habitats and Hillforts project whereby scientific dating techniques are combined with targeted archaeological investigation of a number of sites. Such a study would further our understanding of how the Roman army established control over the north-west of England and increase our understanding of the development of forts and camps within Britain.

The project has highlighted the extent of medieval earthwork survival across the project area and the potential this offers for further research. The churches in Eccleston and Bruera are good candidates for early ecclesiastic sites. This could be confirmed through archaeological investigation of their oval shaped churchyards should the opportunity arise. The rectilinear earthworks identified on Woodhouse Hill are also a good candidate for further archaeological investigation, perhaps in the form of a community project. Despite little direct evidence of Anglo-Saxon settlement, this project has sought to use cartographic and documentary evidence to suggest places where pre-conquest Anglo-Saxon manorial centres most likely existed. The hamlet of Bruera is worthy of further archaeological investigation, as is the moated site at Shotwick. As Blair (2005, 309) points out "Cheshire and Lancashire show an exceptionally strong correlation between mother-parishes and hundreds, each hundred visually comprising two or three interlocking parishes. It may be that post-Viking reorganization, perhaps begun by Aethelflaed and developed through the tenth century, created this exceptional symmetry.". This being the case, the Chester environs provide a unique opportunity for further research into how the hinterland surrounding Chester operated during the Anglo-Saxon period and the transition that took place as a result of the Norman Conquest as captured in Domesday.

Secular and ecclesiastic Anglo-Norman manorial centres are well represented in the project area and offer the opportunity to explore how these estates were organised in the medieval period and how they related to each other. This could consist of co-ordination with the Royal Commission on the Ancient and Historical Monuments of Wales for further aerial mapping on the other side of the Welsh border in Flintshire and Wrexham County for comparison. A historical study of documents formerly held by St. Werburgh's Abbey in Chester may help shed light on how Benedictine estates in the area were organised and help contextualise differences between estates that may be evident in the archaeology.

Designation

The project has identified a number of features that may meet the criteria for schedule assessment. Two barrows (71169) were identified and mapped at Seven Lows barrow cemetery that may meet the criteria for schedule assessment (Historic England 2018a). The saucer barrow had previously been scheduled and may meet the criteria for reassessment given finds from excavation. A probable round barrow

identified by this project may meet the criteria for assessment given the scheduled status of the rest of the monuments that make up the cemetery and the regional importance of the cemetery.

Earthworks relating to a number of Roman camps have been identified in the project area and may meet the criteria required for scheduling (Historic England 2018b). Two Roman camps (1623690) were identified in the parish of Barrow overlooking the Chester-Manchester Roman road. The proximity of these sites appears to demonstrate a degree of strategic importance attached to their location in relation to the routeway and have the potential to contribute to our understanding of the chronological development of such sites and the Chester-Manchester road. Two Roman camps (1629065) were identified in the north-east of the parish of Christleton adjacent to the Chester-Manchester Roman road. Lidar imagery shows excellent survival of earthworks relating to the camp on the south side of the road, allowing for a double bank to be identified surrounding the enclosure that appears to be set within a larger banked enclosure that may represent a camp that predates the fort. The site may meet the criteria for assessment given its preservation, potential to contribute to our understanding of the chronological development of such sites and its distinct morphology. Two Roman camps (1629026, 1629023) were identified south of the junction between Chester Road and Sandy Lane that may meet the criteria for assessment. Lidar imagery shows excellent survival of earthworks relating to the monuments. Their proximity to the legionary fortress at Chester and a potential a Roman road (1629023) increases the monument's potential

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APPENDIX 1 ARCGIS MAP LAYERS AND DRAWING CONVENTIONS

Layer Name	Layer content	Feature Type	Layer colour
BANK	Closed polygons for features such as banks, platforms, mounds and spoil heaps	POLYGON	Red
DITCH	Closed polygons for cut features such as ditches, ponds, pits or hollow-ways	POLYGON	Green
EXTENT_OF_FEATURE	Closed polygons outlining complex or extensive remains such as mining or military installations	POLYGON	Orange
MONUMENT_ POLYGON	Closed polygons encircling all the features recorded within a single NRHE record	POLYGON	White
RIDGE_AND_FURROW_ALIGNMENT	Polyline showing the direction of ploughing of ridge and furrow	POLYGON	Cyan
RIDGE_AND_FURROW_AREA	Closed polygon defining the furlongs or extent of area of ridge and furrow	POLYGON	Cyan
STRUCTURE	Closed polygons for built features including concrete, metal and timber constructions such as military installations	POLYGON	Purple
THACHURE	Polyline T-hachure convention to schematize sloped features indicating the top of slope and direction of slope	POLYGON	Blue

APPENDIX 2 ARCGIS MAP DATA TABLES

Monument Data Table

The Monument Data table consists of nine fields that were input directly through ArcMap 10.4. The content of these fields follows those that are entered in the Historic England Research Records.

FIELD NAME	**FIELD CONTENT**	**Sample data**
MONARCH	NRHE / Historic England Research Records Unique Identifier Unique Identifier ()	68887
PERIOD	Date of features (HE Thesaurus)	MEDIEVAL
NARROW_TYPE	Monument type (HE Thesaurus)	MOTTE
BROAD_TYPE	Monument type (HE Thesaurus)	CASTLE
EVIDENCE_1	Form of remains (HE Thesaurus) as mapped	EARTHWORK
PHOTO_1	Reference for the photograph/image from which the feature was mapped and the date of the source	LIDAR SJ4350 Environment Agency LAST RETURN 16-FEB-2001
EVIDENCE_2	Form of latest evidence (HE Thesaurus) as mapped	LEVELLED EARTHWORK
PHOTO_2	Reference for the photograph/image from which the latest evidence was taken	Next Perspectives APGB Images SJ4350 09-JUN-2013
HER_NO	Cheshire HER record number where applicable.	MCH1397

APPENDIX 3 PROJECT MANAGEMENT

The project was funded by Historic England (HE) and undertaken by Archaeological Research Services Ltd (ARS Ltd).

The Project Board was made up of Jonathan Last (HE NHPCP Project Assurance Officer), Matthew Oakey (HE AI&M Quality Assurance Officer), and Rob Edwards (Cheshire APAS). The Project Executive was Robin Holgate (ARS Ltd). The wider Project Liaison Group also included Andrew Davison (HE Principal Inspector of Ancient Monuments), Kate Kendall (HE Heritage at Risk Projects Officer).

Joel Goodchild (ARS Ltd) was the Project Officer who carried out the survey, recording and report production.

The HE AI&M Quality Assurance Officer for the air photo mapping was Matthew Oakey, and quality assurance was carried out on *c.* 30% of the total mapped area (50% of Block 2 as the mapping block was the first AI&M external work undertaken by the Project Officer, followed by the usual 5% recommended by AI&M on the remaining blocks). The high percentage of Quality Assurance carried out was a result of the Project Officer undergoing training at the start of the project, this being the first aerial mapping work he had undertaken. The HE team also provided advice and support where necessary and helped ensure the interpretation, mapping and recording were conducted according to AI&M standards.

The project ran for 14 months beginning in September 2018, with mapping completed in September 2019. Report finalisation took place in January 2022 following monument recording that was delayed as a result of Covid 19 and the introduction of the WARDEN monument recording system.

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