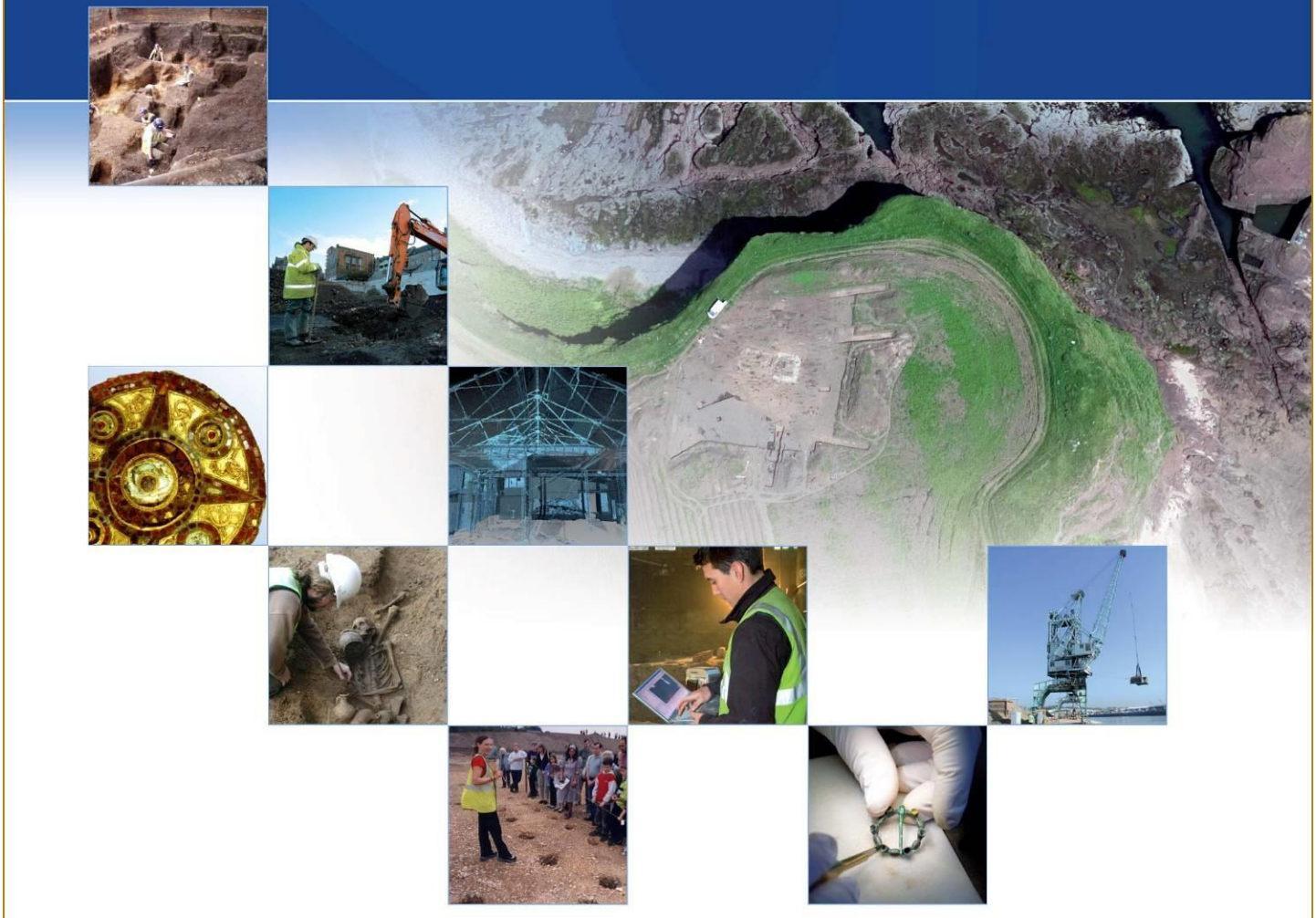
Parsonage Farm, Stansted, Essex

Archaeological Geophysical Survey

National Grid Reference: TL 51685 23093
AOC Project No: 40907
Date: 23 May 2025



AOC Archaeology Group

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Parsonage Farm, Stansted, Essex

Archaeological Geophysical Survey

On Behalf of:	**WSP UK Limited** WSP House 70 Chancery Lane London, London WC2A 1AF United Kingdom
National Grid Reference (NGR):	**TL 51685 23093 (centre)**
AOC Project No:	**40907**
OASIS IC	**TBC**
Prepared by:	**Hannah Brown**
Illustrations by:	**Hannah Brown**
Date of survey:	**22/04/2025 - 25/04/2025**
Surveyors:	**Victoria Huggett and Jessica Taylor**

This document has been prepared in accordance with AOC standard operating procedures.

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Report Stage: Draft Version 2	**Date: 23 May 2025**

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Non-Technical Summary

AOC Archaeology Group was commissioned by WSP UK Ltd to undertake an archaeological geophysical survey, using magnetic gradiometry to investigate the potential for buried archaeological remains prior to a proposed development at Parsonage Farm, Stansted Mountfitchet, Essex, centred at NGR TL 51685 23093.

The survey area was located c. 3km northeast of the centre of Bishop's Stortford and comprised c. 40.45ha of agricultural land across nine fields surrounding Parsonage Farm and adjacent to the M11.

A number of anomalies have been identified that may be of archaeological interest. These primarily comprise linear and curvilinear anomalies that are typical of those associated with ditches or other cut features. A cluster of such anomalies in the northeastern corner of the survey area may relate to a series of enclosures, while additional groups have been identified in the western corner and southern tip of the survey area. The date and contemporaneity of these features is uncertain.

Additional, more fragmentary, magnetic anomalies have also been identified that appear less distinct and for which a clear interpretation cannot be confidently confirmed. These include ephemeral trends in the data and small, isolated anomalies; they are most likely to have geological or agricultural origins but an archaeological explanation cannot be ruled out.

A range of anomalies indicate current and past use of the survey area for agricultural purposes, and include evidence for ploughing, land drains and former field boundaries.

Overall, the geological conditions resulted in a relatively 'quiet' magnetic background and, although strong responses associated with several buried services and surrounding modern infrastructure were recorded, such disturbances were localised and spatially confined.

1 Introduction

1.1 AOC Archaeology Group was commissioned by WSP UK Ltd to undertake an archaeological geophysical survey, using magnetic gradiometry, of an area of land at Parsonage Farm, Stansted Mountfitchet, Essex. The survey was undertaken between 22nd and 25th April 2025, and forms part of a wider scheme of archaeological assessment in association with proposed development on the site. Survey was completed over a total of 40.45ha, with areas unsuitable for survey (e.g. due to vegetation or other obstacles) limited to narrow zones alongside field boundaries and the immediate surroundings of upstanding features.

1.2 Archaeological geophysical survey uses non-intrusive and non-destructive techniques to determine the presence or absence of anomalies likely to be caused by archaeological features, structures or deposits, as far as is reasonably possible (CIfA 2014, updated 2020). It is therefore a common component of the process of evaluating the impact of development on the historic environment. It is also a key tool in archaeological research as it is non-destructive and able to cover large areas, to allow below ground interventions to be appropriately targeted.

1.3 This survey was carried out in accordance with the agreed WSI (WSP, 2025b) in order to provide information on the presence, character and extent of potential buried archaeological remains within the proposed development site. The significance of any such remains can only be determied with reference to further information; as such this report may form part of an assessment of significance, but cannot stand alone as such.

2 Survey Area Location and Description

2.1 The proposed development site (hereafter 'the survey area') is located c. 3km northeast of the centre of Bishop's Stortford and c. 400m northeast of the village of Birchanger, centred at TL 51685 23093 (Figure 1).

2.2 The survey area comprised nine contiguous agricultural fields surrounding Parsonage Farm and buildings of of the M11 Business Link industrial estate (Figure 2). It is bisected by Parsonage Lane and lies immediately west of the M11. The wider landscape is broadly flat with gentle undulations; the village of Birchanger occupies slightly elevated ground to the southwest, with the land sloping gently down to the north and east across the survey area; the highest ground within the survey area is therefore across the southern edge of Areas 1 (c. 100m above Ordnance Datum (aOD)) and Area 2 (c. 97m aOD) and the northwest of Area 5 (c. 95m aOD), with the northern edge of Area 1 at c. 88m aOD.

2.3 The recorded solid geology underlying the survey area consists of clay, silt and sand of the London Clay Formation. This is overlain by superficial deposits of Lowestoft Formation diamicton across most of the area to the south and east of Parsonage Farm, with Mid Pleistocene glaciofluvial sands and gravels to the north and west; a narrow band of head deposits are mapped coinciding with the boundary separating Areas 5 and 6 (BGS, 2025). The soils within the survey area are mapped as lime-rich loamy and clayey soils with impeded drainage across Areas 7-9, with freely draining slightly acid but base-rich soils across the remainder (Soilscapes, 2025).

2.4 Magnetometry can provide variable results over clays and mudstones, but will be strongly influenced by the magnetic properties of the parent material from which any overlying drift deposits are derived (David *et al.* 2008: 15). In this instance, the soil and geological environment of the survey area have

resulted in a relatively homogenous magnetic background, albeit with some localised mineralogical variation, and do not appear to have unduly hindered interpretation of the data.

3 Archaeological Background

3.1 The following archaeological and historical context of the site is summarised from the Archaeological Desk-Based Assessment (ADBA) report (WSP 2025a) and is based on information provided in the WSI (WSP 2025b). The ABDA offers a detailed chronological overview of the site, incorporating data from both the immediate study area and the wider landscape.

3.2 Two archaeological investigations have taken place on the eastern edge of the site / directly adjacent to the site, associated with surrounding infrastructure developments. These revealed significant findings, including multi-period prehistoric settlements and earthworks, with a Middle Iron Age settlement identified at the site's eastern periphery during the M11 Widening Scheme (1992–1995; ECCFAU, 1995a-b). An archaeological watching brief at Parsonage Farm (Archaeological Solutions, 2008) recorded limited remains, such as earlier lime mortar flooring beneath modern structures.

3.3 Nearby investigations within the study area, including Oxford Archaeology's recent works for Stansted Northside Phase 1 development to the east of the M11 motorway, suggests the area was part of the Iron Age agricultural hinterland (Oxford Archaeology, OA, 2023–4), while the Stansted Airport excavations (1985–2004) uncovered extensive prehistoric and Roman remains (Framework Archaeology, FA, 2008). In 2006, Oxford Archaeology's trial trenching near the site uncovered 19th–20th century features linked to Rochford Nurseries (OA, 2006a-b), while Northamptonshire Archaeology's works (2007, Phase 3) revealed mostly post-medieval features, alongside one Iron Age pottery sherd. The Portable Antiquities Scheme recorded over 40 finds, predominantly Roman, medieval, and post-medieval artefacts.

3.4 The site is located on the upper slopes and edge of a plateau, with nearby rivers and tributaries likely attracting human activity throughout history. The main archaeological potential is for prehistoric, Roman, medieval and World War II airfield remains, supported by historical records and evidence presented below, suggesting promising archaeological prospects during these periods (for detail see Section 4.5 of WSP, 2025). These findings are recorded in the Essex Historic Environment Record data, accessed in December 2024, hereafter referenced as 'EHER, 2024'.

3.5 The site has moderate to high potential to contain prehistoric remains. Evidence of sedentary settlement in the Stansted area begins post-1600 BC, in the Middle Bronze Age, but earlier activity is evident through finds of Mesolithic to the Iron Age materials (FA, 2008). The Stansted Project and the Stansted Framework project, both to the east of the site, reveal a rich prehistoric landscape comprising settlement, agricultural activity and burials (FA, 2008). Sporadic evidence of Mesolithic and Neolithic activity has been recorded. Mesolithic activity is indicated by sparse flint tools, while Neolithic finds include small pits, tree-throw deposits, and pottery scatters, such as those at Rochford Nurseries (170m northwest), and early Neolithic pottery found at Stansted Airport Long Stay Car Park Phase 1 (160m southeast) (FA, 2008).

3.6 A major intensification of the use of the landscape is noted from the middle Bronze Age onwards (FA, 2008). The Bronze Age is marked by a range of features, including a cremation burial at Stansted Mountfitchet (440m north), a barrow or ring ditch at Stansted Airport Long Stay Car Park Phase 3 (70m east), and additional Bronze Age features such as roundhouses, burnt mounds, and ring ditches within 525m of the site. Late Bronze Age finds include cremations and pottery from Stansted Car Park I (330m east) (EHER, 2024).

3.7 Iron Age activity comprises cemetery enclosures, settlement, ditches, field boundaries, roundhouses, and other enclosures. Evidence of Iron Age activity was recorded immediately east of the site during the M11 Widening Scheme (ECCFAU, 1995a-b) at M11 Bury Lodge Lane - Site C, 30m east, where findings included a circular ditch, gully, and pits filled with domestic rubbish, indicating a Middle Iron Age settlement at the site's eastern periphery. Nearby findings from Stansted Project and Stansted Framework project suggest continued occupation of the area in the Late Bronze Age/early Iron Age (FA, 2008). Iron Age activities are recorded at Stansted Car Park (410m southeast) and Rochford Nurseries (170m northwest), alongside a pottery-filled pit at Land North of Stansted (370m east) (EHER, 2024).

3.8 The site has low to moderate potential to contain Roman remains. Evidence of small-scale Roman settlement, agricultural use and burials has been recorded to the east of the site, and along with evidence of settlement at the site of the St. Mary's Church, 420m northeast (EHER, 2024). The area lies near the boundary of the Catuvellauni and Trinovantes tribes, with evidence of small-scale farm settlements (FA 2008). Notable Roman features include a cemetery at the Stansted Duckend Car Park site, 450m southeast, and Roman enclosures and ditches at Stansted Airport Long Stay Car Park Phase 2, 30m east. Roman pottery and metalwork were found at Stansted Bury Lodge Lane, 470m east. The nearest large Roman settlements were at Bishops Stortford, 3km south-west of the site and the Roman Road, Stane Street, lies 930m south, linking Colchester to Braughing (Margary 1967) (EHER, 2024).

3.9 The site has moderate potential to contain medieval remains. The site lies on the outskirts of two medieval settlements, Birchanger and Stansted Mountfitchet, within agricultural land. Parsonage Farm lays adjacent to the site and is the location of a medieval moated farmstead. The site is located within the boundary of Stansted Deer Park, in use throughout the later medieval period. associated with Parsonage Farm (EHER, 2024).

3.10 The site has moderate to high potential to contain WWII airfield remains. The site was in agricultural fields prior to the construction of RAF Stansted Mountfitchet in World War II. The majority of the airfield buildings have been demolished, including Dispersed Site No 3 and the Anti-Aircraft Head Quarter Site, the sites of which are on the site (see Figure 2 of WSP, 2025). Some Nissen huts remain extant from Dispersed Site No 6. Buried footings from the demolished buildings may be present (EHER, 2024).

3.11 Ploughing and roots crops (0.3 – 0.4mbgl) may have impacted the potential for archaeological survival. However, cut features such as pits and ditches can remain below this level, and the survival of these is expected to be higher. OS mapping and aerial imagery show the land has remained agricultural with no construction development, indicating moderate to high potential for archaeological survival.

4 Aims

4.1 The aim of the geophysical survey was to identify anomalies that suggest the presence of archaeological remains, in order to enhance the current understanding of the historical environment within the survey area.

4.2 Specifically, the aims of the gradiometer survey were:

- To determine, the presence or absence of subsurface archaeological features and anomalies within the site, and to map the extent of any features that may be present, as far as is possible using the magnetic gradiometry method.
- To determine, as far as is reasonably possible, the nature of the detectable archaeological resource within a specified area using appropriate methods and practices; and
- To inform the scope and nature of any further site-based archaeological work that may be required.
- To produce a comprehensive site archive (Appendix 1) and report.

5 Methodology

5.1 The geophysical survey was undertaken between 22/04/2025 and 25/04/2025.

5.2 All geophysical survey work was carried out in accordance with the agreed WSI and in accordance with current good practice specified in the EAC guidelines document (Schmidt *et al.* 2015), as recommended by Historic England, and in the Chartered Institute for Archaeologists' *Standard and Guidance for Archaeological Geophysical Survey* (2014, updated 2020).

5.3 Parameters and survey methods were selected that were suitable for the prospective aims of the survey and in accordance with recommended professional good practice (Schmidt *et al*. 2015).

5.4 Digital photographs of every survey parcel were taken before, during and after geophysical survey to show any changes to field conditions following the programme of works. The photos were downloaded and stored off site, and relevant examples are included as Plates 1 to 4 in this report.

5.5 The survey was carried out using a Sensys MAGNETO® MXPDA push-cart magnetometer system. The cart utilises six FGM650/3 fluxgate gradiometer sensors mounted upon a frame along with data logging equipment and batteries (see Appendix 2).

5.6 Data was collected using zig-zag traverses alongside a constant stream of GPS data collected through a Trimble R10 GPS, enabling the collected data to be spatially georeferenced without the need for a pre-determined grid system. The data and measured tracks were collected through the data acquisition unit MXPDA and visualised through a tablet PC mounted to the cart.

5.7 A total of 40.45ha were surveyed using the Sensys cart.

5.8 Care was taken to attempt to avoid metal obstacles present within the survey area, such as metal objects within and adjacent to the survey area as gradiometer survey is affected by 'above-ground ferrous disturbance' and avoiding these improves the overall data quality and results obtained.

5.9 The data was downloaded via USB and converted using DLMGPS and Geoserver before being processed (compensated) using MAGNETO® 3.0 software. The details of these processed can be found in Appendices 2 and 3.

5.10 Interpretations of the data were created as layers in ArcGIS Pro and the technical terminology used to describe the identified features can be found in Appendix 4.

6 Results and Interpretation

6.1 The magnetometer survey results have been visualised as greyscale plots, with the processed data plotted at -1nT to 2nT as seen in Figure 3 (overview at 1:7,000); detailed plots (1:1,500) are shown in Figures 5.1 - 5.7. An interpretation of the data can be seen in Figures 4 (overview) and 6.1 - 6.7. An interpretation of the anomalies of interest is given below. Figures 7.1 - 7.7 show minimally processed data plotted as XY traces at 50nT/cm at A3.

6.2 Appendix 4 contains a guide to the interpretation categories employed and the logic used to assign anomalies to specific classes, as well as a short discussion of how past human activity results in these anomalies, however, some important points are noted below:

6.3 The classes have three sub-types (generally): anomalies (typically indicated by a solid colour polygon), spreads (a stippled polygon) and trends (a line with a colour matching the polygon colour). *Anomalies* refer to distinct changes in the survey data which suggest an abrupt boundary between materials below ground, such as a cut feature with a magnetically contrasting fill. *Spreads* of enhanced material refer to diffuse areas of altered magnetic contrast which suggest a localised spread of material with a magnetic contrast within the topsoil or ploughzone. Linear *trends* are less distinct and are typically visible as linear patterning in the overall texture of the data. A common example of these is the striping effect caused by recent ploughing.

6.4 Anomalies placed in the '*Uncertain'* class may have an archaeological origin, but other explanations are equally likely. Where any particular interpretation is *more* likely than others, the anomaly is assigned to that class.

6.5 The definite '*Archaeology'* class is only used for anomalies with no other possible explanation, either due to their diagnostic characteristics or because they are corroborated by other sources such as previous interventions within the survey area. Anomalies with magnetic characteristics or morphologies that suggest an archaeological origin will generally be assigned to the '*Possible Archaeology'* class.

6.6 The anomaly type '*Ferrous Spike'* is assigned to strong dipolar anomalies which cover a small spatial area and have a characteristic appearance in the XY traces of the survey data. These are strongly likely to be of recent origin in the form of magnetic or ferrous debris within the topsoil; 'spikes' of other origin will be assigned to their appropriate classification.

6.7 A distinction is made between modern *disturbance* from strongly ferrous materials within or adjacent to the survey area, such as the strong dipolar 'halos' produced by services like gas mains, and spreads of material within the topsoil causing noise that is assumed to have a recent origin. Generally speaking, '*Modern Disturbance'* occurs at a distance from a magnetic source, whereas *modern magnetic spreads/debris* are related to material directly at that location.

6.8 Generally, only anomalies (or groups thereof) of a likely archaeological or historical origin have been assigned an anomaly number on the interpretation figures. However, anomalies interpreted as resulting from other processes that are integral to the discussion of the results have also been assigned anomaly numbers.

6.9 Overall, the magnetometer has recorded a broadly homogeneous magnetic background, with the underlying geology resulting in relatively 'quiet' data. A range of anomalies have been identified that contrast to a greater or lesser extent with the subtle 'mottling' effect visible across most of the area that is typical of natural variation within geology and soils of the types recorded. Data artefacts are present in parts of the dataset (most visible in the south of Area 1 and Area 2 as a 'chequer-board'

effect) due to rough ground, but coherent anomalies interpreted as indicative of buried features remain visible in these areas.

6.10 The magnetic effects of several buried services and above-ground modern ferrous sources (e.g. fencing, buildings, pylons) are clearly apparent in the data; while the resultant strong magnetic disturbance is likely to have obscured any weaker anomalies that may be present within their footprint, it is localised. As with all magnetic gradiometer survey, the potential for the presence of buried features that are unsuitable for detection using this technique (e.g. due to a lack of magnetic contrast between the feature and the surrounding soil matrix) should be borne in mind.

Archaeology

6.11 No anomalies that unequivocally indicate archaeological features have been identified; however, a number of features have been detected that may be of archaeological interest and these anomalies are discussed below.

Possible Archaeology

6.12 The anomalies categorised as possibly having archaeological origins primarily comprise narrow linear and curvilinear positive anomalies that are typically indicative of ditches or similar cut features that have been backfilled with magnetically enhanced material. Given their nature and morphology, the majority of the identified anomalies are considered likely to be associated with former field boundaries or other land divisions, though no direct evidence for their date of construction/use or their temporal relationship to each other can be extracted from the magnetometer data. See also Para 6.18 below in relation to probable field boundaries categorised as Historical Features.

6.13 A group of such anomalies, [**9A**], are located in the eastern corner of Area 9, and may indicate a group of enclosures. Diffuse areas of weak enhancement may have archaeological origins or reflect natural variation. The anomalies appear to extend beyond the northern edge of the survey area. They are also interrupted by a service and a historical field boundary (orientated on a different alignment to the Possible Archaeology). To the west and south of the group, weak, fragmentary trends in the data are discernible that may suggest the continuation of similar features, but which have been identified with a lower level of confidence (categorised as having Unclear origins).

6.14 In the southern part of Area 1, several linear zones of enhancement, [**1A**], have been detected that may indicate buried archaeology such as plot boundaries, along with an area of increased readings, [**1B**], that is roughly square in shape and measures approximately 10m across. Given the proximity of the extant farm buildings and the irregularity of the mapped field boundaries, it is possible that the anomalies relate to associated archaeological remains. Where anomalies appear particularly fragmentary and/or ephemeral, or where their context has been obscured by strong (modern) magnetic disturbances, their origin is less clear and they may have agricultural or natural origins.

6.15 Across the southern part of the survey area (Areas 5 and 6), several anomalies have been identified that are typical of those associated with linear features such as ditches. While some may form phases of the field system shown on late 19th-century OS maps, others do not obviously fit this pattern. It is possible that some of these anomalies have natural origins, perhaps relating to the local geology or to former watercourses.

Unclear Origins

6.16 The anomalies identified as having Unclear origins primarily comprise very faint linear or curvilinear trends that are visible in the data but which do not have distinctive characteristics. Their form could be consistent with various explanations. Although it is considered most likely that they reflect agricultural activity, natural variations or coincidental alignments, an archaeological origin cannot be ruled out.

Historical Features

6.17 This category has been used for detected features that coincide with former field boundaries shown on consulted late-19th-century OS maps, though it should be noted that the original date of construction may be considerably earlier. It is apparent from the survey data that many of the mapped former boundaries comprise two parallel linear elements, which do not necessarily take a similar form. Where it has been possible to identify which element(s) is more likely to represent the mapped feature (either directly i.e. a probable ditch) or indirectly i.e. a scatter of dipolar anomalies likely to be caused by the accumulation of ferrous or fired material in or along the boundary), this has been indicated by the use of the Historical Feature category; otherwise, the Possible Archaeology category has been used, to reflect the potential that the post-medieval boundary fossilised the line of an earlier feature. However, it is also possible that the additional elements indicate a drainage ditch contemporary with or later than the mapped feature.

6.18 For example, the parallel curvilinear anomalies ([**6A**] and [**6B**]) that run across Area 6, suggest two parallel ditches separated by c. 9m; given the georeferencing margin of error of the consulted historical OS map, it is not possible to confidently determine which (if either) of these features is the post-medieval mapped feature, although the magnetic form of the two anomalies is very slightly different (the eastern anomaly appearing marginally 'crisper' and stronger). It is possible that the pair relate to an earlier ditch-delineated trackway or boundary, the line of which was reused by the post-medieval boundary. In the northern part of this field, an additional former field boundary has been detected; this comprises a largely constant linear anomaly with a parallel spread of broader, stronger anomalies along its southern side; the latter may be related to the remains of a land drain or to different (less homogenous and more magnetic) fill of a second ditch.

6.19 In Area 9, anomalies [**9B**] that correlate with the location of mapped field boundaries include weak linear anomalies suggestive of ditches, with scattered small dipolar anomalies that are likely to be caused by the accumulation of ferrous or fired material in or along the boundary.

6.20 At the northern end of Area 1, various anomalies (e.g. [**1C**]) have been identified that correlate with mapped former boundaries. These appear in the data as anomalies typical of a combination of ditches and ferrous/fired debris. Note that, while the probable boundary [**9D**] in the northeastern quadrant of this field has been categorised as Possible Archaeology for reasons noted previously, the angle of incidence of this anomaly with an additional narrow linear anomaly that appears to join it, running in from the eastern edge of the survey area, suggests that these anomalies may relate to drains.

Agricultural

6.21 Various very faint linear trends in the data, identified in several parts of the survey area, indicate ploughing and/or the remains of agricultural drains. These trends do not exhibit distinctive morphology through which to infer a date of the cultivation/improvement.

Non – Archaeology

6.22 Areas of weak magnetic enhancement that are most likely to result from natural variations in the subsurface have been detected as diffuse anomalies and a 'mottled' background texture across the dataset; the most prominent of these have been indicated on the interpretation figures.

6.23 Linear alignments of strong dipolar and bipolar anomalies are present running across Areas 1, 4 and 9 and around the periphery of Areas 6 and 7. These are associated with buried services. Elsewhere, strong responses are associated with upstanding ferrous infrastructure, such as nearby buildings and fencing; these are largely confined to field edges, although a number of isolated, discrete responses surround features such as pylons.

7 Conclusion

7.1 The magnetic gradiometry survey was successfully completed over 40.45ha of the proposed development area that comprised agricultural land at the time of survey. Overall, the magnetic background is relatively homogenous and magnetically 'quiet', primarily reflecting the underlying geological circumstances; the subtle 'mottled texture' present across the data is typical of the clays and glacial drift deposits recorded, while a relatively low level of ferrous 'spikes' distributed across the area probably reflect modern debris and/or naturally occurring inclusions in the topsoils. In places, rough ground has resulted in discernible artefacts in the data; these are most apparent in the south of Area 1 and Area 2 but have been taken into account during the interpretation process. Although strong interference from modern magnetic sources (such as buried services and proximal buildings) is evident in the dataset, it is generally localised, though it should be noted that, where it does occur, it has the potential to obscure any weaker anomalies (including those associated with archaeology) that may be present.

7.2 A number of linear and discrete anomalies have been identified that are interpreted as possibly having archaeological origins and are considered likely to reflect ditches and other cut features. A cluster of such anomalies occur in the northeastern corner of Area 9 and suggest the possible presence of a series of enclosures and associated features. Given their limited context (i.e. their position in relation to the edge of the survey grid and other detected features, including a buried service and a post-medieval field boundary), it has not been possible to confidently refine the interpretation of these anomalies further, however, in light of the previously recorded archaeology located immediately east of the M11, it is suggested that the magnetic anomalies would be consistent with remains of prehistoric occupation.

7.3 Similarly, linear and curvilinear anomalies in the south, west and north of the survey area, which are variously visible as well-defined or more diffuse responses, are interpreted as indicative of possible archaeological features or deposits. While some of these features may form part of post-medieval or later field systems, their date of construction cannot be determined from the magnetic data alone.

7.4 Where anomalies do not demonstrate sufficiently distinctive characteristics or morphology to determine their origin more closely, they have been categorised as having 'unclear' origins. Such anomalies primarily comprise weak trends in the data; while these may reflect agricultural activity, natural variation or coincidental alignments, it should be noted that an archaeological explanation cannot be eliminated.

7.5 A range of anomalies evidence historical and modern agricultural activity across the study area and include examples relating to ploughing, land drainage and former field boundaries; the latter correspond to mapped features.

7.6 In assessing the results of the geophysical survey against the specific aims set out in Section 4:

- The survey has succeeded in locating, recording and characterising surviving sub-surface remains within the survey area, though more remains may be present that are not suitable for detection using magnetometry;
- The survey will help in determining the next stage of works;
- The survey has resulted in a comprehensive report and archive.

8 Statement of Indemnity

8.1 Although the results and interpretation detailed in this report have been produced as accurately as possible, it should be noted that the conclusions offered are a subjective assessment of collected datasets.

8.2 The success of a geophysical survey in identifying archaeological remains can be heavily influenced by several factors, including geology, seasonality, field conditions and the properties of the features being detected. Therefore, the geophysical interpretation may only reveal certain archaeological features and not produce a complete plan of all the archaeological remains within a survey area.

9 Archive Deposition

9.1 In accordance with professional standard practice an online OASIS database record will be completed for submission to the HER and Archaeological Data Service (ADS) (Appendix 2).

9.2 One digital and hard copy of the report and data will be submitted to the relevant Historic Environment Record (HER) at the Client's discretion.

9.3 A digital copy of the report and data will also be submitted to the ADS at the Client's discretion.

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*denotes a reference that occurs in Appendix 2 rather than the main body of this report.

11 Plates

Plate 1: View north across the northern end of Area 1, looking along Parsonage Lane.

Plate 2: Survey Area – Post-Survey Condition

Plate 3: View north across Area 8.

Plate 4: Survey Area – Ongoing Survey Operations.

12 Figures

Appendix 1: Survey Metadata

Oasis ID: TBC

Field	Description
Surveying company	AOC Archaeology Group
Data collection staff	Victoria Huggett and Jessica Taylor
Client	WSP UK Ltd
Site name	Parsonage Farm, Stansted
County	Essex
NGR	TL 51685 23093
Land use/field condition	Agricultural, pasture
Duration	22/04/2025 – 25/04/2025
Weather	Fine, dry
Survey type	Gradiometer Survey
Instrumentation	Sensys cart survey: Sensys MXPDA cart, four FGM650/3 sensors, Trimble R10 GNSS System
Area covered	40.45ha
Download software	DLMGPS v4.01-10, Geoserver v1.00-02
Processing software	MAGNETO®
Visualisation software	ArcGIS Pro
Geology	London Clay overlain by till, glaciofluvial sands/gravels and head deposits (BGS, 2025)
Soils	Lime-rich loamy and clayey soils with impeded drainage; freely draining slightly acid but base-rich soils (Soilscapes, 2025)
Scheduled Monuments	No
Known archaeology within survey area	Yes (Heritage Gateway)
Historical documentation/ mapping of survey area	Yes (NLS website)
Report title	Parsonage Green, Stansted, Essex: Archaeological Geophysical Survey
Project number	40907
Report author	Hannah Brown
Quality Checked by	Susan Ovenden

Appendix 2: Archaeological Prospection Techniques, Instrumentation and Software Utilised

Gradiometer Survey

Gradiometer surveys measure small changes in the earth's magnetic field. Archaeological materials and activity can be detected by identifying changes to the magnetic values caused by the presence of weakly magnetised iron oxides in the soil (Aspinall *et al*. 2008: 23; Sharma 1997: 105). Human habitation often causes alterations to the magnetic properties of the soils and sediments present in the area (Aspinall *et al*. 2008: 21). There are two physical transformations that produce a significant contrast between the magnetic properties of archaeological features and the surrounding soil: the enhancement of magnetic susceptibility and thermoremanent magnetization (Aspinall *et al*. 2008: 21; Heron and Gaffney 1987: 72).

Ditches and pits can often be detected through gradiometer survey as the topsoil within and around settlements typically has a greater magnetisation than the subsoil, due to human activity. This enhanced material accumulates in cut features such as ditches and pits. Areas of burning or materials which have been subjected to heat commonly also have high magnetic signatures, such as hearths, kilns, fired clay and mudbricks (Clark 1996: 65; Lowe and Fogel 2010: 24).

It should be noted that negative anomalies can also be useful for characterising archaeological features. If the buried remains are composed of a material with a lower magnetisation compared to the surrounding soil, the feature in question will display a negative signature. For example, stone-built structures composed of sedimentary rocks that are less magnetic than the surrounding soils can appear as negative features within the dataset if the local soils and sediments are at all magnetised.

Ferrous objects – i.e. iron and its alloys - are strongly magnetic and are typically detected as high-value peaks in gradiometer survey data; small (in spatial terms) spikes are generally assumed to derive from ferrous material of recent origin (e.g. stray bits of farm equipment) in the topsoil, though archaeological sources cannot be ruled out. Broader dipolar anomalies and those with diagnostic characteristics of form will be assigned to other classifications based on their character, which might include archaeology, burning, modern ferrous or uncertain.

Although gradiometer surveys have been successfully carried out in all areas of the United Kingdom, the effectiveness of the technique is lessened in areas with complex geology, particularly where igneous and metamorphic bedrock is present or there are layers of alluvium or till between the surface and the layers of interest. All magnetic geophysical surveys must therefore take the effects of background geological and geomorphological conditions into account.

Sensys MAGNETO® MXPDA Non-Magnetic Cart Instrumentation and Software

AOC Archaeology's cart-based surveys are carried out using a Sensys MAGNETO® MXPDA towed magnetometer system. The cart enables multiple traverses of data to be collected at the same time, increasing the speed at which surveys may be carried out and offers the benefits of reduced random measurement noise and rapid area coverage (Schmidt et al. 2015, 60-62; David et al. 2008, 21).
The cart uses a configuration of eight FGM650/3 fluxgate gradiometer sensors mounted upon a frame along with data logging equipment and batteries. The sensors are normally positioned at 0.5m intervals along a horizontal bar, with the data being collected in a constant stream through the data acquisition unit MXPDA. The data is georeferenced via a Trimble R10 Real Time Kinematic (RTK) VRS Now GNSS GPS which streams data throughout survey and allows the data to be recorded relative to a WGS1984 UTM coordinate system. Whilst the cart is surveying, the data acquisition is visualised through a tablet PC which is mounted to the cart.
The data is downloaded via USB and converted using DLMGPS and Geoserver, before being processed (compensated) using MAGNETO® 3.0 software (see Appendix 3 for a summary of the processes used in MAGNETO® to create final data plots).

Appendix 3: Summary of Data Processing

Process	Effect
Clip	Limits data values to within a specified range
De-spike	Removes small spatial scale exceptionally high readings in the data. In resistivity survey, these can be caused by poor contact of the mobile probes with the ground. In gradiometer survey, these can be caused by highly magnetic items such as buried modern ferrous objects.
De-stagger	Corrects a misalignment of data when the survey is conducted in a zig-zag traverse pattern.
Discard Overlap (TerraSurveyor)	Removes datapoints which occur too closely together and can cause digital artefacts in the data which are caused by the overlapping of parallel traverses.
Edge Match	Counteracts edge effects in grid composites by subtracting the difference between mean values in the two lines either side of the grid edge from one of the grids.
Filter (MAGNETO)	Much like a zero mean traverse, it resets the median value of each point to zero, in order to address the effect of striping in the data and counteract edge effects. In MAGNETO the individual values take into account the value of all uncorrected points within a certain distance to create its own median.
GPS Filter (MAGNETO)	Used to either remove or reduce the appearance of constant and reoccurring features that are not consistent with the GPS signal in use by the cart system.
High pass filter	Removes low-frequency, large spatial scale variance in order to remove background trends in the data, such as variations in geology.
Interpolate	Increases the resolution of a survey by interpolating new values between surveyed data points, creating a smoother overall effect.
Low Pass filter	Uses a Gaussian filter to remove high-frequency, small spatial scale variance, typically for smoothing the data.
Periodic Filter	Used to either remove or reduce the appearance of constant and reoccurring features that distort other anomalies, such as recent plough lines.
Remove Turns (TerraSurveyor)	Uses analysis of the direction of travel derived from the GNSS data to break continuous streams of data into individual traverses.
Zero Mean Grid	Resets the mean value of each grid to zero, in order to counteract grid edge discontinuities in composite assemblies.
Zero Mean Traverse	Resets the mean value of each traverse to zero, in order to address the effect of striping in the data and counteract edge effects.

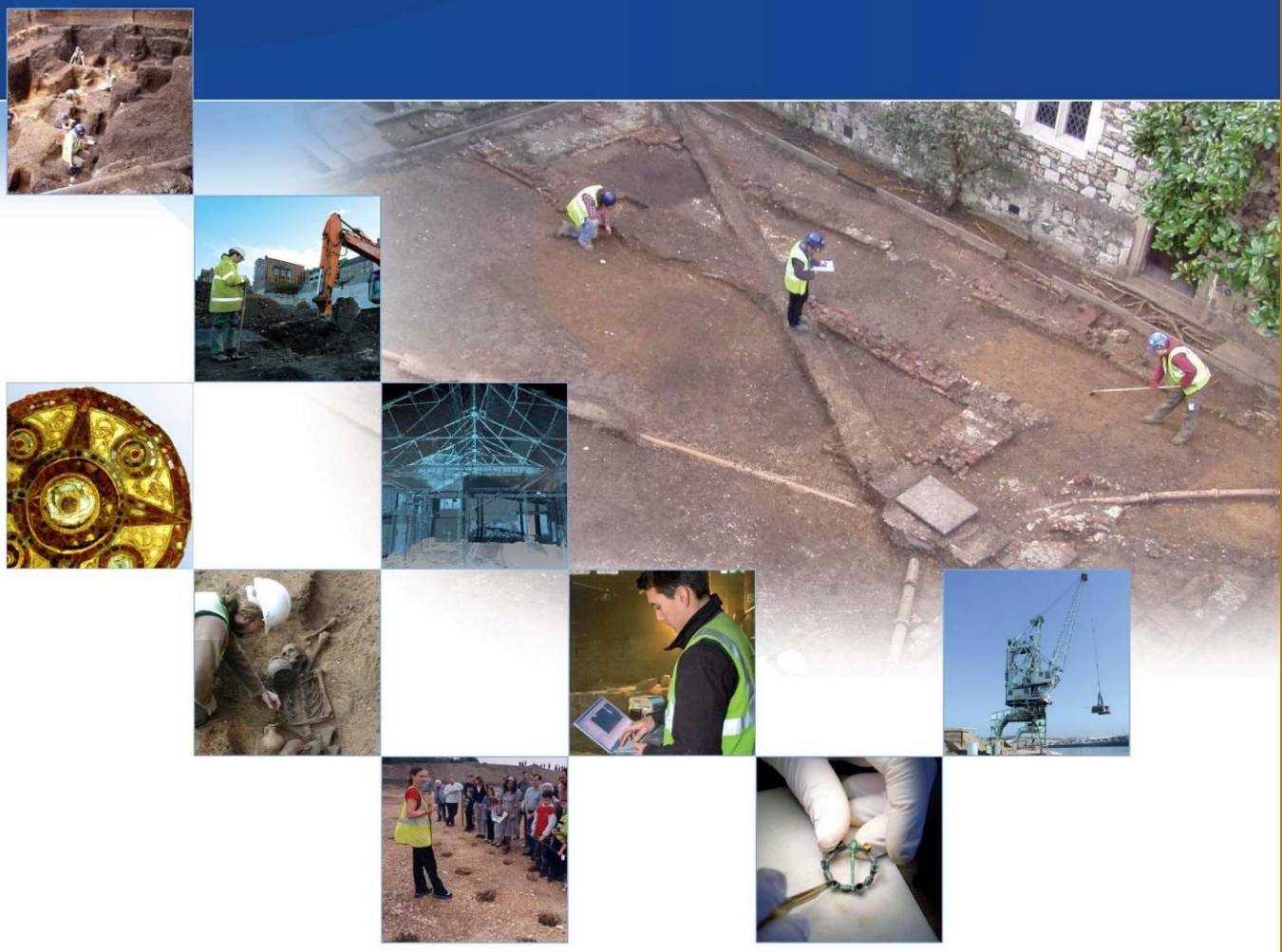
Processing Steps

Sensys Cart survey	
Process	**Extent**
Filter	Moving median with 15 metre rolling median (import with a minimum of 5 GPS points)
GPS filter	1Hz with angle correction
Clip	No compensation
Interpolate	X = 0.2 metres, Y = 0.2 metres Interpolation output = Bi-linear triangle
Raw Palette Scale	User colour palette (256 colours) Min= -5nT Max= 5nT
Palette Scale	User colour palette (256 colours) Min= -5nT Max= 5nT

Appendix 4: Technical Terminology

Type of Anomaly	Description of Type/Class and rationale for interpretation
Anomaly	Usually linear / curvilinear / rectilinear / discrete anomalies characterised by a sharp-edged increase or decrease in values compared to the magnetic background. Some interpretation classes may have more gradual transitions in magnetic character- this is used as part of the classification process.
Spread	Spreads of enhanced material refer to diffuse areas of altered magnetic character, which suggest a localised spread of material with a magnetic contrast within the topsoil or ploughzone or a generalised enhancement of the magnetic properties over a specific area. These anomalies do not have the high dipolar response characteristic of ferrous material anomaly unless specifically classified as a spread of ferrous debris.
Linear Trend	Linear trends are less distinct and are typically visible as linear patterning in the overall texture of the data. A common example of these is the striping effect caused by recent ploughing.

Class of Anomaly	Description
Probable Archaeology	Interpretation is supported by the presence of known archaeological remains or by other forms of evidence such as HER records, LiDAR data or cropmarks identified through aerial photography. OR the data contains diagnostic anomalies in terms of character or morphology which allow a secure interpretation. Anomalies typically have well defined edges with abrupt transitions indicative of cut features with magnetically enhanced fills, such as ditches. Discrete anomalies will be checked on XY traces for their magnetic character; discrete anomalies in this class likely to be cut features such as pits; anomalies indicating high temperature processes will alternatively classified as 'burned area' - see below. Ferrous material creates distinct 'spikes' and is classified as such.
Possible Archaeology	Anomalies are interpreted as likely to have an archaeological origin, though other explanations are also possible, but less likely. Anomalies typically have well defined edges with abrupt transitions indicative of cut features with magnetically enhanced fills, such as ditches. Discrete anomalies checked on XY traces; discrete anomalies in this class likely to be cut features such as pits; anomalies indicating high temperature processes classified as 'burned area' - see below.
Burned Area	An anomaly with a form on the XY trace plot that is characteristic of high temperature activity such as a kiln or hearth. Should be considered as possible archaeology and should be assigned an anomaly number if a more specific interpretation is possible based on the anomaly characteristics (for example, a clear kiln) so that this can be discussed in text.
Historical Features	Features observed on historical mapping that correspond with anomalies in the data. Linear anomalies caused by removed field boundaries often exhibit distinct characteristics related to the removal process. Areas of enhanced magnetism in this class could relate to former buildings, trackways, quarries or ponds and their nature should be clarified with the use of anomaly numbers and discussion in the results section.
Unclear Origin	These anomalies are (often) magnetically weak and discontinuous or isolated making their context difficult to ascertain. OR they are indistinct for other reasons such as magnetic disturbance in their vicinity. Anomalies in this category have no more likely explanation than another, so whilst an archaeological origin is possible, an agricultural, geological, or modern origin is also equally likely.
Agricultural	Anomalies associated with agricultural activity, either historical (unless shown on a map, then classed as a historical feature) or modern. Usually, this interpretation is arrived at due to on the ground observations of (for example) ploughing, access tracks and the like, or from observation of recent aerial images of the survey area. Recent ploughing is shown as a dashed line and Ridge and Furrow ploughing is shown as a solid line.
Ridge and Furrow / Rig and Furrow	A series of regular linear or slightly curvilinear anomalies which are broad and usually have diffuse edges, either composed of an increased or decreased magnetic response compared to background values. Wide regular spacing between the anomalies is consistent with that of a ridge and furrow / rig and furrow ploughing regime, and the regime may also have a degree of sinuosity characteristic of certain types of ridge and furrow cultivation. Often, multiple directions will be present, with distinct headlands in between. The pattern might follow the general landscape organisation, or it may radically differ from it, depending on the local sequence of inclosure. The anomalies often present as a positive 'ridge' anomaly adjacent to a negative 'furrow' anomaly.
Ploughing Trends	A series of regular linear anomalies or changes in the texture of the survey data, either composed of an increased or decreased magnetic response compared to background values. Anomalies seen parallel to field edges are representative of headlands caused by ploughing.
Drains	A series of magnetic linear anomalies (often with a characteristic alternating positive-negative pattern, which indicates a ceramic drain) of an indeterminate date, usually with a regular dendritic or herringbone patterning which reflects the topography of the survey area.
Geology / Natural	An area of enhanced magnetism that is composed of irregular (usually) weak increases or decreases in magnetic values, frequently with gradual transitions in character, compared with background readings. These are likely to indicate natural variations in soil composition or reflect variations in the bedrock or superficial geology. In areas where former water courses were present, paleochannels may present as distinct curving and banded or braided linear anomalies.
Service	Strong linear anomalies often composed of contrasting high positive and negative dipolar values, with a halo of magnetic disturbance extending from the causative body. Such anomalies are characteristic of below-ground services.
Magnetic Disturbance	A zone of strong magnetic response (usually alternating between positive and negative with abrupt transitions) that has been caused by modern infrastructure or ferrous material within or adjacent to the survey area, such as metallic boundary fencing, gateways. The magnetic haloes around services and changes in the background texture of the data resulting from overhead power lines also fall into this class. These haloes are strong enough to obscure other anomalies (including those of possible archaeological interest) in the area they affect.
Ferrous Anomalies / Ferrous (iron spikes) and ferrous or debris spreads	A response caused by ferrous materials on the ground surface or within the subsoil, which causes a strong but localised dipolar response in the data. These generally represent modern material often re-deposited during manuring, rubbish at field edges and spreads of debris or building material used to surface tracks or left behind following demolition. Distinct from magnetic disturbance, these anomalies relate to material at their spatial location, rather than an effect occurring at a distance from the material responsible.
Free Category for custom use	A category which may be employed to denote specifically identified anomalies related to known past activity within the area, for example those definitely associated with a former airfield, or mapped former mineral extraction.



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