



# Battlefields Lane, Holbeach

Gradiometer Survey Report

Planning Ref.: H09-0115-21  
Document Ref.: 283572.04  
Feb 2026



© Wessex Archaeology Ltd 2026, all rights reserved

Unit R6  
Sheaf Bank Business Park  
Prospect Road  
Sheffield  
S2 3EN

[www.wessexarch.co.uk](http://www.wessexarch.co.uk)

Wessex Archaeology Ltd is a company limited by guarantee registered in England, company number 1712772. It is also a Charity registered in England and Wales number 287786, and in Scotland, Scottish Charity number SC042630. Our registered office is at Portway House, Old Sarum Park, Salisbury, Wiltshire, SP4 6EB

#### Disclaimer

The material contained in this report was designed as an integral part of a report to an individual client and was prepared solely for the benefit of that client. The material contained in this report does not necessarily stand on its own and is not intended to nor should it be relied upon by any third party. To the fullest extent permitted by law Wessex Archaeology will not be liable by reason of breach of contract negligence or otherwise for any loss or damage (whether direct indirect or consequential) occasioned to any person acting or omitting to act or refraining from acting in reliance upon the material contained in this report arising from or connected with any error or omission in the material contained in the report. Loss or damage as referred to above shall be deemed to include, but is not limited to, any loss of profits or anticipated profits damage to reputation or goodwill loss of business or anticipated business damages costs expenses incurred or payable to any third party (in all cases whether direct indirect or consequential) or any other direct indirect or consequential loss or damage

## Document Information

Document title Battlefields Lane, Holbeach  
Document subtitle Gradiometer Survey Report  
Document reference 283572.04

Commissioned by Ken Parke Planning Consultants Limited  
Address Anniversary House  
23 Abbott Road  
Bournemouth  
BH9 1EU

Site location Land off Battlefields Lane South,  
Holbeach  
Spalding  
PE12 7PG

County Lincolnshire

National grid reference 536931 325381 (TF 36931 325381)  
Planning authority South Holland District Council  
Planning reference H09-0115-21  
Museum name Lincoln Museum

WA project name Battlefields Lane, Holbeach - Geophysics  
WA project code 283572  
Date of fieldwork 02 February 2026  
Fieldwork directed by Jo Instone-Brewer  
Project management by Alastair Trace  
Document compiled by Lydia Jones  
Contributions from Jack Trueman  
Graphics by Lydia Jones

## Quality Assurance

| Issue | Date       | Author | Approved by   |
|-------|------------|--------|---|
| 1     | 19/02/2026 | LJ     |  (ADT) |



## Contents

|  |          |
|--|----------|
| Summary .....  | ii       |
| Acknowledgements.....  | ii       |
| <b>1 INTRODUCTION .....</b>                                  | <b>1</b> |
| 1.1 Project background.....                                  | 1        |
| 1.2 Scope of document.....                                   | 1        |
| 1.3 The site.....  | 1        |
| <b>2 ARCHAEOLOGICAL BACKGROUND.....</b>                      | <b>1</b> |
| 2.1 Introduction.....  | 1        |
| 2.2 Summary of the archaeological resource .....             | 2        |
| 2.3 Previous investigations related within the site .....    | 3        |
| <b>3 METHODOLOGY .....</b>                                   | <b>3</b> |
| 3.1 Introduction.....  | 3        |
| 3.2 Aims and objectives.....                                 | 3        |
| 3.3 Fieldwork methodology .....                              | 4        |
| 3.4 Data processing.....                                     | 4        |
| <b>4 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION .....</b> | <b>4</b> |
| 4.1 Introduction.....  | 4        |
| 4.2 Gradiometer survey results and interpretation .....      | 5        |
| <b>5 DISCUSSION .....</b>                                    | <b>6</b> |
| 5.1 Results .....  | 6        |
| <b>REFERENCES .....</b>                                      | <b>7</b> |
| <b>APPENDICES .....</b>                                      | <b>8</b> |
| Appendix 1 Survey equipment and data processing.....         | 8        |
| Appendix 2 Geophysical interpretation.....                   | 10       |
| Appendix 3 OASIS form.....                                   | 11       |

## List of Figures

- Figure 1** Site location and survey extent
- Figure 2** Magnetic gradiometer survey - greyscale plots
- Figure 3** Magnetic gradiometer survey – interpretation
- Figure 4** Magnetic gradiometer survey – XY plots



## Summary

A gradiometer survey was conducted over land off Battlefields Lane South, Holbeach, Spalding, Lincolnshire (centred on NGR 536931 325381). The project was commissioned by Ken Parke Planning Consultants Limited with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features in support of a hybrid planning application for 158 dwelling comprising a Full Application for the Erection of 62 Dwellings, Associated Landscaping and Infrastructure and Outline Application for the Erection of Approximately 96 Dwellings (Some Matters Reserved) under application ref. H09-0442-25.

The site comprises agricultural fields located in the north-east of Holbeach, 10.6 km north-east of Spalding, Lincolnshire, covering an area of 6 ha. The geophysical survey was undertaken on 02 February 2026.

Several ditches of possible archaeological origin have been identified across the site which may have once formed former field boundaries or enclosures. Large pit features have also been identified which may also have archaeological origins, such as former extraction. Despite the evidence for some Romano-British to post-medieval activity from both within and surrounding the site, the geophysical anomalies do not have enough characteristic morphology to confirm a date of origin. Given the underlying natural deposits on the site, these features also have the potential to be natural channels formed by water movement, and natural pitting. Further investigation would be necessary to fully understand these features.

Further features have also been identified that reflect the agricultural use of the site from the post-medieval period to today including possible former mapped field boundaries, modern cultivation trends and drainage.

In the east of the site are features likely related to variations in the underlying deposits, however given their similarity to areas of extraction further investigation would be required to fully understand their nature.

The remainder of the features identified are thought to be modern in origin including magnetic interference from surrounding fencing, a modern service, residential areas and a pylon.

## Acknowledgements

Wessex Archaeology would like to thank Ken Parke Planning Consultants Limited for commissioning the geophysical survey. The assistance of James Blake is gratefully acknowledged in this regard.

The fieldwork was undertaken by Jo Instone-Brewer, Matt Lester and Nathan Kostanjevic. Lydia Jones processed the data. Jack Trueman interpreted the geophysical data and assisted with the report. Lydia Jones wrote the report, and prepared illustrations. The project was quality controlled by Filippo Carrozzo. The project was managed on behalf of Wessex Archaeology by Alastair Trace.



# Battlefields Lane, Holbeach Lincolnshire

## Gradiometer Survey Report

### 1 INTRODUCTION

#### 1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Ken Parke Planning Consultants Limited to carry out a geophysical survey at Battlefields Lane, Holbeach, Lincolnshire (centred on NGR 536931 325381) (**Figure 1**). The survey forms part of an ongoing programme of archaeological works being undertaken in support of a planning application for a residential development.

#### 1.2 Scope of document

1.2.1 This report presents a brief description of the methodology followed by the survey results and the archaeological interpretation of the geophysical data.

#### 1.3 The site

1.3.1 The site is located in the north-east of Holbeach, and 10.6 km north-east of Spalding in the county of Lincolnshire.

1.3.2 The survey comprises 6 ha of agricultural land, currently fallowed. The site is bounded by Battlefields Lane South and a construction site to the north and residential housing associated with Narnwell street to the east, Kensington Close to the south and Marshlands Drive to the west.

1.3.3 The site is relatively flat sloping from 4 m above Ordnance Datum (aOD) at the north-east edge to approximately 5 m aOD at the south-west edge.

1.3.4 A single set of overhead cables traverses the site from north to south across the centre of LP\_002.

1.3.5 The solid geology comprises Mudstone of the Ampthill Clay Formation, with overlying superficial geological deposits of clay and silt tidal flat deposits (BGS 2026).

1.3.6 The soils underlying the site are likely to consist of loamy and clayey soils of coastal flats with naturally high groundwater (Soilscapes 2026). Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

### 2 ARCHAEOLOGICAL BACKGROUND

#### 2.1 Introduction

2.1.1 The archaeological and historical background was assessed in prior Written Scheme of Investigations (WSI) (Wessex Archaeology, 2024a; 2024b), which considered the recorded historic environment resource surrounding the proposed development. The WSI's used information from the Lincolnshire Historic Environment Record (HER) and the National Heritage List for England (NHLE). Additional sources of information are referenced, as appropriate.

## 2.2 Summary of the archaeological resource

### *Prehistoric*

- 2.2.1 Prehistoric evidence in the area is sparse but 2.5 km north of the site a possible Bronze Age barrow has been identified in aerial photographs, and 2.5 km south-east residual Iron Age pottery has been reported within later medieval contexts (MLI 23005).

### *Romano-British*

- 2.2.2 The site is a region of fenland which, although useful for salt extraction as evidenced at Chapelgate 4.2 km to the east (Allen *et al.* 2015) appears to have been sparsely populated in the later Roman period (Todd 1973). Prior to coastal defences the area would have been subject to enormous sedimentary deposition, and it is highly likely that pre-medieval material lies at depth beneath coverings of alluvium.

### *Medieval*

- 2.2.3 There are some suggestions of early medieval material in the area; During development works at the William Stukeley Primary School 1.4 km south-west, a probable pit was seen containing redeposited slag debris which has been suggested as Anglo-Saxon (Clay and Allen 2002), unfortunately, nothing can be said on this with any certainty. Additionally, anomalies seen within a geophysical survey conducted 2 km to the west were interpreted as possibly Anglo-Saxon (Smith 2015), although these were never further investigated.
- 2.2.4 As with many settlements, the Domesday Survey is our earliest historical reference to Holbeach, or Holbech, Holeben, Holobech and Holobec as it was spelt in various entries. The name is believed to derive from the Old English; hol meaning 'hollow' and Baec meaning 'back'; topographically meaning hollow or concave ridge (KEPN 2024). These records show that area was reasonably wealthy and there is some suggestion that just south of Fleet, 2.5 km south-east, a tumulus marked on early OS mapping represents a motte (MLI 22265), possibly itself reusing an earlier barrow and potentially even representing an Anglo-Saxon manorial site.
- 2.2.5 The land in this area was drained in the 13th century. To the south of the town are several fen banks, ranging in date from probable Anglo-Saxon to the 13th century (Cope-Faulkner 1997), and it has been suggested that Roman Bank to the north-west represents the probable Saxon coastline (MLI 89892). The presence of Fen banks speaks to a population large enough to have maintained these structures.
- 2.2.6 By 1241 Common Dyke, the last of the large medieval dykes, had been completed, finally draining the fenlands up to the Cambridgeshire border (Hallam 1954 cited in Cope-Faulkner 1997). Indeed, there are a number of medieval find spots across the town, including pottery, coins, and iron work, and several antiquarian references to Guilds, implying the presence of a guildhall (Cope-Faulkner 1997). The surrounding fields are a combination of irregular enclosures of early medieval origin and, as mentioned, the area has long been a centre of salt production, which appears to have boomed from the 12th or 13th century, with many salterns recorded to the north of the town. By 1252 the town was clearly growing as the Lord of Holbeach, Thomas De Multon, obtained a license for a market and a fair, and by the 14th century a free grammar school was founded.
- 2.2.7 The name of the road the site adjoins, Battlefield Lane South, is in reference to the fields immediately across the road to the north, which are labelled as Battle Fields, on early OS maps. Traditionally this is thought to be in reference to a Skirmish which may have taken place here in 1461, during the Wars of the Roses. However, no definitive evidence for this has ever been forthcoming.

### *Cartographic*

- 2.2.8 The name of the road the site adjoins, Battlefield Lane South, is in reference to the fields immediately across the road to the north, which are labelled as Battle Fields, on early OS maps. Traditionally this is thought to be in reference to a Skirmish which may have taken place here in 1461, during the Wars of the Roses. However, no definitive evidence for this has ever been forthcoming.
- 2.2.9 The existence of post medieval field boundaries within the site is apparent on historical mapping from the 19th and 20th centuries. It suggests the land was widely used as an agricultural resource, later being enclosed and then some boundaries being removed.

## **2.3 Previous investigations related within the site**

### *Geophysical survey (2006)*

- 2.3.1 A geophysical survey was conducted and consisted of magnetic susceptibility and magnetometry (Stratascan, 2006). Linear anomalies were identified across all three areas surveyed which suggested agricultural activity having taken place across the site. Some positive anomalies indicative of ditches and pits were detected in both LP\_001 and 002, and were concluded to potentially be archaeological.

### *Fieldwalking survey (2006)*

- 2.3.2 Fieldwalking survey (Archaeological Project Services, 2006) on the site revealed 2 sherds of Roman period pottery in the south-western corner, and abundant post-medieval pottery, ceramic building material, coins and clay pipes were found across the site. This was against a site wide backdrop of medieval pottery.

## **3 METHODOLOGY**

### **3.1 Introduction**

- 3.1.1 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team on 2nd February 2026. Field conditions at the time of the survey were very rough due to previous cultivation trends and wet throughout the period of survey. An overall coverage of 4.28 ha was achieved. An area in the north-west of LP\_002 could not be surveyed owing to localised flooding. LP\_003 and LP\_004 could not be surveyed due to being overgrown with trees.
- 3.1.2 The methods and standards employed throughout the geophysical survey conform to that set out in the Written Scheme of Investigation (WSI) (Wessex Archaeology 2024b), as well as to current best practice, and guidance outlined by the Chartered Institute for Archaeologists' (CIfA 2020) and European Archaeologiae Consilium (Schmidt *et al.* 2015).

### **3.2 Aims and objectives**

- 3.2.1 The aims of the survey comprise the following:
- 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 either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.
- 3.2.2 In order to achieve the above aims, the objectives of the geophysical survey are:

- To conduct a geophysical survey covering as much of the specified area as possible, allowing for on-site obstructions;
- To clarify the presence/absence of anomalies of archaeological potential; and
- Where possible, to determine the general nature of any anomalies of archaeological potential.

### 3.3 Fieldwork methodology

- 3.3.1 The cart-based gradiometer system used a Carlson BRX-7 RTK GNSS instrument, which receives corrections from a network of reference stations operated by the OS. Such instruments allow positions to be determined with a precision of 0.02 m in real-time and therefore exceeds Europae Archaeologiae Consilium recommendations (Schmidt et al. 2015).
- 3.3.2 The gradiometer survey was undertaken using four Sensys FGM650/3 magnetic gradiometers spaced at 1 m intervals and mounted on a non-magnetic cart. Data were collected with an effective sensitivity of  $\pm 8 \mu\text{T}$  over  $\pm 1000 \text{ nT}$  range at a rate of 100 Hz, producing intervals of 0.02 m along transects spaced 4 m apart.

### 3.4 Data processing

- 3.4.1 Data from the survey were subjected to minimal correction processes. These comprise a 'Destripe' function ( $\pm 5 \text{ nT}$  thresholds), applied to correct for any variation between the sensors, and an interpolation used to grid the data and discard overlaps where transects have been collected too close together.
- 3.4.2 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.

## 4 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION

### 4.1 Introduction

- 4.1.1 The gradiometer survey has identified magnetic anomalies across the site. Results are presented as a series of greyscale plots, XY plots and archaeological interpretations at a scale of 1:1500 (**Figures 2 to 4**). The data are displayed at  $-2 \text{ nT}$  (white) to  $+3 \text{ nT}$  (black) for the greyscale image and  $\pm 25 \text{ nT}$  at  $25 \text{ nT per cm}$  for the XY trace plots.
- 4.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous responses, burnt or fired objects, and magnetic trends (**Figure 3**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.
- 4.1.3 Numerous ferrous anomalies are visible throughout the dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.
- 4.1.4 It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be present than have been identified through geophysical survey.
- 4.1.5 Gradiometer survey may not detect all services present on site. This report and accompanying illustrations should not be used as the sole source for service locations and appropriate equipment (e.g., CAT and Genny) should be used to confirm the location of buried services before any trenches are opened on site.

## 4.2 Gradiometer survey results and interpretation

- 4.2.1 Across the site several weak, positive, curvilinear sinuous anomalies have been detected at **4000 – 4002**. They are 0.5 – 1 m wide by 10 – 100 m long, recorded on various orientations. They are typical of narrow ditch-like features with a more enhanced fill than the surrounding soil. They may be the remnants of former field boundaries from before the post-medieval period and available mapping. However, given the morphology of the anomalies and the underlying tidal flat deposits these may be the remnants of former natural drainage channels through the underlying clay and silt.
- 4.2.2 In LP\_002 a further weakly positive, curvilinear anomaly has been detected at **4003**. It is up to 1 m wide and 26 m long with a semi-circular morphology. Again, it is typical of a ditch-like feature. Given its morphology it may be the remnants of a former enclosure. Despite the evidence for some Romano-British to post-medieval activity from both within and surrounding the site, this anomaly does not have enough characteristic morphology to confirm a date of origin. However, given the underlying tidal flat deposits it may also be the remnants of former natural drainage channels running through the underlying clay and silt.
- 4.2.3 In the west of LP\_001 a strong positive amorphous anomaly has been detected at **4004**. It is 6 m in diameter. It is typical of a pit containing a more enhanced fill. Given its size, if anthropogenic, it may have been a small area of unmapped extraction. However, a natural explanation such as an infilled hollow in the underlying geology is also possible. Further investigation is necessary to understand this feature.
- 4.2.4 Two strong discrete positive anomalies have been detected at **4005** in LP\_002. They are 6 – 8 m in diameter and may be large pits filled with buried waste or highly enhanced soil. Whilst there is the possibility they are archaeological, it is unclear what their origin is from the geophysical data alone and further investigation would be necessary to understand them fully.
- 4.2.5 Three positive linear anomalies have been detected across the site at **4006 – 4008**. They are approximately 1 m wide, up to 100 m long and are oriented north-west to south-east. They are all in proximity to former field boundaries as recorded on historical OS mapping (NLS 2026: Lincolnshire CXXXV.SE 1887). Similar narrow linear anomalies are recorded across LP\_001. They coincide with former cultivation visible on satellite imagery from 1999 and are likely cultivation tracks or drains. It is therefore possible that **4005 – 4007** are also these more modern agricultural features, rather than former field boundaries.
- 4.2.6 In the centre of LP\_002 three weakly positive amorphous anomalies have been detected at **4009**. They are between 5 – 15 m in diameter. Their magnetic signal is typical of variations in the underlying deposits; however these properties are also sometimes seen in areas of extraction. Further investigation would be necessary to understand these features further.
- 4.2.7 On the south-eastern edge of LP\_002 strong magnetic disturbance has been detected at **4010**. It covers an area of 20 x 17 m. Immediately to the south is residential housing, and to the east building plots for more houses. It is likely modern rubble for hardstanding, or earth that has been disturbed with discarded waste.
- 4.2.8 Close to **4010** is a strong dipolar linear anomaly running along the south-eastern edge of the site at **4011**. Whilst this can sometimes be caused by modern metal fencing, it is also typical of a modern service.
- 4.2.9 The remainder of the anomalies detected are modern in origin including magnetic halos from surrounding fencing, residential areas and a pylon.



## 5 DISCUSSION

### 5.1 Results

- 5.1.1 The survey has identified several possible archaeological ditches across the site which may have formed former field boundaries or enclosures. Large pit features identified may also have archaeological origins, such as former extraction. Despite the evidence for some Romano-British to post-medieval activity from both within and surrounding the site, the geophysical anomalies do not have enough characteristic morphology to confirm a date of origin. Given the underlying natural deposits on the site, these features also have the potential to be natural channels formed by water movement, and natural pitting. Further investigation would be necessary to fully understand these features.
- 5.1.2 Several features have been identified that reflect the agricultural use of the site from the post-medieval period to today including possible former mapped field boundaries, cultivation trends and drainage.
- 5.1.3 In the east of the site are features likely related to variations in the underlying deposits, however given their similarity to areas of extraction further investigation would be required to fully understand their nature.
- 5.1.4 The remainder of the features identified are thought to be modern in origin, including magnetic interference from surrounding fencing, residential areas, a service and a pylon.
- 5.1.5 The survey has confirmed some of the results of the previous geophysical survey undertaken on this site in 2006. Both geophysical surveys have shown a site used for agricultural purposes, with several ditches and pits of possible archaeological origin. However, whilst some of the ditches and pits detected are the same features, some are not. Notably, some of the agricultural trends and pits detected in 2006 were not detected in this survey, showing that shallower agricultural features may have been destroyed by repeated cultivation on the site.

## REFERENCES

- ADS 2015 Guidelines for Depositors,  
<http://archaeologydataservice.ac.uk/advice/FilelevelMetadata.xhtml#Geophysics> and Remote Sensing (accessed February 2026)
- Allen, M., Blick, N., Brindle, T., Evans, T., Fulford, M., Holbrook, N., Richards, J.D. and Smith, A. 2015. *The Rural Settlement of Roman Britain: an online resource*. York: Archaeology Data Service <https://doi.org/10.5284/1030449> (accessed October 2024)
- APS (Archaeological Project Services) 2006. *Fieldwalking Report*. Unpubl. Rep. 168/06.
- British Geological Survey 2026. *Geology of Britain Viewer*  
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html> (accessed February 2026).
- Chartered Institute for Archaeologists [ClfA] 2020 *Standards and guidance for archaeological geophysical survey*. Reading, ClfA.
- Clay, C. & Allen, M. 2002. *Archaeological Watching Brief: William Stukeley Primary School, Holbeach*. Pre-Construct Archaeology (Lincoln). Unpubl. Rep. 2002.133.
- Cope-Faulkner, P. 1997. *Archaeological Implications of the Reappraisal of Holbeach Conservation Area, Holbeach, Lincolnshire*. Unpubl. Rep. Archaeological Project Services 23/97
- Cotswold Archaeology 2020 *Land at Battlefields Lane, Holbeach, Lincolnshire: Archaeology Statement* Unpub
- Historic England 2015 *Management of Research Projects in the Historic Environment: The MoRPHE Project Manager's Guide. Version 1.0*
- National Library of Scotland (NLS). <https://maps.nls.uk/geo/explore/side-by-side/> (accessed February 2026)
- Schmidt, A., Linford, P., Linford, N., David, A., Gaffney, C., Sarris, A. and Fassbinder, J. 2015. *Guidelines for the use of geophysics in archaeology: questions to ask and points to consider*. EAC Guidelines 2, Belgium: European Archaeological Council.
- Soilscapes 2026. Cranfield University  
<http://www.landis.org.uk/soilscapes/> (accessed February 2026).
- Smith, J. 2015. *Land at Northons Lane, Holbeach, Lincolnshire: Geophysical Survey*. Archaeological Project Services. Unpubl. Rep. 19/15.
- Stratascan 2006 *Geophysical Survey Report: Holbeach Lincolnshire*. Unpubl. Rep. J2250
- Wessex Archaeology, 2024a. Battlefields Lane South, Holbeach, Spalding, Lincolnshire. Written Scheme of Investigation for Archaeological Watching Brief. Report no. 283570.01.
- Wessex Archaeology, 2024b. Battlefields Lane, Holbeach, Lincolnshire. Written Scheme of Investigation for an Archaeological Geophysical Survey. Document Ref. 283572.02

## APPENDICES

### Appendix 1 Survey equipment and data processing

#### Survey methods and equipment

The magnetic data for this project were acquired using a non-magnetic hand-pushed cart fitted with four SenSys FGM650/3 magnetic gradiometers.

The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 0.6 m separation and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of  $\pm 8 \mu\text{T}$  over  $\pm 1000 \text{ nT}$  range. All of the data will be then relayed to a CS35 tablet, running the MONMX program, which is used to record the survey data from the array of FGM650/3 probes at a rate of 100 Hz. The program also receives measurements from a GPS system, which is fixed to the cart at a measured distance from the sensors, providing real time locational data for each data point.

The cart-based system relies upon accurate GPS location data which is collected using a Carlson BRX-7 RTK system. This receives corrections from a network of reference stations operated by the Ordnance Survey, allowing positions to be determined with a precision of 0.02 m in real-time and therefore exceed the level of accuracy recommended by European Archaeologiae Consilium (Schmidt *et al.* 2015).

#### Post-processing

The magnetic data collected during the detail survey were downloaded from the Sensys system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing was conducted so as not to distort the anomalies.

The cart-based system generally requires a lesser amount of post-processing than the handheld instrument. This is largely because mounting the gradiometers on the cart reduces the occurrence of operator error, caused by inconsistent walking speeds and deviation in traverse position due to varying ground cover and topography.

Typical data and image processing steps may include:

- Destripe – Applying a zero-mean traverse in order to remove differences caused by directional effects inherent in the magnetometer;
- Destagger – Shifting each traverse longitudinally by a number of readings. This corrects for operator errors and is used to enhance linear features;
- Despiking – Filtering isolated data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings (generally only used for earth resistance data)

Typical displays of the data used during processing and analysis:



- Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.
- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies.



## Appendix 2 Geophysical interpretation

The interpretation methodology used by Wessex Archaeology separates the anomalies into four main categories: archaeological, modern, agricultural, and uncertain origin/geological.

The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Possible archaeology – used for features which give a response, but which form no discernible pattern or trend.

The modern category is used for anomalies that are presumed to be relatively modern in date:

- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Modern service – used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

The agricultural category is used for the following:

- Former field boundaries – used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Ridge and furrow – used for broad and diffuse linear anomalies that are considered to indicate areas of former ridge and furrow.
- Ploughing – used for well-defined narrow linear responses, usually aligned parallel to existing field boundaries.
- Drainage – used to define the course of ceramic field drains that are visible in the data as a series of repeating bipolar (black and white) responses.

The uncertain origin/geological category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They can be distinguished as areas of positive, negative, or broad bipolar (positive and negative) anomalies.



## Appendix 3 OASIS form

### OASIS Summary for wessexar1-540736

|                                   |   |
|-----------------------------------|---|
| OASIS ID (UID)                    | wessexar1-540736  |
| Project Name                      | Geophysical Survey at Battlefields Lane, Holbeach   |
| Sitename                          | Battlefields Lane, Holbeach   |
| Sitecode                          | 283572  |
| Project Identifier(s)             | 283572  |
| Activity type                     | Geophysical Survey, MAGNETOMETRY SURVEY   |
| Planning Id                       | H09-0115-21   |
| Reason For Investigation          | Planning: Post determination  |
| Organisation Responsible for work | Wessex Archaeology  |
| Project Dates                     | 02-Feb-2026 - 02-Feb-2026   |
| Location                          | Battlefields Lane, Holbeach<br>NGR : TF 36931 25381<br>LL : 52.80859993549545, 0.030025696441672<br>12 Fig : 536931,325381  |
| Administrative Areas              | Country : England<br>County/Local Authority : Lincolnshire<br>Local Authority District : South Holland<br>Parish : Holbeach   |
| Project Methodology               | The cart-based gradiometer system used a Carlson BRX-7 RTK GNSS instrument, which receives corrections from a network of reference stations operated by the OS. Such instruments allow positions to be determined with a precision of 0.02 m in real-time and therefore exceeds Europae Archaeologiae Consilium recommendations (Schmidt et al. 2015).<br>The gradiometer survey was undertaken using four Sensys FGM650/3 magnetic gradiometers spaced at 1 m intervals and mounted on a non-magnetic cart. Data were collected with an effective sensitivity of $\pm 8 \mu\text{T}$ over $\pm 1000 \text{ nT}$ range at a rate of 100 Hz, producing intervals of 0.02 m along transects spaced 4 m apart. |



|                             |  |
|-----------------------------|--|
| Project Results             | <p>The survey has identified several possible archaeological ditches across the site which may have formed former field boundaries or enclosures. Large pit features identified may also have archaeological origins, such as former extraction. Despite the evidence for some Romano-British to post-medieval activity [AT6.1] from both within and surrounding the site, the geophysical anomalies do not have enough characteristic morphology to confirm a date of origin. Given the underlying natural deposits on the site, these features also have the potential to be natural channels formed by water movement, and natural pitting. Further investigation would be necessary to fully understand these features. Several features have been identified that reflect the agricultural use of the site from the post-medieval period to today including possible former mapped field boundaries, cultivation trends and drainage. In the east of the site are features likely related to variations in the underlying deposits, however given their similarity to areas of extraction further investigation would be required to fully understand their nature. The remainder of the features identified are thought to be modern in origin, including magnetic interference from surrounding fencing, residential areas, a service and a pylon. The survey has confirmed some of the results of the previous geophysical survey undertaken on this site in 2006. Both geophysical surveys have shown a site used for agricultural purposes, with several ditches and pits of possible archaeological origin. However, whilst some of the ditches and pits detected are the same features, some are not. Notably, some of the agricultural trends and pits detected in 2006 were not detected in this survey, showing that shallower agricultural features may have been destroyed by repeated cultivation on the site.</p> |
| Keywords                    |  |
| Funder                      | Private or public corporation Ken Parke Planning Consultants Ltd.  |
| HER                         | Lincolnshire HER - unRev - STANDARD  |
| Person Responsible for work | Alastair Trace   |
| HER Identifiers             |  |
| Archives                    |  |

Report generated on: 20 Feb 2026, 11:49

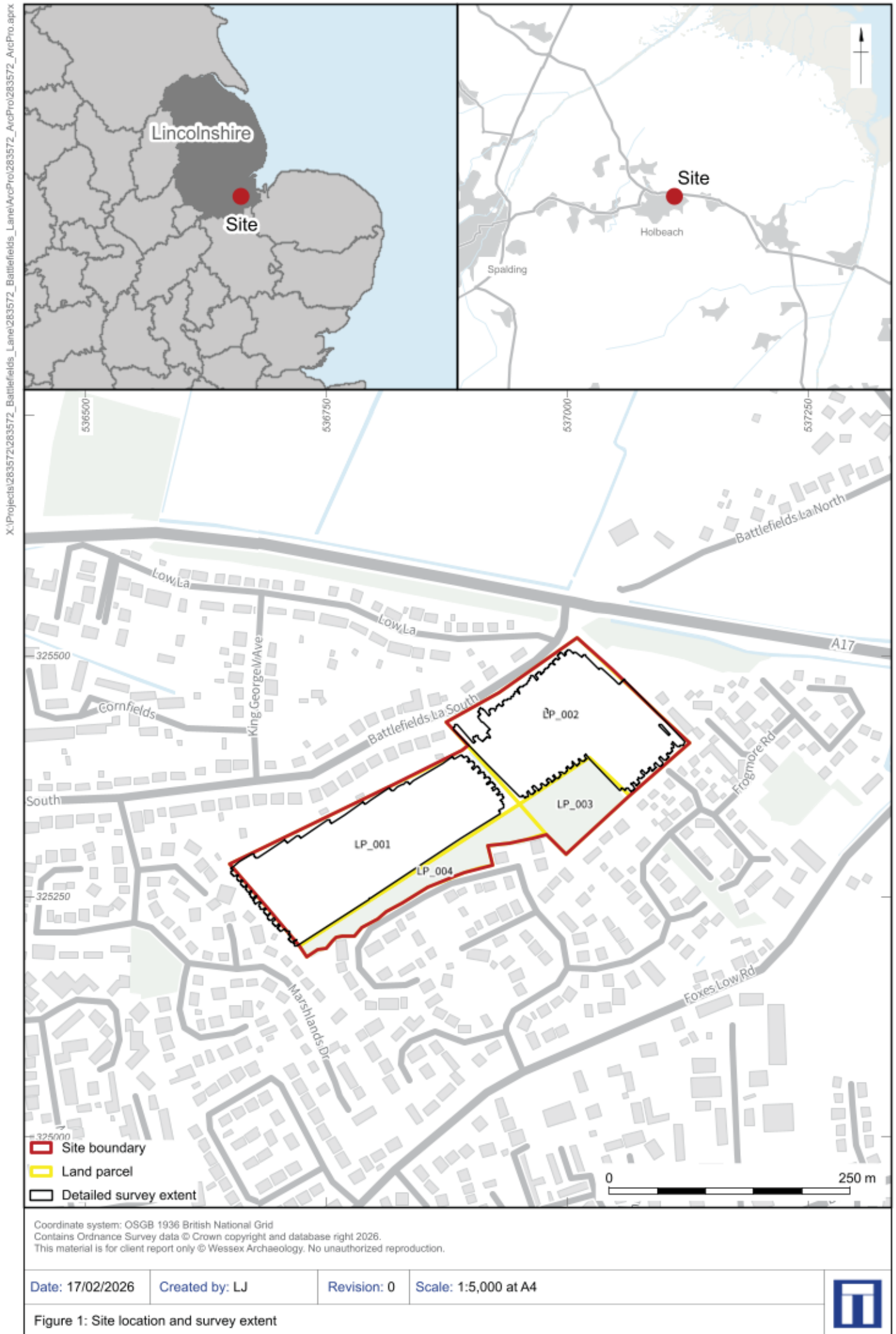


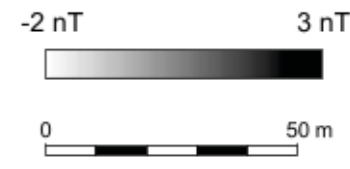
Figure 1: Site location and survey extent



X:\Projects\283572\_Battlefields\_Lane\ArcPro\283572\_ArcPro.aprx



- Site boundary
- Land parcel
- Detailed survey extent

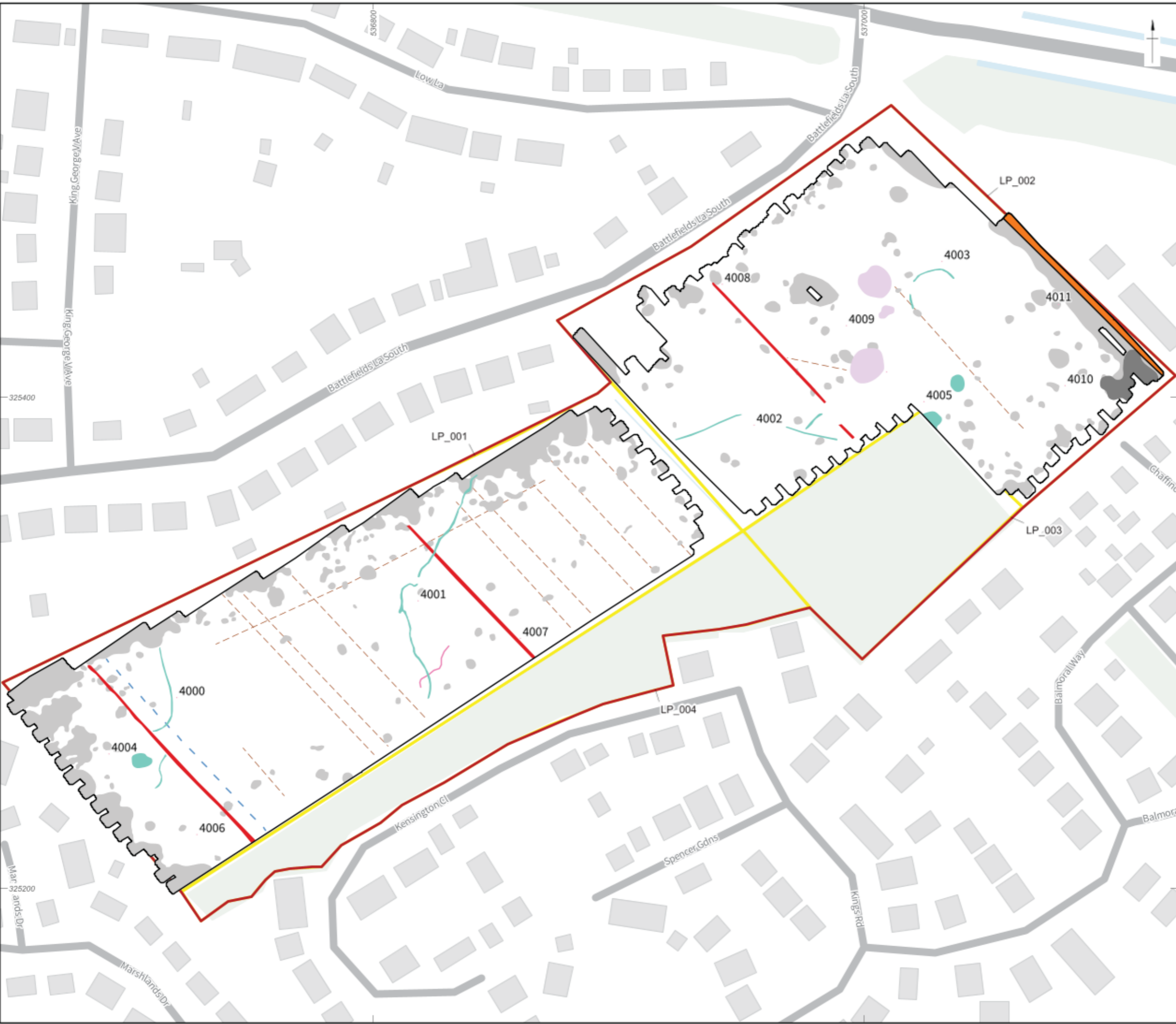


Coordinate system: OSGB 1936 British National Grid  
 Contains Ordnance Survey data © Crown copyright and database right 2026.  
 This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

|                  |                |   |
|------------------|----------------|---|
| Date: 19/02/2026 | Created by: LJ |  |
| Scale: 1:1,500   | Revision: 0    |   |

Figure 2: Magnetic gradiometer survey - greyscale plots

X:\Projects\283572\_Battlefields\_Lane\ArcPro\283572\_ArcPro.aprx



- Site boundary
- Land parcel
- Detailed survey extent
- Possible archaeology
- Former field boundary
- Geology
- Modern service
- Increased response
- Ferrous
- Agricultural feature
- Drain
- Trend



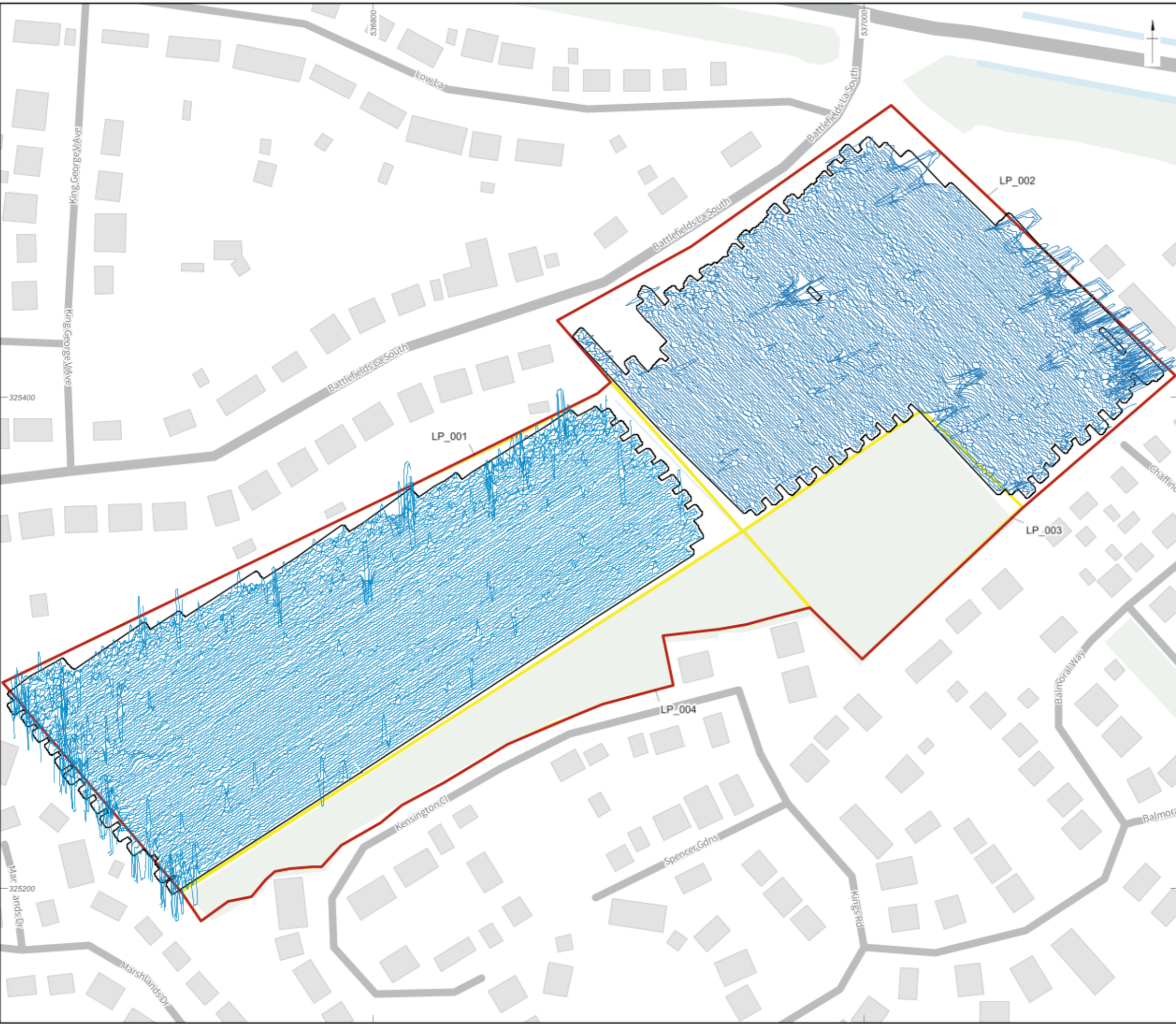
Coordinate system: OSGB 1936 British National Grid  
 Contains Ordnance Survey data © Crown copyright and database right 2026.  
 This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

|                         |                       |
|-------------------------|-----------------------|
| <b>Date:</b> 19/02/2026 | <b>Created by:</b> LJ |
| <b>Scale:</b> 1:1,500   | <b>Revision:</b> 0    |



Figure 3: Magnetic gradiometer survey - interpretation

X:\Projects\283572\Battlefields\_Lane\ArcPro\283572\_ArcPro.aprx



- Site boundary
- Land parcel
- Detailed survey extent



Coordinate system: OSGB 1936 British National Grid  
 Contains Ordnance Survey data © Crown copyright and database right 2026.  
 This material is for client report only © Wessex Archaeology. No unauthorised reproduction.

Date: 19/02/2026 Created by: LJ

Scale: 1:1,500 Revision: 0



Figure 4: Magnetic gradiometer survey - XY plots



Wessex Archaeology Ltd registered office Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB  
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk

