Archaeology South-East

ASE

# RESULTS FROM A MAGNETOMETER SURVEY OF LAND AT DEADMANS LANE, RYE, EAST SUSSEX

**NGR: TQ 922 210**

**ASE Project No: 4249**
**ASE Report No. 2010048**
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**By Chris Russel BA (Hons)**

**May 2010**

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***Abstract***

*Archaeology South East was commissioned by Spiller Associates to carry out a detailed fluxgate gradiometer survey on land at Deadmans Lane, Rye to inform as to the location of evaluation trenches in advance of the development of the site. The survey covered 0.21 hectares and took place on the 26th of April 2010. The survey area consisted of short grass, trees and shrubs bounded by hedges. The area appears to have been disturbed by landscaping making the identification of anomalies of an archaeological nature problematic.*

## CONTENTS

## 1.0 INTRODUCTION

### 1.1 Site Background

1.1.1 Archaeology South-East was commissioned by Spiller Associates on behalf of Ray Simonds to conduct a Magnetometer survey on land at Deadmans Lane, Rye, hitherto referred to as 'the site' (NGR TQ 922 210; Figure 1).

### 1.2 Geology and Topography

1.2.1 The geology of the site consists of Cretaceous Clay of the Ashdown Beds (BGS Sheet 320, Solid & Drift Edition, 1;50,000).

### 1.3 Planning Background

1.3.1 The survey was undertaken as part of an archaeological programme designed to inform a planning decision for development of the site.

### 1.4 Aims of Geophysical Investigation

1.4.1 The purpose of the geophysical survey was to detect any buried archaeological anomalies that might provide a measurable magnetic response.

### 1.5 Scope of Report

1.5.1 The scope of this report is to report on the findings of the survey with a view to fulfilling the archaeological planning condition on the site. The project was conducted by Chris Russel and Kathy Grant with the assistance of Rob Cole; project managed by Neil Griffin and Dan Swift.

## 2.0 ARCHAEOLOGICAL BACKGROUND

2.0.1 Rye grew from potentially 11$^{th}$ century beginnings to become an arm of the Cinque port of Hastings by the 12$^{th}$ century. By the 14$^{th}$ century Rye and its sister town of Winchelsea were important enough to both be granted full Cinque port status. With the silting up of Winchelsea the focus of trade moves to Rye stimulating a boom during the Tudor period before Rye itself silts up sometime in the 16$^{th}$ century leading to a decline in the town (Dawkes, 2010).

## 3.0 SURVEY METHODOLOGY

### 3.1 Summary of Methodology

3.1.1 A Bartington Grad 601-2 fluxgate gradiometer was used to survey an area of 0.21 hectares. The survey grid was set out using a differential GPS (Global Positioning Systems). A 30 metre grid was set out across the survey area and transects were walked every meter across these grids. Samples for the magnetometry survey were taken at 0.25m intervals along each transect.

### 3.2 Geophysical Survey Methods Used

3.2.1 The magnetometry survey was undertaken in the areas depicted in Figure 2.

3.2.2 Clay type geologies will normally provide a poor-average result for magnetic survey techniques however sand geologies generally respond well to magnetic prospection techniques (David 1995: 10; Gaffney & Gater 2003: 79). A 100% detailed area survey is the desirable strategy for any given area of land and has the potential to provide the best possible information on all types of feature including those where no significant occupation may have occurred. The fluxgate gradiometer method of magnetic detail survey was chosen as this instrumentation perfectly balances speed with quality of data collection. The survey grid consisted of 30 x 30 metre grids. Each grid was surveyed with 1 metre traverses; samples were taken every 0.25m for the magnetometry survey and every 1.0m for the resistance survey. The survey was undertaken over the course of a single day and the weather was sunny.

### 3.3 Applied Geophysical Instrumentation

3.3.1 The Fluxgate Gradiometer employed was the Bartington Instrumentation Grad 601-2. This consists of two separate Fluxgate Gradiometers joined to work as a pair. The Fluxgate Gradiometer is based around a pair of highly magnetic permeable cores made out of an alloy called ‘Mu-metal’. They are driven in and out of magnetic saturation by the solenoid effect of an alternating ‘drive current’ in the coils wrapped around them. Every time the coils come out of saturation external fields can enter them; this will cause an electrical pulse in the detector coil proportional to the field strength. Two cores are used, with the cores in opposite direction, so that the drive current has no net magnetic effect arising on the sensor coil (Clark 1996: 69). A single sensor is very sensitive to tilt which causes the amount of ambient field flux along its axis to change, which will then alter the reading. The problem is solved by using two sensors arranged as a gradiometer with one sensor subtracting the output of the other (Clark 1996: 70). Before use the instrument is required to be ‘balanced’. That is the fine tuning of the detector alignment that reduces direction sensitivity to a minimum. The Grad 601-2 has an internal memory and a data logger that store the survey data. This data is downloaded into a PC and is then processed in a suitable software package.

3.3.2 The Fluxgate Gradiometer is an efficient technique of archaeological prospecting (Gaffney et al 1991: 6). It is suitable for detecting ditches, walls, kilns, hearths and ovens. The Fluxgate Gradiometer will pick up areas of a magnetic field that differ from the 'background' magnetic field of the local geology. A zero point is set over a magnetically stable area of the site to be surveyed. This is termed as balancing. A cut feature such as a ditch will have a different magnetic field to the local geology therefore will elicit a greater response from the sensors. The response will be positive if the fill has a higher magnetic gradient than the surrounding soil. Areas of burning or a ceramic dump (e.g. collapsed tile roof) will have a drastically different magnetic field. Modern rubbish, concrete and other modern activity can have an adverse effect upon the sensors during magnetic survey. Buildings may not be readily detected unless there was a high proportion of brick/tile used in their construction.

3.3.3 The Fluxgate Gradiometer uses a NanoTesla (nT) as a unit of measurement. A Tesla is a unit of magnetic measurement. NanoTeslas must be used as the deviation of the magnetic field due to buried archaeology can be very small. The Earths background magnetic field is in the region of 48000 nT.

3.3.4 The Fluxgate Gradiometer, in common with almost all geophysical techniques, is better at detecting archaeological sites from the Late Prehistoric period onwards. It should always be borne in mind that earlier periods of prehistory that have had less impact upon the landscape (e.g. in the form of significant boundaries, structures etc.) may not be detected by most geophysical techniques.

### 3.4 Instrumentation Used for Setting out the Survey Grid

3.4.1 It is vitally important for the survey grid to be accurately set out. The English Heritage guidelines (David 1995) state that no one corner of any given survey grid square should have more than a few centimetres of error. The survey grid for the site was set out using a Leica TCRA 1205 total station. The grid points were then geo-referenced using a Leica System 1200 Differential Global Positioning System (DGPS). The GPS base station collects satellite position to determine its position. This data is processed in survey specific software to provide a sub centimetre Ordnance Survey position and height for the base station. The survey grid is then tied in to this known accurate position by using a roving satellite receiver that has its position corrected by the static base station. Each surveyed grid point has an Ordnance Survey position; therefore the geophysical survey can be directly referenced to the Ordnance Survey National Grid.

### 3.5 Data Processing

3.5.1 All of the geophysical data processing was carried out using Geoplot V3 published by Geoscan Research. Data processing must be done to the raw survey data to produce a meaningful representation of the results so that they can then be further interpreted. However it is important that the data is not processed too much. Data processing should not replace poor

field work. The Fluxgate Gradiometer data has had four stages of processing applied to it. Due to the very high positive readings of some of the magnetic disturbance the values were replaced with a dummy value so as to avoid detrimentally affecting the dataset when further processed. The first process carried out upon the data was to CLIP it. CLIP can be used to limit data to specified maximum and minimum values for improving graphical presentation. It also has the effect of removing some of the 'iron spikes' that occur with fluxgate gradiometer survey data. ZERO MEAN TRAVERSE was then applied to survey data. This removes stripe effects within grids and ensures that the survey grid edges match. Next DESPIKE was applied to the data set which removes the remaining random 'iron spikes' that occur within fluxgate gradiometer survey data. LOW PASS FILTER was then applied to the data. LOW PASS FILTER removes high frequency minor scale spatial detail. This is particularly useful for smoothing data or for enhancing larger weak features. INTERPOLATE smoothes the data by creating extra data points based upon collected values. INTERPOLATE was carried out upon the survey data in the Y axis. INTERPOLATE improves the data presentation. This was all the processing that was applied to the survey data. Figures 3 & 4 display the processed survey data.

## 4.0 GEOPHYSICAL SURVEY RESULTS (Figures 3-5)

### 4.1 Description of Site

4.1.1 The survey area consisted of 0.21 hectares adjacent to the junction of Deadmans Lane and the A268 Rye to Tenterden road. The survey took place over former gardens that slope down approximately from north to south. In the western extent of the survey area the natural slope of the topography appears to have been terraced to produce a sunken flat area (former tennis court) bounded to the south by a sandstone wall. The survey area was well drained.

4.1.2 The vegetation of the site consisted of a mixture of short grass, trees and shrubs and hedges.

### 4.2 Survey Limitations

4.2.1 There were several barriers to the geophysical survey which are listed below. These areas were omitted from the survey.

4.2.2 The site was accessed via a narrow gate fronting onto Deadmans Lane. The area immediately inside this gate was either overgrown or constricted by hedges and this area was omitted from the survey (Figure 6.1).

4.2.3 Further west in there was further undergrowth along with intermittent trees and shrubs. Where these proved a barrier to survey these areas were also omitted. This western area also contained three structures of varying size which were also omitted from the survey (see figures 6.2 and 6.3).

4.2.4 The southern extent was bounded by a steep bank with a fall off down to Deadmans Lane; this was omitted from the survey for safety reasons.

## 4.3 Introduction to results

4.3.1 The results should be read in conjunction with the figures at the end of this report. The types of features likely to be identified are discussed below.

4.3.2 *Positive Magnetic Anomalies*
Positive anomalies generally represent cut features that have been in-filled with magnetically enhanced material.

4.3.3 *Negative Magnetic anomalies*
Negative anomalies generally represent buried features such a banks that have a lower magnetic signature in comparison to the background geology

4.3.4 *Magnetic Disturbance*
Magnetic disturbance is generally associated with interference caused by modern ferrous features such as fences and service pipes or cables.

4.3.5 *Dipolar Anomalies*
Dipolar anomalies are positive anomalies with an associated negative response. These anomalies are usually associated with discreet ferrous objects or may represent buried kilns or ovens.

4.3.6 *Bipolar Anomalies*
Bipolar anomalies consist of alternating responses of positive and negative magnetic signatures. Interpretation will depend on the strength of these responses; modern pipelines and cables typically produce strong bipolar responses.

## 4.4 Interpretation of Fluxgate Gradiometer Results (Figures 3-5)

4.4.1 The results from the survey revealed a high degree of disturbance and magnetic interference across the entire survey area. Due to this disturbance it has been almost impossible to identify any anomalies that may relate to buried archaeology. There are some anomalies that may potentially represent archaeological features and these are detailed below.

***Magnetometry Results***

4.4.2 There is possibly a moderate positive anomaly running north-south shown at M1. This ends abruptly and may have been truncated by landscaping activity. To the south of this anomaly there are a number of discreet positive magnetic anomalies which are almost certainly associated with disturbance in this area. Similarly the sandstone wall

also produced a magnetic response.

4.4.3 In the east of the survey area there is possibly a line of discreet positive anomalies shown at M2 with a possible accompanying feature of a similar nature shown at M3. These may represent buried features but may equally be the result of disturbance.

4.4.4 To the north of M2 and M3 there is the hint of a positive linear anomaly shown at M4. This linear feature appears to run in a south easterly direction before turning to run east. Unfortunately not enough of this anomaly was revealed in the survey to pass definitive comment upon it.

4.4.5 Further areas of disturbance were also noted within this survey area.

## 5.0 CONCLUSION

5.0.1 The magnetometry survey was successful although the survey area appears to have been heavily disturbed probably by gardening and landscaping activity. There were some possible anomalies that were tentatively identified although the level of disturbance and interference seen at Deadmans Lane made it impossible to say with any conviction that these were of an archaeological origin.

5.0.2 The scope of any evaluation trenching will be severely limited by the extent of terracing (former tennis court), modern disturbance and accessibility. It is suggested that trial trenching should target anomalies M1-M4.

### 5.1 Statement of Indemnity

5.1.1 Geophysical survey is the collection of data that relate to subtle variations in the form and nature of soil. Magnetic and resistance detail survey may not always detect sub-surface archaeological features. This is particularly true when considering earlier periods of human activity, for example those periods that are not characterised by sedentary social activity. These periods may include but are not necessarily restricted to the earlier Bronze Age, Neolithic, Mesolithic and Palaeolithic.

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## Acknowledgements

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OASIS Form

## OASIS ID: archaeol6-76247

**Project details**

| | |
|---|---|
| Project name | Deadmans Lane Rye |
| Short description of the project | Results from a magnetometer survey of land at Deadmans Lane, Rye, East Sussex |
| Project dates | Start: 26-04-2010 End: 26-04-2010 |
| Previous/future work | Not known / Yes |
| Type of project | Recording project |
| Site status | None |
| Current Land use | Residential 1 - General Residential |
| Monument type | NONE None |
| Significant Finds | NONE None |
| Investigation type | 'Geophysical Survey' |
| Prompt | Planning condition |
| Solid geology (other) | Ashford Beds |
| Drift geology | Unknown |
| Techniques | Magnetometry |

**Project location**

| | |
|---|---|
| Country | England |
| Site location | EAST SUSSEX ROTHER RYE Deadmans Lane |
| Postcode | TN31 7NH |
| Study area | 0.21 Hectares |
| Site coordinates | TQ 922 210 50.9557172738 0.736956038206 50 57 20 N 000 44 13 E Point |

**Project creators**

| | |
|---|---|
| Name of Organisation | Archaeology South East |
| Project brief originator | Spiller Associates |
| Project design originator | Archaeology South-East |
| Project director/manager | Neil Griffin |
| Project supervisor | Chris Russel |
| Type of sponsor/funding body | Developer |

| **Project archives** | |
|---|---|
| Physical Archive Exists? | No |
| Digital Media available | 'Geophysics' |
| Paper Archive recipient | Spiller Associates |
| Paper Contents | 'other' |
| Paper Media available | 'Unpublished Text' |

| **Project bibliography 1** | |
|---|---|
| Publication type | Grey literature (unpublished document/manuscript) |
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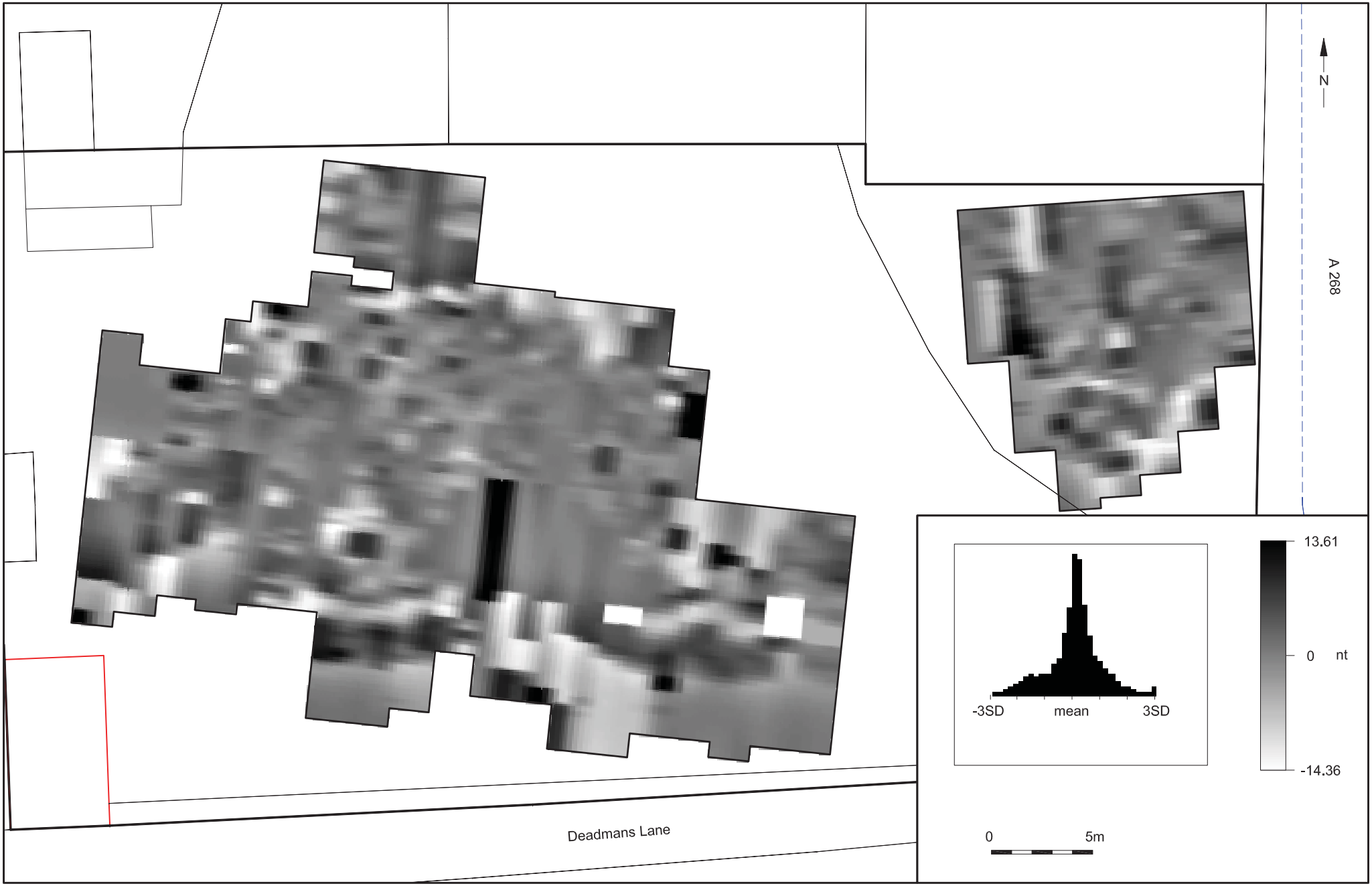
| © Archaeology South-East | | Deadmans Lane, Rye | Fig. 1 |
|---|---|---|---|
| Project Ref: 4249 | May 2010 | Site location | |
| Report Ref: 2010048 | Drawn by: JLR | | |


| © Archaeology South-East | | Deadmans Lane, Rye | Fig. 2 |
|---|---|---|---|
| Project Ref: 4249 | May 2010 | Site plan | |
| Report Ref: 2010048 | Drawn by: JLR | | |




| © Archaeology South-East | | Deadmans Lane, Rye | Fig. 3 |
|---|---|---|---|
| Project Ref: 4249 | May 2010 | Processed shade plot | |
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|---|---|---|---|
| Project Ref: 4249 | May 2010 | Processed trace plot | |
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|---|---|---|---|
| Project Ref: 4249 | May 2010 | Interpretation | |
| Report Ref: 2010048 | Drawn by: JLR | | |

Fig. 6.1: Hedges in east of survey area

Fig. 6.2: Hedges in west of survey area

Fig. 6.3: Structures in west of survey area

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