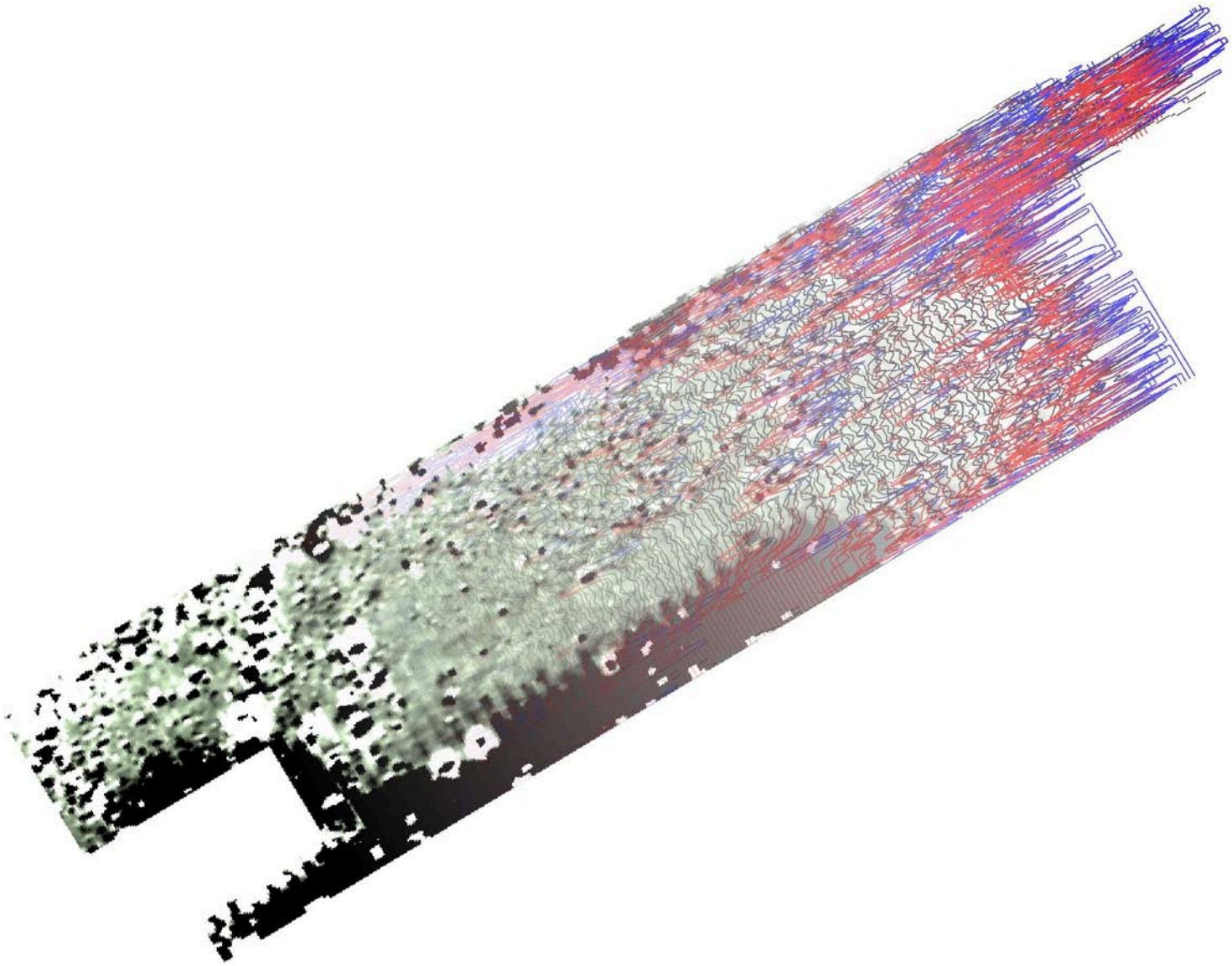
Wessex Archaeology

Land at Hudson's Field
Salisbury, Wiltshire

Detailed Gradiometer Survey Report



Ref: 70710.01

December 2008

LAND AT HUDSON'S FIELD
SALISBURY
WILTSHIRE

Detailed Gradiometer Survey Report

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Summary

Wessex Archaeology was commissioned by Salisbury District Council to conduct a geophysical survey on land at Hudson's Field, Salisbury, centred on NGR 414072 131996, ahead of a proposed development.

A detailed gradiometer survey was carried out over approximately 1.4ha. The survey did not identify any anomalies interpreted to be of archaeological significance. The majority of the dataset was affected by strong magnetic disturbance, caused largely by modern buildings adjacent to the survey area and the presence of a metalled vehicle track.

Any weaker anomalies of archaeological origin will have been masked by the stronger ferrous responses and areas of disturbance. Given the proximity of the survey area to the multi-period site of Old Sarum, the existence of significant archaeological features, whilst unlikely, cannot be precluded by this survey.

LAND AT HUDSON'S FIELD
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Detailed Gradiometer Survey Report

Acknowledgements

The detailed gradiometer survey was commissioned by Salisbury District Council. The assistance of Chris Stringer is gratefully acknowledged.

The fieldwork was directed by Nathan Thomas, and assisted by Dan Hart. Nathan Thomas processed and interpreted the geophysical data and wrote this report. Illustrations were prepared by Ken Lymer. The project was managed and quality-controlled on behalf of Wessex Archaeology by Paul Baggaley.

LAND AT HUDSON'S FIELD
SALISBURY
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Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Salisbury District Council to undertake a geophysical survey on land at Hudson's Field, Salisbury (**Figure 1**), centred on NGR 414072 131996, ahead of a proposed development (hereafter 'the Site').

1.1.2 The aim of the geophysical survey was to establish the presence/absence, extent, character and date of detectable archaeological remains in view of the development proposal and its associated facilities, services and infrastructure.

1.1.3 This report presents a brief description of the methodology followed, detailed survey results, and the archaeological interpretation of the geophysical data.

1.2 The Site

1.2.1 The Site is located 2km north of Salisbury city centre on the A345 road to Amesbury, 750m south of the multi-period hill fort of Old Sarum. The Site lies between 55m and 75m above Ordnance Datum (AOD), with the ground sloping downwards from northeast to southwest. The Site is currently used as recreational playing fields, with the majority of the area under short grass.

1.2.2 A total area of 1.4ha was covered by the detailed gradiometer survey (**Figure 1**). The survey area was bounded by the presence of an existing sports pavilion to the southeast of the Site, and by trees adjacent to the southern boundary.

1.2.3 The soils underlying the Site are grey rendzinas of the 342a (Upton 1) association (SSEW 1983). This type of soil has previously been shown to produce magnetic contrasts suitable for the detection of archaeological features through detailed survey utilising the Bartington Grad 601-2 gradiometer.

2 METHODOLOGY

2.1 Introduction

2.1.1 A geophysical specification was prepared by Wessex Archaeology to investigate the proposed study area. The methodology consisted of a detailed gradiometer survey using a Bartington Grad 601-2 dual gradiometer system. This survey was conducted in accordance with English Heritage guidelines for geophysical surveys (2008).

2.1.2 The geophysical survey was carried out by Wessex Archaeology's in-house team on 26th November 2008.

2.1.3 Survey grids were established at 30m x 30m using a Leica 1200 RTK GPS system, which is able to provide locations in real-time and is precise to within 2cm and therefore exceeds English Heritage recommendations.

2.1.4 The detailed gradiometer survey was conducted using a Bartington Grad 601-2 Gradiometer system over 30m x 30m grids with a sample interval of 0.25m along transects spaced 1m apart. Data were collected in the zigzag method along traverses oriented approximately northwest to southeast.

2.1.5 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.

3 RESULTS AND INTERPRETATION

3.1 Introduction

3.1.1 Results from the geophysical survey are presented as a greyscale plot and an XY trace (**Figure 2**) of the entire Site at a scale of 1:1000.

3.1.2 The interpretation of the datasets highlights the presence of possible archaeology, trends, ferrous/burnt or fired objects and areas of general increased magnetic response. The interpretation is shown for the entire Site in **Figure 3** at a scale of 1:1000. Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.

3.2 Detailed Survey Results and Interpretation

3.2.1 The geophysical survey has demonstrated the presence of large areas of magnetic disturbance and frequent ferrous anomalies within the confines of the survey area.

3.2.2 To the south of the Site, the close proximity of modern industrial units has resulted in a broad area of strong magnetic response that has masked any responses from potential archaeology (**4001**). The area affected by this response also encompasses the current pavilion and the immediate zone surrounding it.

3.2.3 To the north east of the Site, near to the access gate and adjacent to the track that delimits the northern edge of the Site, a further broad area of magnetic disturbance is present (**4002**). This is most likely associated with modern landscaping and/or the construction materials used within the access road. This magnetic disturbance continues along the southern edge of the road for the full extent of the survey area. This area of 'noise' would also mask any potential anomalies of archaeological origin within this area.

3.2.4 Anomaly **4003** is a linear trend of dipolar responses, approximately aligned north-south. This is most likely caused by a modern service pipe linked to the pavilion.

3.2.5 Elsewhere across the Site, numerous strong dipolar responses are likely to indicate ferrous material located near to, or on, the surface of the field. It is probable that the majority of these responses are modern in origin and of little archaeological significance. However, it cannot be ruled out that some of the responses may be of some archaeological significance.

3.2.6 Four weak magnetic trends have been identified. Three of these are oriented approximately north-south near the centre of the survey area; another is aligned approximately east-west. It is possible that these responses represent former field divisions or drainage channels, although their lack of contrast with the magnetic background weakens such an interpretation.

4 CONCLUSION

4.1 Introduction

4.1.1 A detailed gradiometer survey was carried out over approximately 1.4ha at the Site in advance of proposed development. The detailed survey revealed that much of the magnetic background of the Site is affected by ferrous contamination, in the form of extant buildings adjacent to the survey area and by modern services and intrusions.

4.2 Summary

4.2.1 The geophysical survey has not identified any anomalies interpreted as being of archaeological significance within the survey area. However, it is likely that any weaker anomalies of archaeological origin will have been masked due to the extent of ferrous contamination. Whilst it is unlikely, this survey cannot conclusively discount the existence of significant archaeological features within the bounds of the Site, given the proximity of the survey area to the multi-period site of Old Sarum.

5 REFERENCES

English Heritage, 2008. *Geophysical Survey in Archaeological Field Evaluation*. Research and Professional Service Guideline 1, 2nd ed.

Soil Survey of England and Wales, 1983. *Soils of South West England: Sheet 5*. Ordnance Survey, Southampton.

APPENDIX 1: SURVEY EQUIPMENT AND DATA PROCESSING

Survey Methods and Equipment

The magnetic data for this project was acquired using a Bartington 601-2 dual magnetic gradiometer system. This instrument has two sensor assemblies fixed horizontally 1m apart allowing two traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1m 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 a resolution of 0.1nT over a ±3000nT range, and measurements from each sensor are logged at intervals of 0.25m. All of the data are stored on an integrated data logger for subsequent post-processing and analysis.

Wessex Archaeology undertakes two types of magnetic surveys: scanning and detail. Both types depend upon the establishment of an accurate 20m or 30m site grid, which is achieved using a Leica 1200 RTK GPS system and then extended using tapes. The Leica 1200 RTK GPS system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined to an accuracy of 1-2cm in real-time and therefore exceed the level of accuracy recommended by English Heritage (1995) for geophysical surveys.

Scanning surveys consist of recording data at 0.25m intervals along transects spaced 10m apart, acquiring a minimum of 80 data points per transect. Due to the relatively coarse transect interval, scanning surveys should only be expected to detect extended regions of archaeological anomalies, when there is a greater likelihood of distinguishing such responses from the background magnetic field.

The detail surveys consist of 30m x 30m grids, and data are collected at 0.25m intervals along traverses spaced 1m apart. This gives 1600 measurements per grid and is the recommended methodology for archaeological surveys of this type (English Heritage, 2008).

Post-Processing

The magnetic data collected during the detail survey are downloaded from the Bartington 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 is conducted so as not to distort the anomalies.

As the scanning data are not as closely distributed as with detailed survey, they are georeferenced using the GPS information and interpolated to highlight similar anomalies in adjacent transects. Directional trends may be removed before interpolation to produce more easily understood images.

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 forward or backward by a number of readings. This corrects for operator errors and is used to enhance linear features;
- Clipping – Limiting the displayed range of the processed data to either ±3nT or ±3SD. in order to enhance the appearance of smaller anomalies.
- Despike – Filtering any data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings caused by modern, small ferrous objects at the surface

Typical displays of the data used during processing and analysis:

- 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 image can include a hidden line algorithm to remove certain lines and enhance the image. This type of image is useful as it shows the full range and shape of individual anomalies.
- 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.

APPENDIX 2: GEOPHYSICAL INTERPRETATION

The interpretation methodology used by Wessex Archaeology separates the anomalies into two main categories: archaeological and unidentified responses.

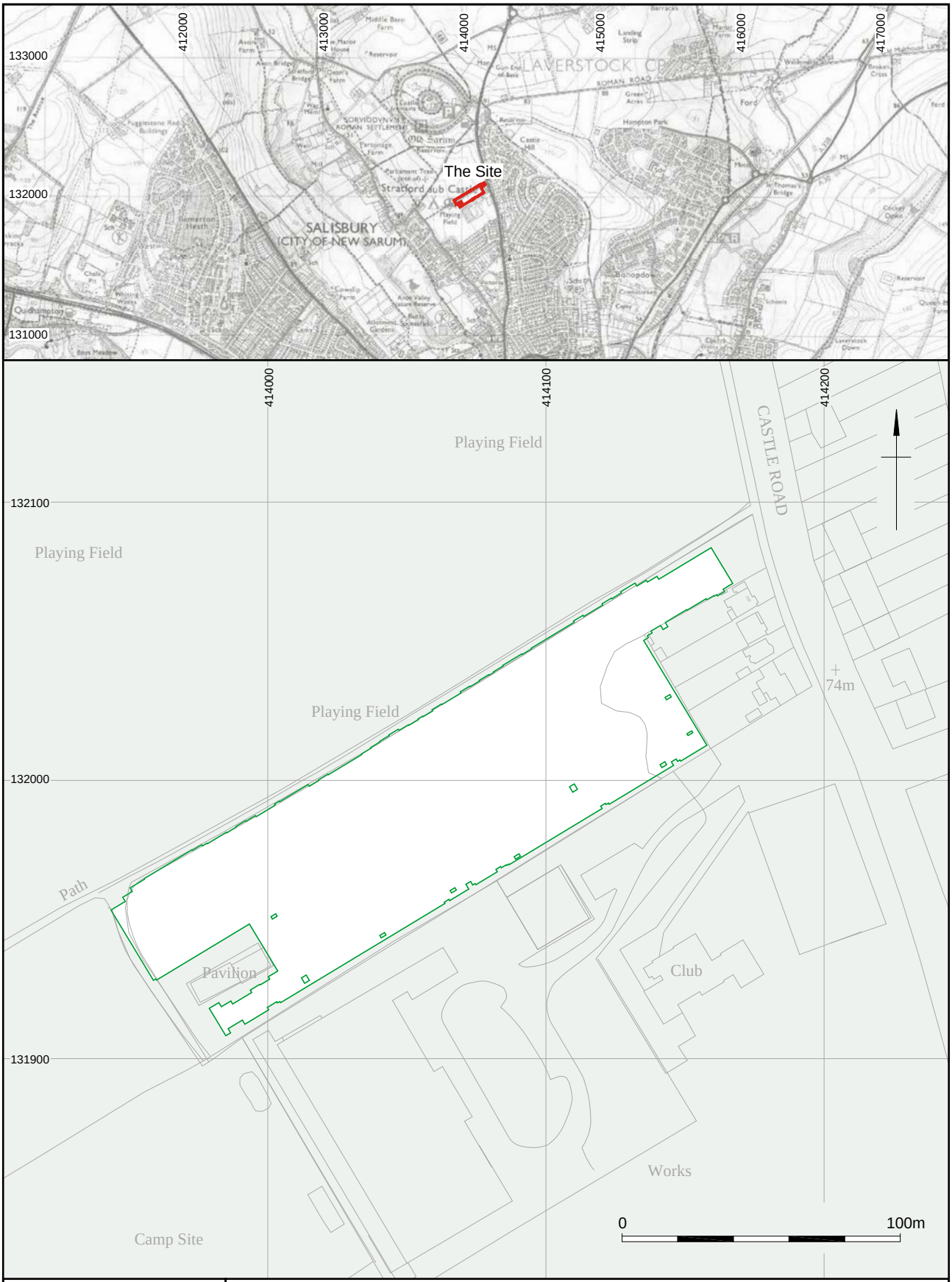
The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided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

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Probable archaeology – used for features which give a clear response but which form incomplete patterns.

The unidentified 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:

- Possible archaeology – used for features which give a response but which form no discernable pattern or trend.
- 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.
- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.

Finally, services such as water pipes are marked where they have been identified.



Geophysical survey area

Wessex Archaeology

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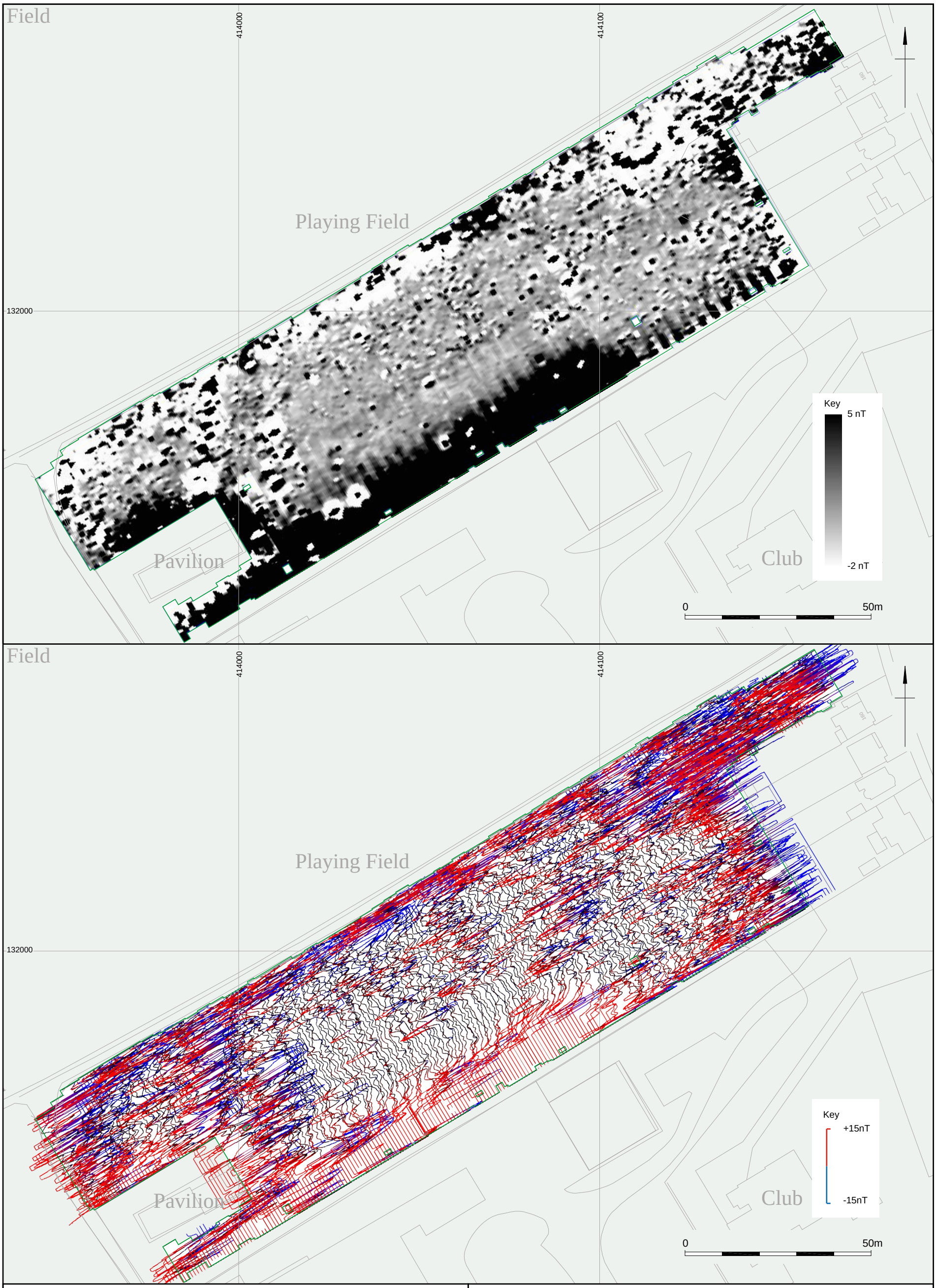
Site location and survey extents

Figure 1



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Geophysical survey area

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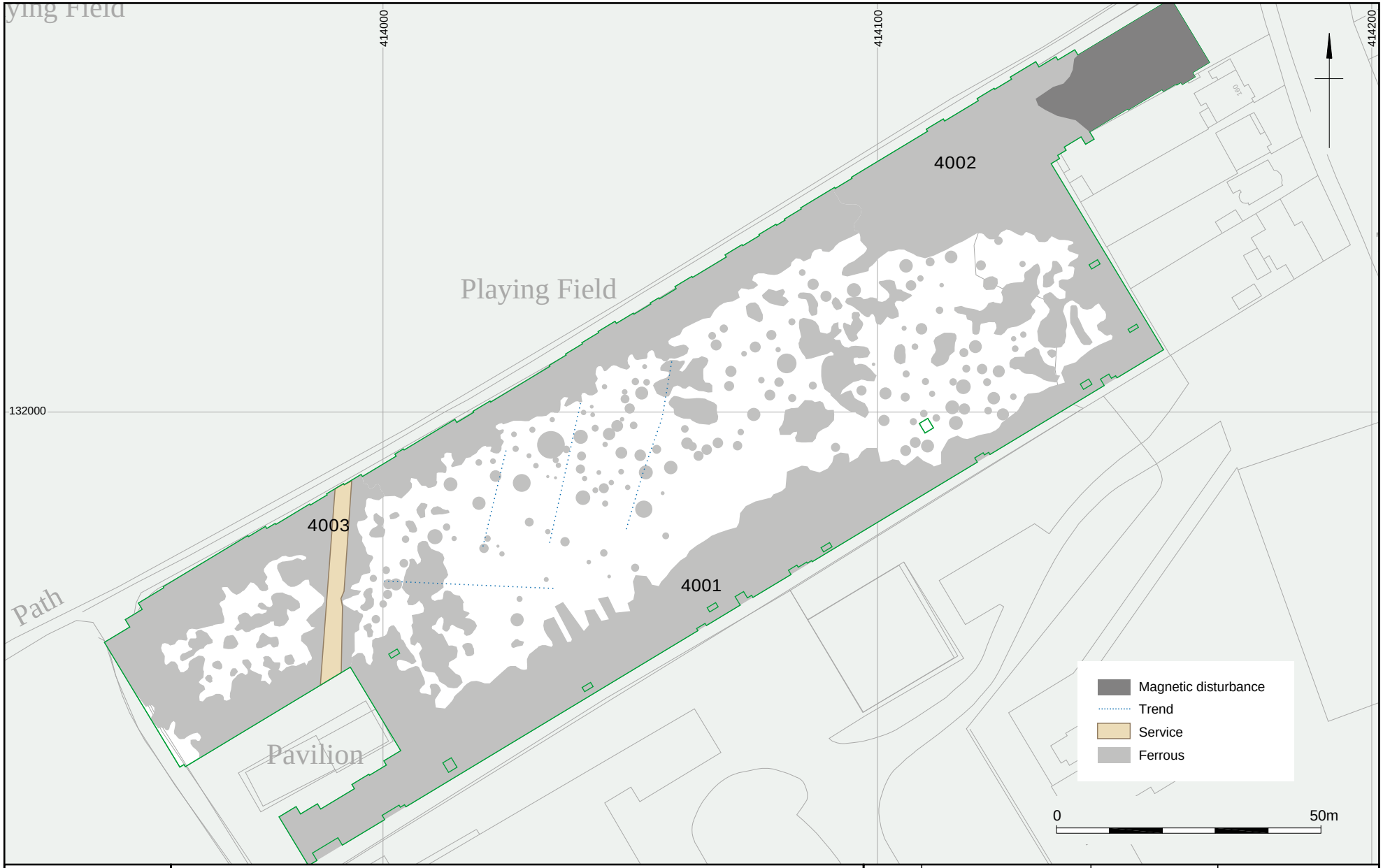
Greyscale plot and XY trace

Figure 2



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Interpretation of geophysical results

Figure 3

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