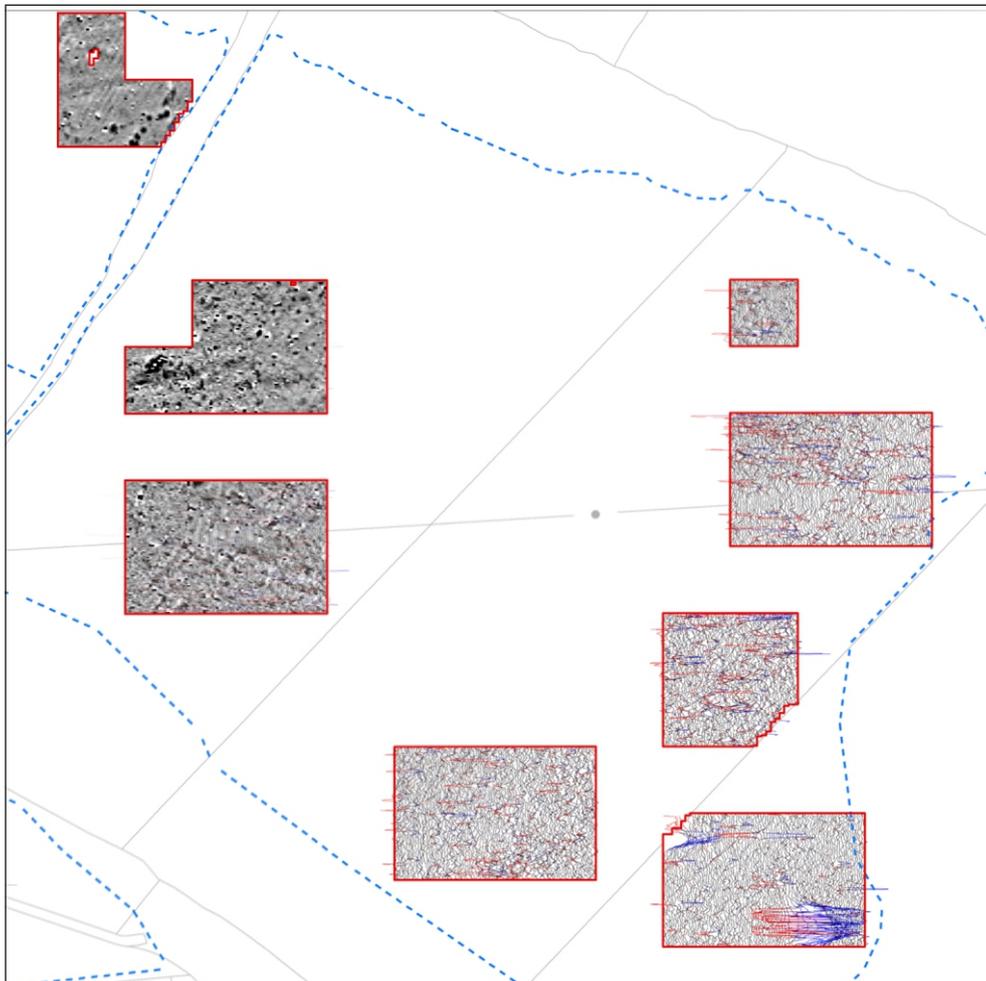




making sense of heritage

Kinson Manor Farm Parley, Dorset

Detailed Gradiometer Survey Report



Ref: 103580.01
May 2014



**Kinson Manor Farm
Parley, Dorset**

Detailed Gradiometer Survey Report

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Kinson Manor Farm, Parley, Dorset

Detailed Gradiometer Survey Report

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Kinson Manor Farm, Parley, Dorset

Detailed Gradiometer Survey Report

Summary

A phased geophysical survey was conducted over land adjacent to Manor Farm Road, near Parley, Dorset. The project was commissioned by Terence O'Rourke, on behalf of The Fairfield Partnership, with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features on the site ahead of a proposed development.

The site comprises pasture fields to the north and east of Manor Farm Road, on the northern outskirts of Kinson, approximately 6km north of Bournemouth centre. The site occupies level ground around 10m aOD and is currently used as horse paddocks. The geophysical survey was undertaken between 7th and 11th April 2014.

Recorded scanning was undertaken over the entire proposed development area of 24ha in order to assess the archaeological potential within the Site, with transects of data collected at 10m intervals.

The recorded scanning was followed by detailed gradiometer survey, which covered 6ha, or 25%, split into a number of survey blocks. These blocks were positioned to investigate further anomalies of possible interest identified through the recorded scanning survey and to verify the identification of areas of lower potential. The detailed survey has demonstrated the presence of a number of anomalies of possible archaeological interest within the survey area, along with several regions of increased magnetic response.

The datasets indicate a generally quiet magnetic background with a number of isolated pit-like anomalies visible throughout. Such responses can be produced by both archaeological features such as pits and by natural features such as tree throws; as it is generally difficult to interpret these responses conclusively, they are considered to be of possible archaeological interest.

Several linear anomalies were identified, with a localised network of these anomalies towards the southwestern extent of the Site. They are considered likely to relate to former field boundaries, given that they share similar orientations to existing boundaries nearby.

Faint ploughing trends can be seen throughout the datasets, indicating that weakly magnetised features are detectable through gradiometer survey and suggesting that more substantial archaeological features would have been identifiable should any have been present.



Kinson Manor Farm, Parley, Dorset

Recorded Scanning and Detailed Gradiometer Survey Report

Acknowledgements

The detailed gradiometer survey was commissioned by Terence O'Rourke on behalf of their client The Fairfield Partnership. The assistance of John Trehay is gratefully acknowledged in this regard.

The fieldwork was carried out by Clara Dickinson, Alistair Salisbury, and Jen Smith. Ross Lefort and Clara Dickinson processed and interpreted the geophysical data in addition to writing this report. The geophysical work was quality controlled by Dr. Paul Baggaley and Ben Urmston. Illustrations were prepared by Richard Milwain and Karen Nichols. The project was managed on behalf of Wessex Archaeology by Caroline Budd.



Kinson Manor Farm, Parley, Dorset

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

- 1.1.1 Wessex Archaeology was commissioned by The Fairfield Partnership to carry out a geophysical survey of land off Manor Farm Road, Parley, Dorset (**Figure 1**), hereafter “the Site” (centred on NGR 407290 97289).
- 1.1.2 The aim of the geophysical survey was to establish the presence/absence, extent and character of detectable archaeological remains within the survey area.
- 1.1.3 This report presents a brief description of the methodology followed, the scanning and detailed survey results and the archaeological interpretation of the geophysical data.

1.2 The Site

- 1.2.1 The survey area comprises of several pasture fields off Manor Farm Road, on the northern outskirts of Kinson, some 6km north of the centre of Bournemouth (**Figure 1**). A recorded scanning survey covering the total area of the Site (24ha) was undertaken followed by a detailed gradiometer survey in targeted regions of the site totalling 6ha.
- 1.2.2 The Site occupies a level expanse of ground, and sloping gently towards the south between approximately 10-12m above Ordnance Datum (aOD). The survey area lies on either side of Manor Farm Road, which is oriented approximately NE-SW, with the extents of the survey area defined by residential housing to the east and south, and hedge boundaries to the north and west. The farm buildings of Manor Farm lie within the centre of the Site.
- 1.2.3 The underlying geology of the area is predominantly sedimentary and composed of Bridgnorth Sandstone Formation with superficial deposits consisting of Devensian glaciofluvial sands and gravels (BGS).
- 1.2.4 The soils underlying the Site are likely to be stoneless clayey soils of the 813b (Fladbury 1) association (SSEW, 1983). Soils derived from such geological parent material have been shown to produce magnetic contrasts suitable for the detection of archaeological remains through gradiometer survey.



2 METHODOLOGY

2.1 Introduction

- 2.1.1 The detailed gradiometer survey was conducted using a Bartington Grad601-2 dual fluxgate gradiometer system. The survey was conducted in accordance with English Heritage guidelines (English Heritage 2008).
- 2.1.2 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team between 7th and 11th April 2014. Field conditions at the time of the survey were variable, although conditions were firm under foot.

2.2 Method

- 2.2.1 Individual survey grid nodes were established at 30m x 30m intervals using a Leica Viva RTK GNSS instrument, which is precise to approximately 0.02m and therefore exceeds English Heritage recommendations (2008).
- 2.2.2 The recorded scanning survey was conducted using a Bartington Grad601-2 fluxgate gradiometer, which has a vertical separation of 1m between sensors. Data were collected at 0.25m intervals along transects spaced 10m apart with an effective sensitivity of 0.03nT. The stakeout data was used to georeference the recorded scanning survey.
- 2.2.3 The detailed gradiometer survey was conducted using a Bartington Grad601-2 fluxgate gradiometer. Data were collected at 0.25m intervals along transects spaced 1m apart with an effective sensitivity of 0.03nT, in accordance with EH guidelines (2008). Data were collected in the zigzag method.
- 2.2.4 Data from the survey were subject to minimal data correction processes. These comprise a zero mean traverse function (± 5 nT thresholds) applied to correct for any variation between the two Bartington sensors used, and a de-step function to account for variations in traverse position due to varying ground cover and topography. These two steps were applied to all survey areas, with no interpolation applied.
- 2.2.5 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 1**.



3 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION

3.1 Introduction

- 3.1.1 The gradiometer survey has been successful in identifying anomalies of probable and possible archaeological interest across the Site, along with areas of increased magnetic response and a large amount of ferrous. Recorded scanning survey results are presented as a greyscale image at a scale of 1:3,000 (**Figure 2**), with data displayed at -2nT (white) to +3nT (black). Detailed survey results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of 1:2,000 (**Figures 3, 4, 6 and 7**). The data are displayed at -2nT (white) to +3nT (black) for the greyscale image and ± 25 nT at 25nT per cm for the XY trace plots.
- 3.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (**Figures 5 and 8**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.
- 3.1.3 Numerous ferrous anomalies are visible throughout the detailed survey dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.

3.2 Scanning Survey Results and Interpretation

- 3.2.1 The scanning results showed several anomalies that were possibly of interest, and were targeted for detailed gradiometer survey. Many ferrous anomalies were also present in the data; particularly in close proximity to buildings, roads, and other extant infrastructure and features.
- 3.2.2 In general, the magnetic background is relatively quiet across the Site, with localised groups of anomalies apparent; primarily the detail survey was positioned to investigate these clusters of responses. Several linear bands of increased response can be seen, associated with existing or former field boundaries, which were presumed to be of limited archaeological interest. Regions of magnetic disturbance can be seen associated with the electricity cables and pylons crossing the northern portion of the survey area.

3.3 Gradiometer Survey Results and Interpretation

- 3.3.1 Survey was targeted over **Area A** as the scanning data revealed an area of increased magnetic response that was thought to be of archaeological potential. Several possible archaeological responses were identified here, such as a broad linear feature displaying positive responses (**4000**). This was found to be running parallel with several ploughing trends on a NW-SE alignment and may be related to these features. Several small positive anomalies are identified, and may also prove to be archaeological in origin, but these do not show an obvious distribution pattern and are considered to be of possible archaeological interest.
- 3.3.2 Another broad linear feature is also identified (**4001**), which runs through the plough features on a north-south orientation. Several linear trends can be identified on either side of this, which do not seem to follow a particular alignment. To the west of this anomaly at the edge of the survey area, a large region of increased response can be identified, which has been interpreted as a geological feature. This follows the western extent of the targeted area, with a large region of magnetic disturbance near its centre. Several small positive anomalies are also identified, and are classified as features of possible archaeological interest due since there is no obvious distribution. A small cluster of the



features are located in the south-east of the area (**4002**) in vicinity to a NE-SW linear trend and several plough features.

- 3.3.3 **Area B** was targeted upon an area of isolated responses. Several anomalies were identified in this region, such as plough trends (**4003**) continuing on the same alignment as found in **Area A**, with some linear trends which follow an opposing orientations to these. Of particular interest is a broad, weakly positive feature which enters the survey area from the north, heading towards the south-east, before turning sharply towards the north-east. This is interpreted as being of possible archaeological interest, and may be related to a similar feature in **Area A**, with seems to be in the same alignment. However, it is possible that these relate to former ploughing headlands.
- 3.3.4 Two other broad linear trend features can also be seen at **4004**, running parallel to each other on a NE-SW alignment. These are more fragmentary but may relate to the previous feature, since it follows on the same direction. Several small positive anomalies, which do not follow an obvious distribution pattern are also of note, and are also thought to be of possible archaeological interest.
- 3.3.5 Towards the south of the survey area are several anomalies interpreted as increased magnetic response (**4005**). These roughly follow the direction of broad linear trends, and may be related; however they are too indistinct to further interpret. Plough trends continue into south of the survey area, following the same NW-SE alignment.
- 3.3.6 **Area C** was targeted as a control block over an area presumed to be empty according to the scanning data. The detailed survey revealed several anomalies of interest, including several ploughing trends (**4006**), following a NW-SE route, and some linear trends that did not follow a defined orientation. In the western extent of the survey area, an area of increased response is considered to be geological, and follows on from the geology interpreted in **Area A**. Several small isolated anomalies are also identified, and similarly to the one described above are thought to be of possible archaeological interest.
- 3.3.7 Towards the southern extent of the area, a sub-annular anomaly is probably archaeological in origin (**4007**). This comprises a well-defined, although fragmented, sub-oval anomaly which has strong positive magnetic values but forms no obvious pattern which suggests they form part of a larger structure or complex. This feature is found alongside several ploughing trends, as well as some linear trends.
- 3.3.8 Survey **Area D** is focused over a region of weakly negative responses identified in the scanning data. These may relate to several linear ploughing trends which have been identified in the detail survey against the quiet magnetic background (**4008**). The plough trends (**4009**) follow a NW-SE direction, close to several linear trends which oppose this, heading towards the NE (**4010**). Several small positive circular features are also found within the survey area, with the south-eastern most group seeming to follow a linear alignment.
- 3.3.9 **Area E** was targeted on a cluster of positive anomalies close to a field boundary. At **4011** several irregular positive sub-oval shaped features have been identified as possible archaeological anomalies. These are found running in a rough east-west pattern, but are somewhat varied in their size. These are also in close proximity to several plough trends, which unlike those described in Area C, which is part of the same field system as **Area E**; follow an opposing NE-SW alignment. These plough trends also show larger gaps between trends compared to those in Area C. These continue towards the south of the survey area, alongside several linear trends (**4012**) that do not follow the ploughing alignment.



- 3.3.10 **Area F** was targeted over a region an increased magnetic response observed in the scanning data. Several ploughing and linear trends are present (**4013**); with the ploughing trends alignment going NE-SW. Alongside these are several sub-circular anomalies that are irregular in shape and are classified as possible archaeology due to their non-uniform shape and their lack of definable pattern. These anomalies continue into the southern extent of the survey area (**4014**), and are found alongside several linear trends which travel roughly E-W. Towards the eastern extent, a compact region of increased magnetic response has also been identified.
- 3.3.11 **Area G** was targeted over a large ferrous response located close to a modern farm building complex. The magnetic disturbance from the farm buildings is identified as a region of ferrous (**4015**) to the west of the survey area. However, several ploughing trends, aligned NW-SE can be distinguished, with the trends spaced widely apart. A thin weakly negative band of increased magnetic response runs through the survey area exactly east-west. Below this, in the south-eastern extent of the survey area is a small grouping of trends; however it is unknown to what these features relate. Lastly, several positive anomalies are identified in the south-west of the area, but due to their irregular shapes and having no discernable pattern, have been interpreted as possible archaeology.
- 3.3.12 **Area H** was selected to target a large ferrous anomaly and a possible positive linear trend identified in the scanning data. The detailed survey revealed a several trends (**4016**), including a large curvilinear which runs from the east boundary of the survey area heading towards the south-west, before turning towards the north. This feature also correlates well with several ferrous anomalies and possible archaeological features, and may relate to several ploughing trends which roughly follow the alignment, found further to the north. Given its similar orientation to the existing boundary, it is possible that these anomalies relate to a former ploughing headland or stock enclosure.
- 3.3.13 These E-W ploughing trends are widely spaced, and may be suggestive of an earlier period of agriculture, as ploughing trends displaying thinner spacing have been found crossing over them, following a NW-SE alignment. These trends may be related to ploughing trends identified in **Area F** that seem to be on the orientation.
- 3.3.14 **Area I** was targeted over a possible linear trend and a region of increased magnetic response. The detailed survey revealed two different sets of plough trends; one orientated NE-SW (**4017**), and the other orientated on an opposing NW-SE alignment. However it is unclear due to the fragmented nature of the plough trends which set may have post-dated the other.
- 3.3.15 There are also several linear and curvilinear trends and possible archaeological anomalies visible within the area (**4018**). These are scattered throughout the survey area, but notably is a cluster located in the NE corner, made up of several circular irregularly-sized positive anomalies and a set of trends. These are found in close proximity to each other suggesting that they might be related. There are also two small pairs of possible archaeology anomalies at the far western extent of the survey area, although their archaeological relationship is unclear.
- 3.3.16 **Area J** was chosen to examine a region of responses of possible interest. Several faint plough trends (**4019**) were identified throughout, most in a NE-SW orientation. Trends were also identified with most travelling in a roughly E-W direction (**4020**), but with some aligned NW-SE and NE-SW (**4021**). Several possible archaeological anomalies have also been identified however their relationship to each other is unclear, since they do not follow a clear, obvious pattern.



Area K was targeted over a possible linear trend identified in the scanning data. Trends were identified within the detailed survey, most on a NW-SE alignment (**4022**). Curvilinear trends were also identified such as at **4023**, where trends heading towards the NE trends starts to turn towards the SE. Trends **4024** in the east of the survey area are not on the same orientation as the ploughing, although their origins are unclear.

- 3.3.17 **Area L** was chosen partly as a control block, but also to focus on a strong ferrous anomaly **4026**. Further ploughing trends can be seen towards the west (**4025**), with a number of isolated pit-like anomalies visible towards the east. A short linear anomaly is considered to be of possible archaeological interest, although it is conceivable that it is agricultural in origin.
- 3.3.18 **Area M** was targeted over a possible linear trend identified within the scanning results. Regions of increased magnetic response **4028** and **4029** lie near the centre of the area, although their origins are unclear. Ploughing trends can be seen on the same NE-SW orientation as elsewhere.
- 3.3.19 **Area N** was chosen to investigate several positive and ferrous responses shown within the scanning data. Numerous ferrous anomalies can be seen, with clusters of relatively large responses at **4030** and **4031**, with a marked increase in their density at **4032**. These anomalies are likely to indicate the presence of modern debris within the ploughsoil, although an archaeological source for this material cannot be excluded entirely; no evidence in the form of anomalies of archaeological potential has been identified nearby, however.
- 3.3.20 **Area O** was targeted over a strong ferrous response and several positive anomalies. A large pit-like anomaly **4033** lies at the centre of the area, with several others close by. It is equally possible that these anomalies are geological or archaeological in origin.



4 CONCLUSION

- 4.1.1 The detailed gradiometer survey has been successful in detecting anomalies of probable and possible archaeological interest and regions of increased magnetic response. Good agreement is seen between the recorded scanning and detailed gradiometer surveys.
- 4.1.2 A single anomaly of probable archaeological interest was identified towards the western extent of the Site. This interpretation is largely based upon its sub-annular appearance in plan, consistent with it being the remnants of a roundhouse or ring ditch, although it does not appear to be associated with an enclosing feature; this reduces confidence in an archaeological interpretation somewhat.
- 4.1.3 The datasets from the western portion of the survey are relatively quiet, with numerous ploughing trends and a number of isolated pit-like anomalies visible. It is not possible to interpret these pit-like anomalies conclusively, as the response over natural features such as tree throws can be similar in character to archaeological features. Linear anomalies within Areas A and B towards the southwestern extent of the Site are consistent with former field boundaries and are oriented parallel with existing boundaries nearby.
- 4.1.4 The eastern portion of the dataset shows a relative increase in the frequency of ferrous anomalies, which most likely relates to agricultural practices. Several larger isolated pit-like anomalies have been identified, along with further similar, albeit smaller, anomalies; given the lack of coherent distribution, it is difficult to offer a more definitive interpretation. A short linear anomaly can be seen near the southeastern extent of the site, although this is consistent with former agricultural activity at the Site.
- 4.1.5 It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of gradiometers. It may therefore be the case that more archaeological features may be encountered than have been identified through geophysical survey.

5 REFERENCES

English Heritage, 2008. *Geophysical Survey in Archaeological Field Evaluation*. Research and Professional Service Guideline No 1, 2nd edition.

Soil Survey of England and Wales, 1983. *Sheet 5, Soils of South West England*. 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 gradiometers 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 gradiometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of 0.03nT over a ± 100 nT 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 Viva RTK GNSS instrument and then extended using tapes. The Leica Viva system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02m in real-time and therefore exceed the level of accuracy recommended by English Heritage (2008) 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 detailed surveys consist of 20m x 20m or 30m x 30m grids, and data are collected at 0.25m intervals along traverses spaced 1m apart. These strategies give 1600 or 3600 measurements per 20m or 30m grid respectively, and are the recommended methodologies for archaeological surveys of this type (EH, 2008).

Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to 0.125m intervals along traverses spaced up to 0.25m apart, resulting in a maximum of 28800 readings per 30m grid, exceeding that recommended by English Heritage (2008) for characterisation surveys.



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 gradiometer;
- Destagger – Shifting each traverse longitudinally by a number of readings. This corrects for operator errors and is used to enhance linear features;
- Despike – 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:

- 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.
- 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.

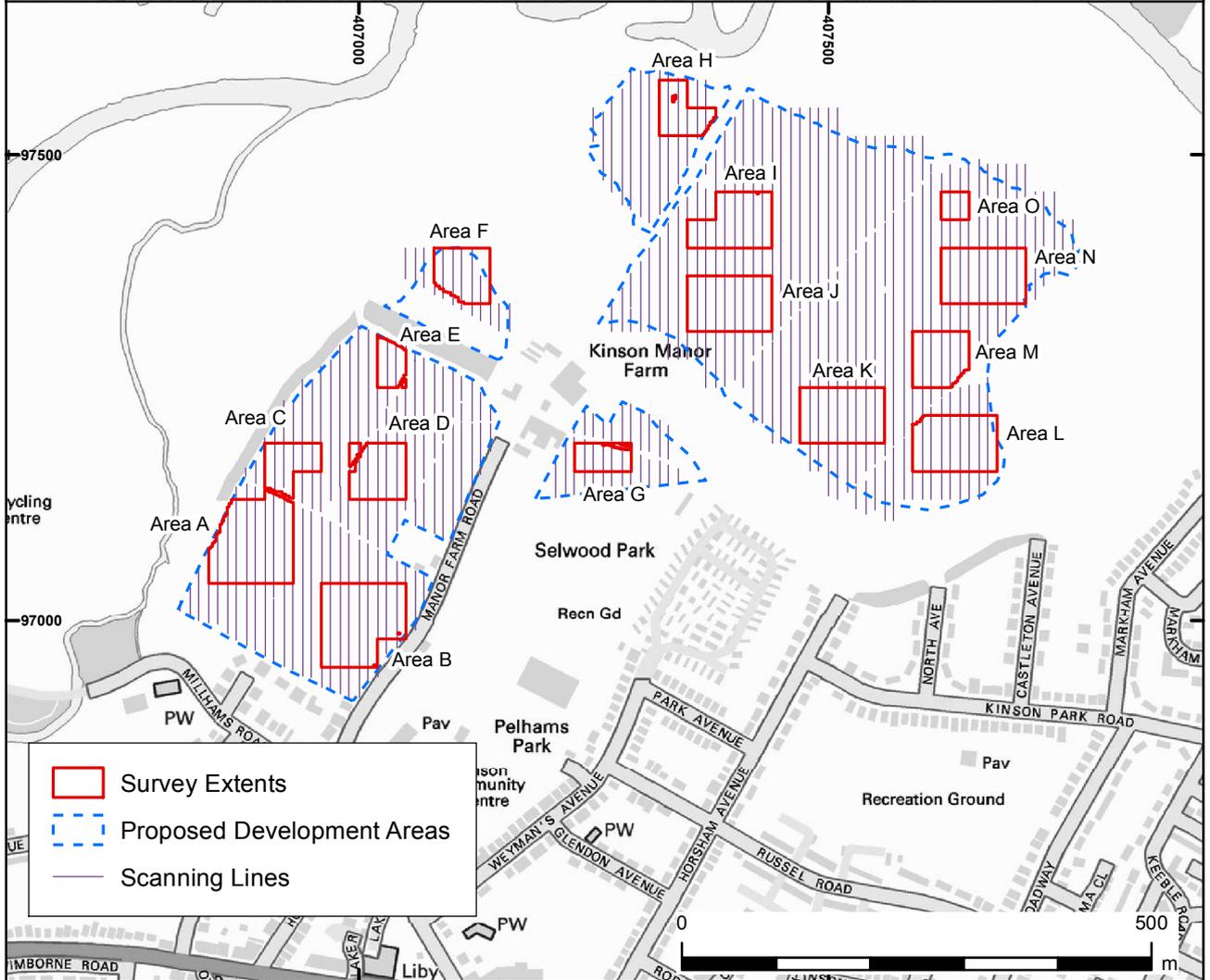
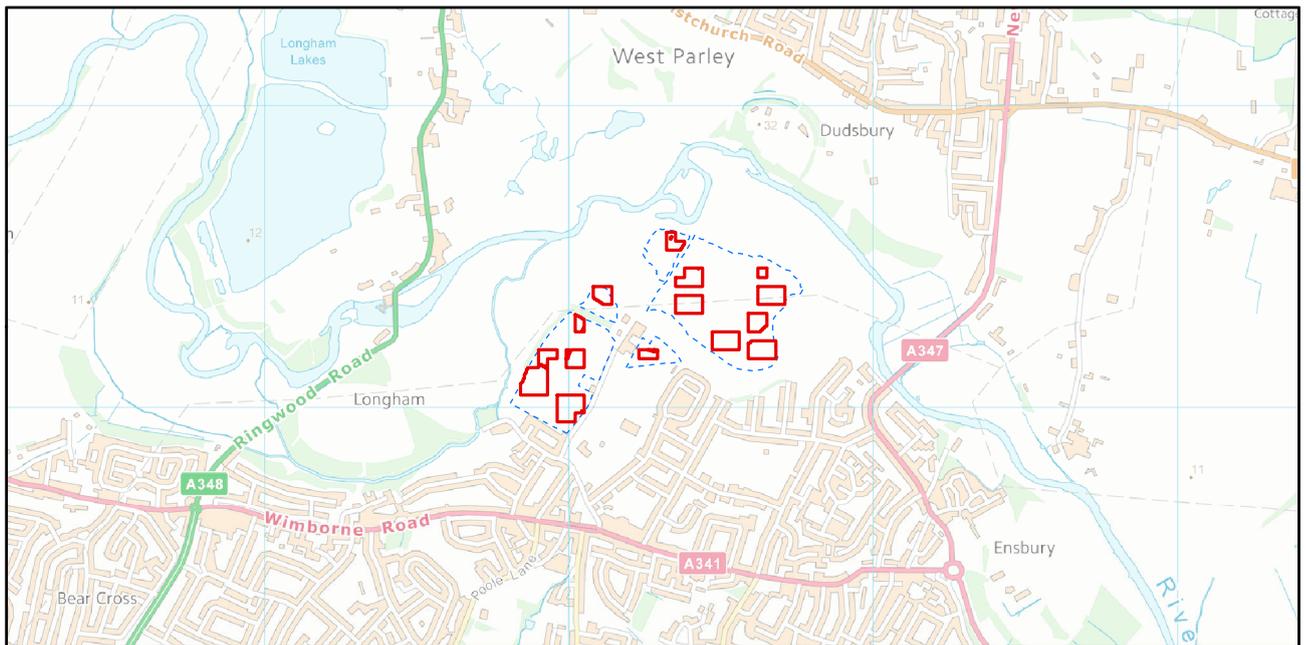
The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided 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.
- Possible archaeology – used for features which give a response but which form no discernible pattern or trend.

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:

- 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.

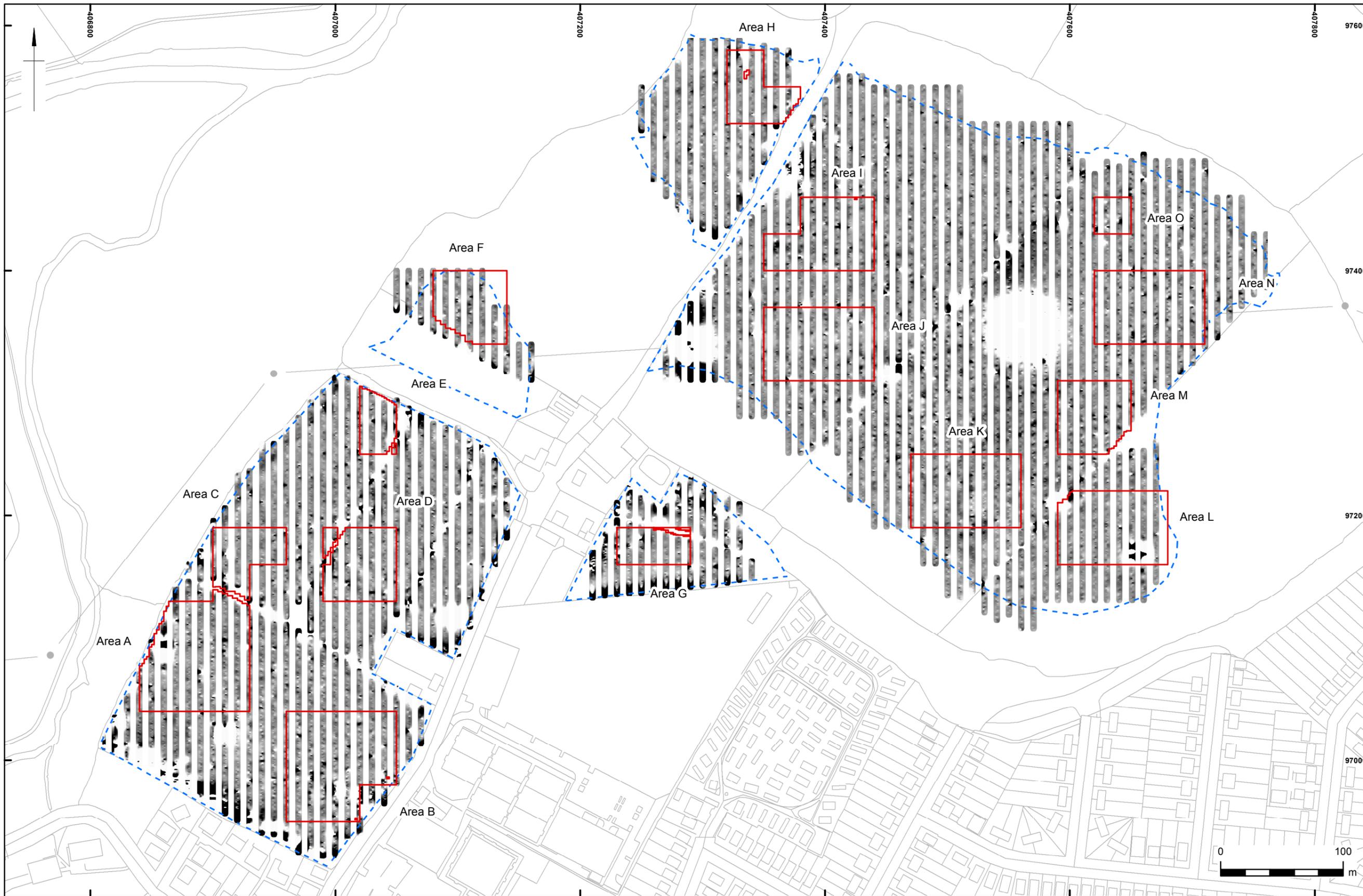


	Survey Extents
	Proposed Development Areas
	Scanning Lines

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Site location and survey extents

Figure 1



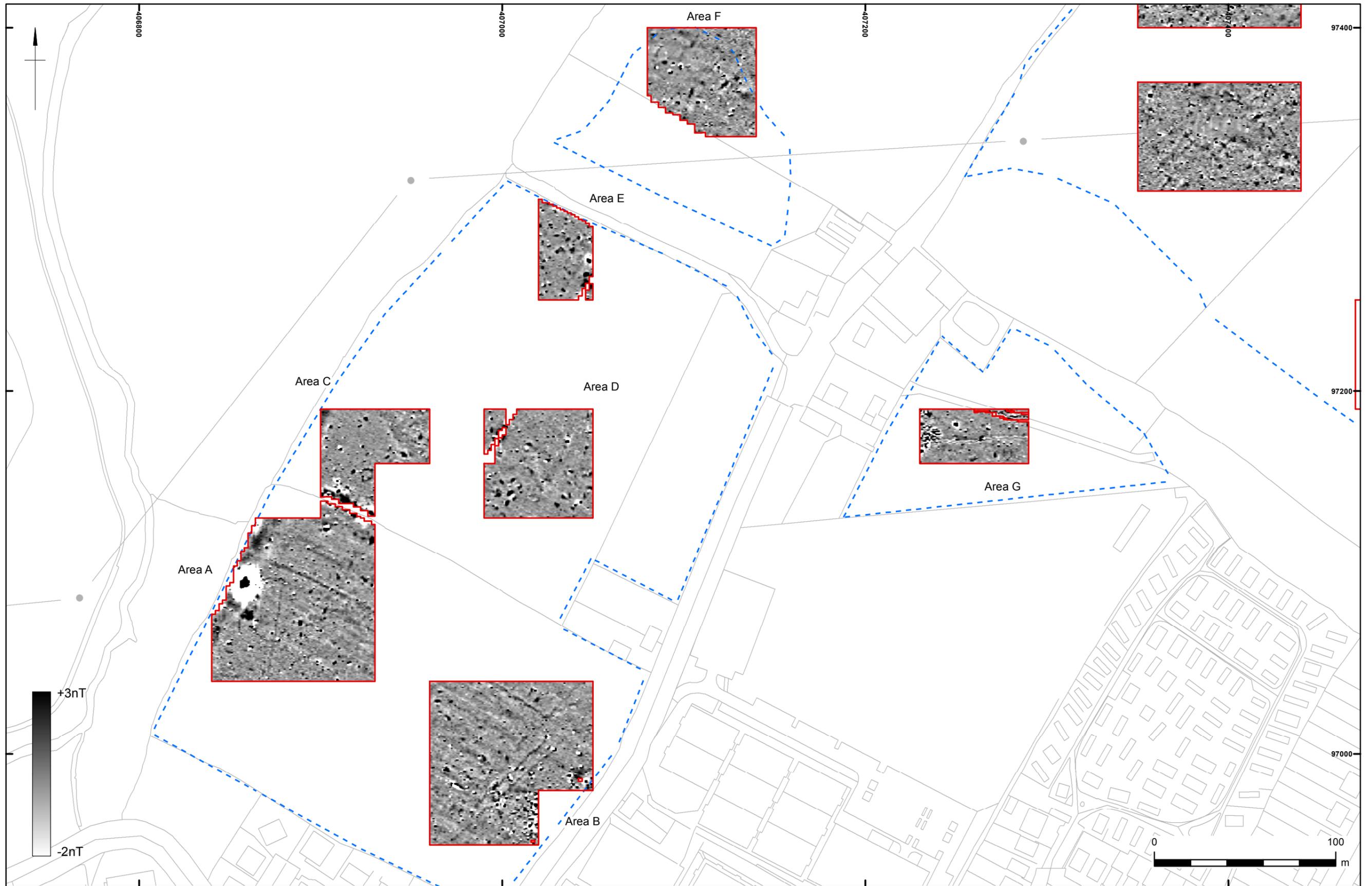
Survey Extents
 Proposed Development Areas

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Recorded Scanning Survey: Greyscale (greyscale image)

Figure 2



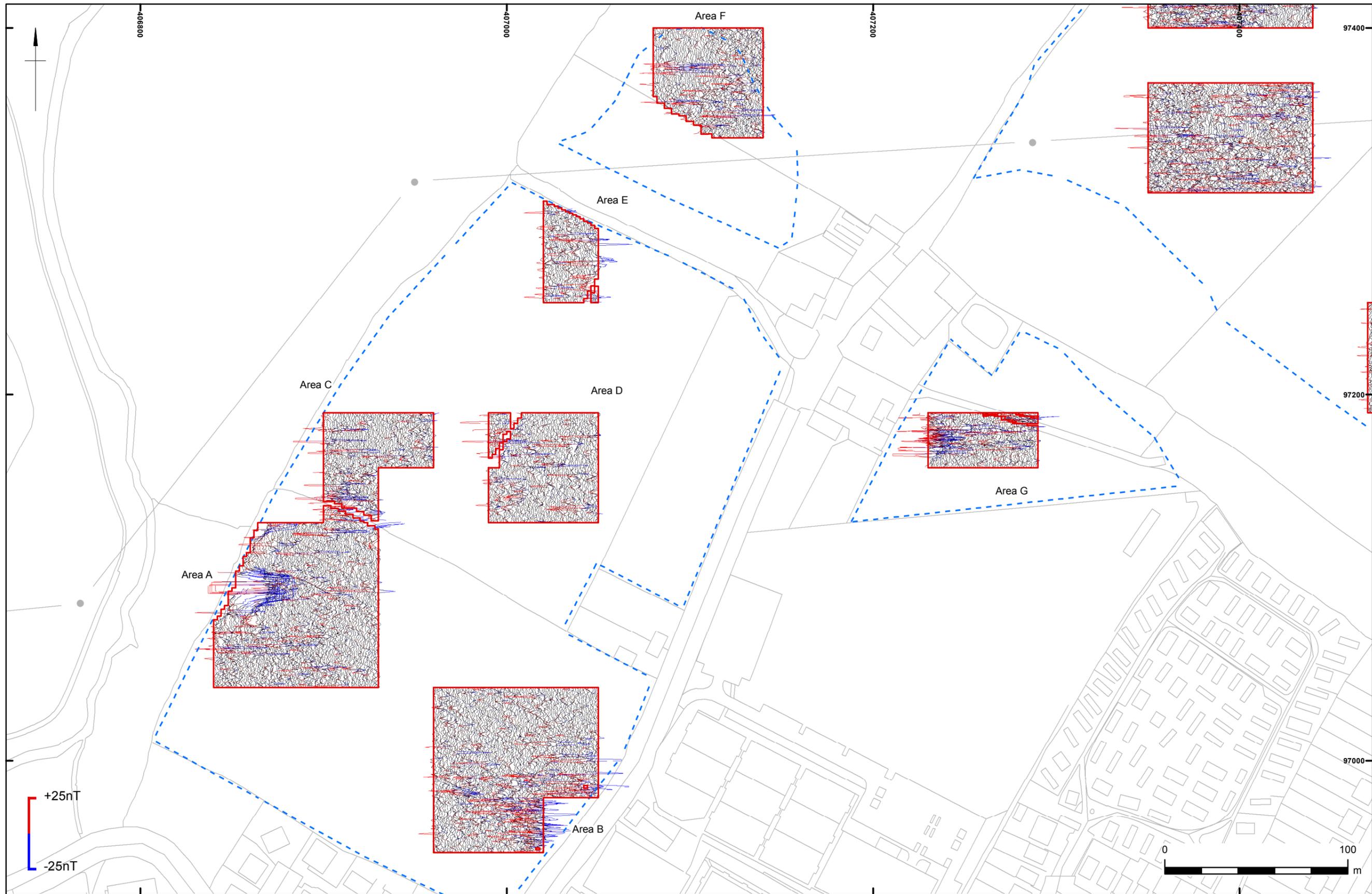
Survey Extents
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Greyscale Areas A-G

Figure 3



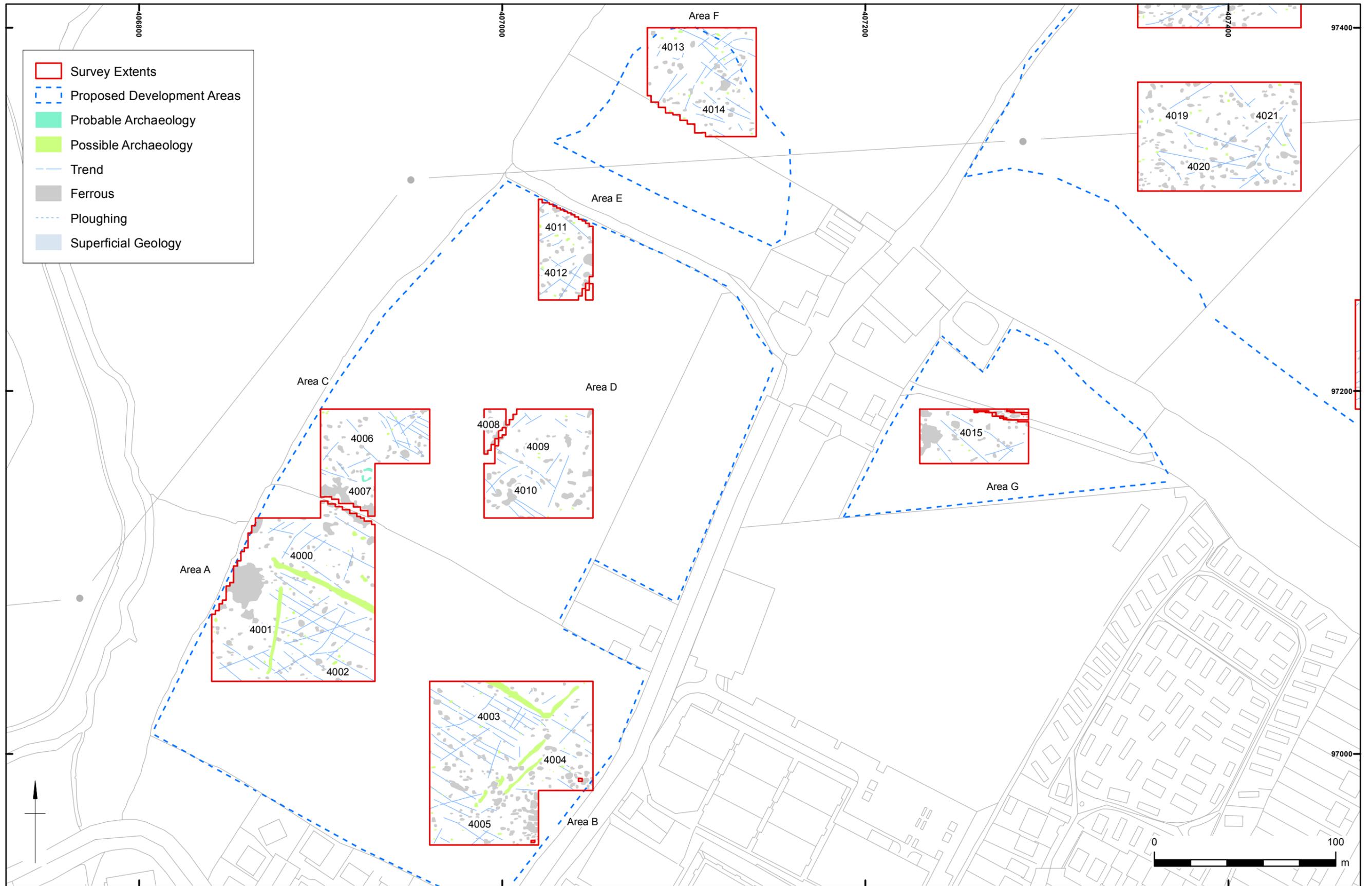
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XY Trace Areas A-G

Figure 4

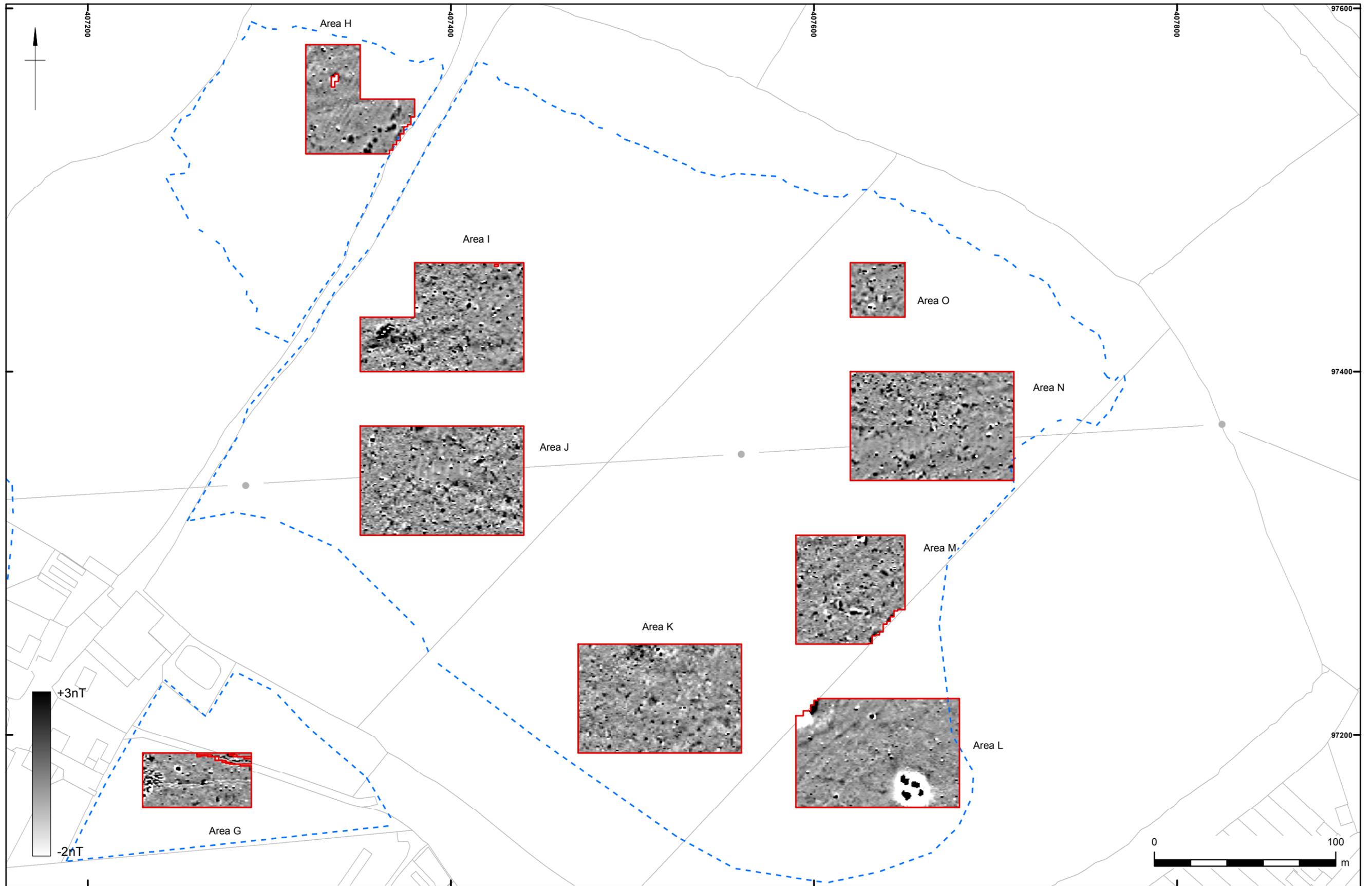


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Date:	02/05/14	Revision Number:	0
Scale:	1:2000 at A3	Illustrator:	RAM
Path:	X:\PROJECTS\103580\GIS\FigsMXD\103580_Fig05.mxd		

Interpretation Areas A-G

Figure 5



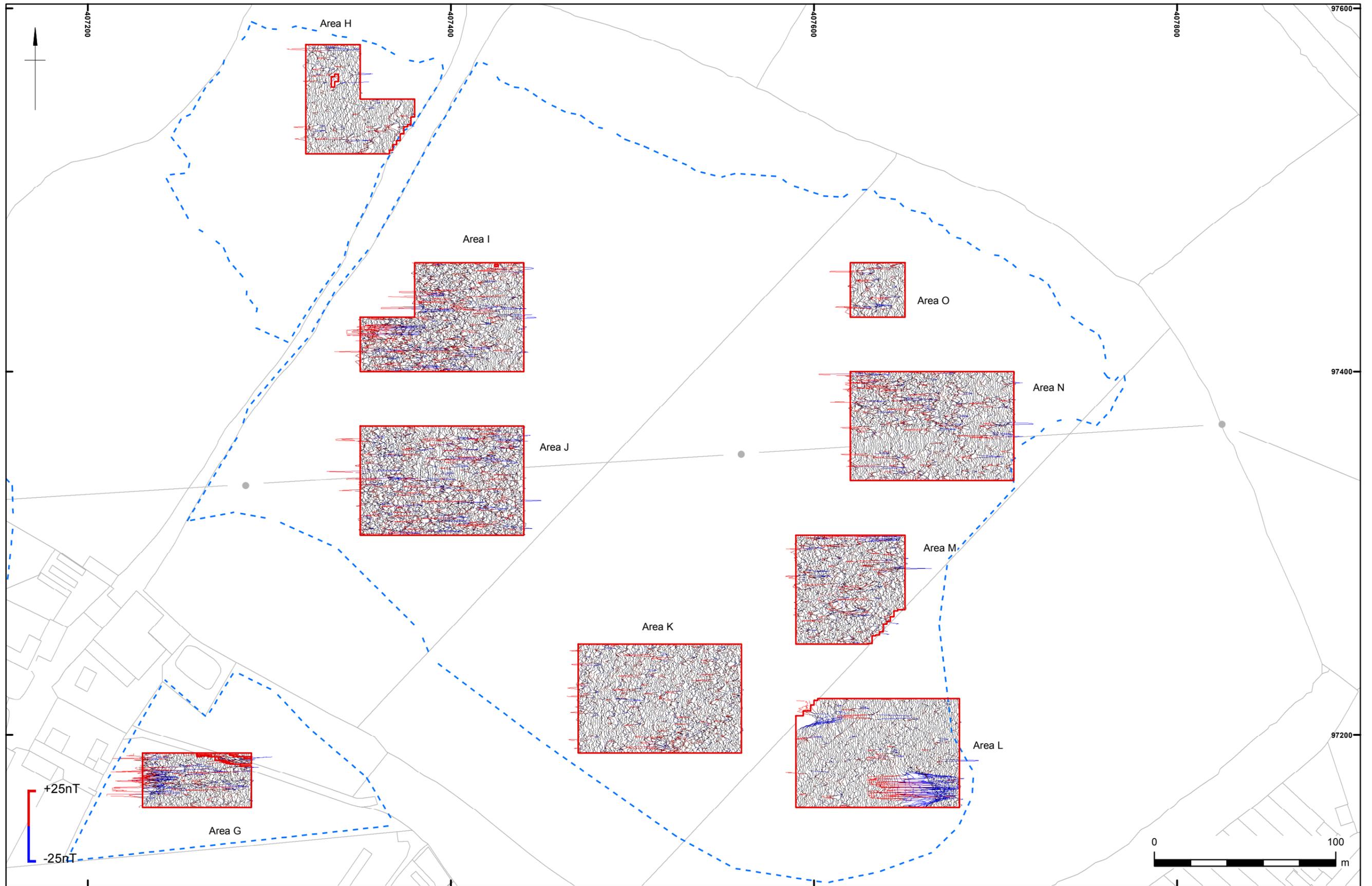
- Survey Extents
- Proposed Development Areas

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Greyscale Areas H-O

Figure 6



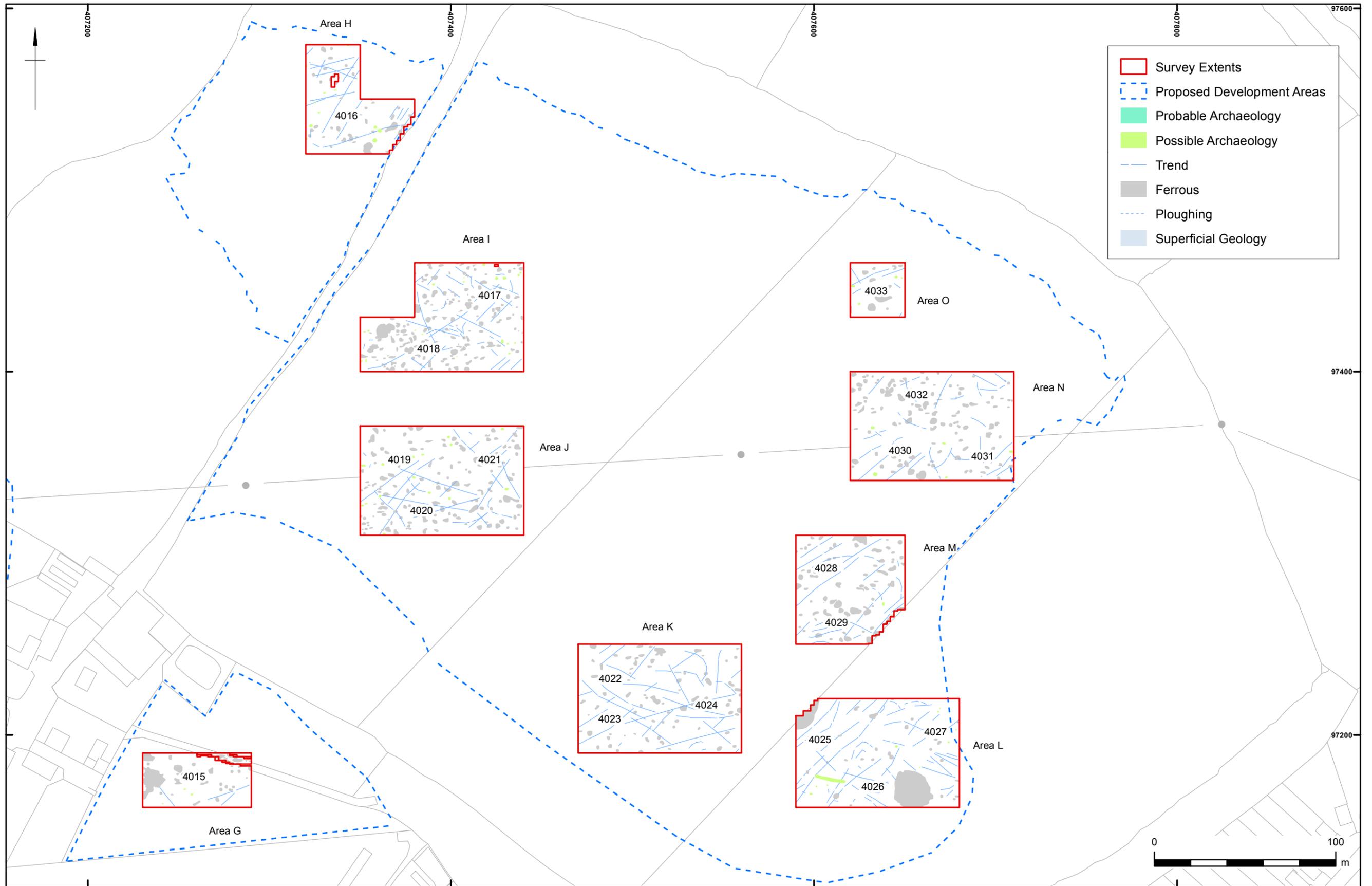

 Survey Extents
 Proposed Development Areas

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XY Trace Areas H-O

Figure 7



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Interpretation Areas H-O

Figure 8



salisbury rochester sheffield edinburgh



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