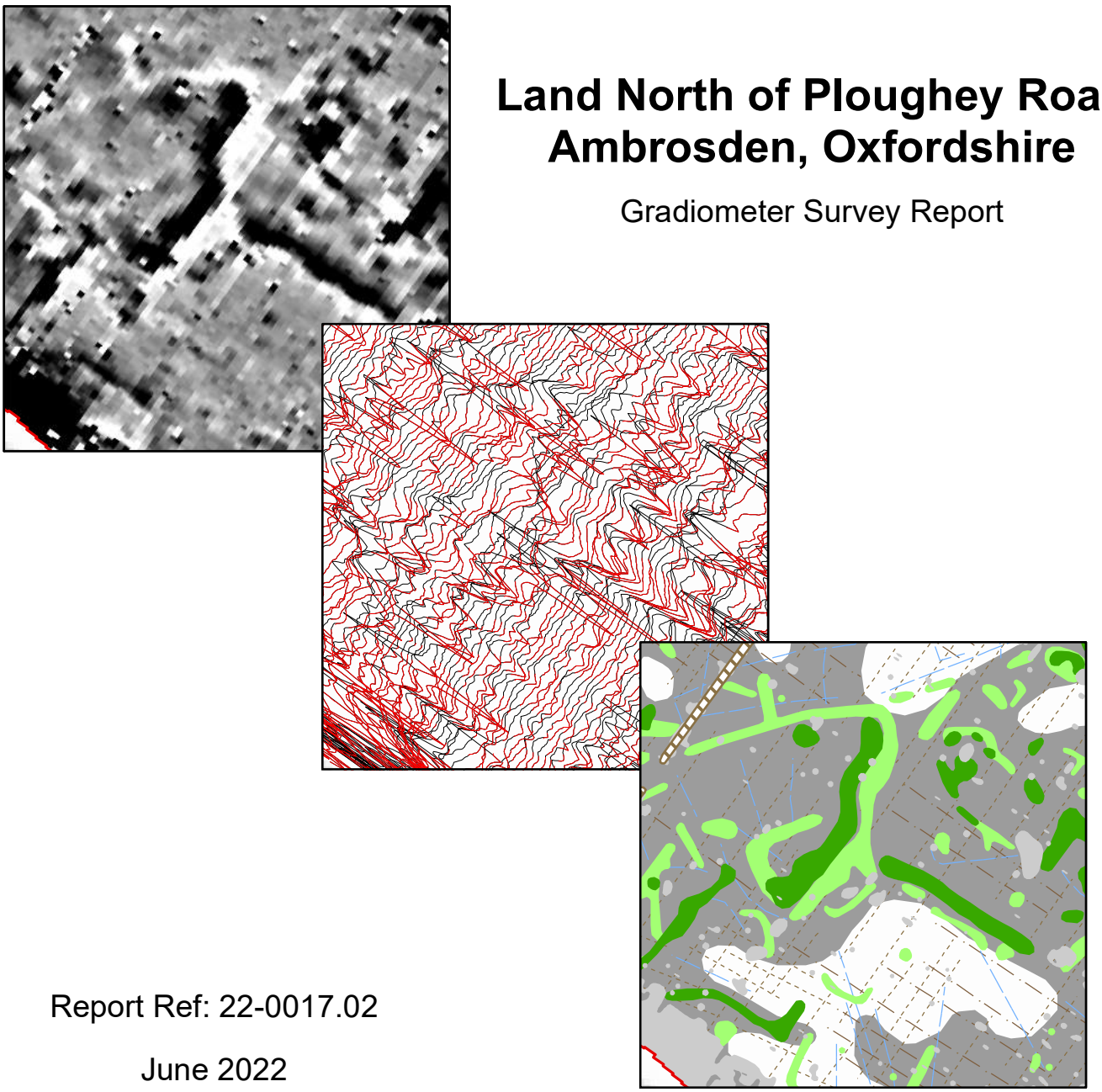
LEFORT GEOPHYSICS



Land North of Ploughey Road Ambrosden, Oxfordshire

Gradiometer Survey Report

Report Ref: 22-0017.02

June 2022

Land North of Ploughey Road, Ambrosden, Oxfordshire

Gradiometer Survey Report

Prepared for:
The Environmental Dimension Partnership (EDP) Ltd
Tithe Barn
Barnsley Park Estate
Barnsley
Cirencester
Gloucestershire
GL7 5EG

Prepared by:
Lefort Geophysics
The Old Vicarage
83 Fore Street
North Petherton
Somerset
TA6 6QA

Author:
Ross Lefort

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Disclaimer

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Summary

A gradiometer survey was conducted over land off Ploughey Road, some 0.5km north of the centre of Ambrosden, Oxfordshire. The project was commissioned by EDP with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features on the site ahead of proposed development.

The site is located on a northwest facing slope on the northern edge of Ambrosden, some 3.5km southeast of the centre of Bicester. The survey area measures approximately 9.8ha and of this a total of 8.8ha has been covered by geophysical survey.

A possible lime kiln and associated limestone quarries have been identified along with a fragmentary field system of unknown date. Other responses detected include ridge and furrow, ceramic field drains, trends of uncertain origin and at least two modern services.

The survey was undertaken by the Lefort Geophysics survey team between the 6th and 11th of June 2022.

Acknowledgements

The gradiometer survey was commissioned by EDP. The assistance of Sarah Doherty is gratefully acknowledged in this regard.

The fieldwork was undertaken by Ross Lefort who processed and interpreted the geophysical data in addition to producing this report.

Land North of Ploughey Road, Ambrosden, Oxfordshire

Gradiometer Survey Report

1. Introduction

1.1. Project Background and Survey Objectives

1.1.1. Lefort Geophysics was commissioned by EDP, on behalf of Archstone, to carry out a geophysical survey over land off Ploughey Road, on the northern edge of Ambrosden, Oxfordshire. The survey area is centred on NGR 460500, 220050 (**Figure 1**).

1.1.2. This survey forms part of a wider scheme of works being undertaken in advance of proposed development at the site. The area selected for geophysical survey measures approximately 9.8ha.

1.1.3. The following aims have been set out for the geophysical survey:

- *To conduct a gradiometer survey that covers as much of the specified area as possible, allowing for surface obstructions.*
- *To determine the presence or absence of archaeological features, as far as the technique and site conditions will allow, and to map the extent of any features that may be present.*
- *To clarify the general nature and possible significance of the detected features.*
- *To produce a report of the survey results in sufficient detail to support an informed decision as to the site's archaeological potential.*

1.1.4. This report sets out details of the site's location, the methodology followed, the survey results and the archaeological interpretation of the geophysical data.

1.2. Site Location and Topography

1.2.1. The site is located approximately 0.5km north of Ambrosden and covers three pasture fields located on the northern edge of Ambrosden. The site is located some 3.5km southeast of Bicester, Oxfordshire (**Figure 1**).

1.2.2. The site spans a gentle northwest facing slope with the land in the southeast at a height over 75m above Ordnance Datum (aOD) falling to under 65m aOD in the northwest. An unnamed stream flows past the site to the northwest, this watercourse flows south to join the River Ray.

1.3. Geology and Soils

1.3.1. The bedrock geology under the site consists of four bands of Jurassic sedimentary rock aligned northeast-southwest. The bedrock furthest southeast is recorded as limestone and mudstone of the Forest Marble Formation with Limestone of the Cornbrash Formation next to this, Mudstone of the Kellaways Clay Member lies beyond this with sandstone and siltstone of the Kellaways Sand Member under the

northwest edge of the site. No superficial deposits have been recorded under the site (BGS 2022).

1.3.2. The soils underlying the southeast half of the site are likely to be brown rendzinas of the 343c (Elmton 3) association. The soils underlying the northwest half are recorded as typical stagnogley soils of the 711f (Wickham 2) association.

1.3.3. It is considered that soils derived from the parent material outlined above can produce contrasts suitable for the detection of archaeological features through geophysical survey.

1.4. Archaeological and Historical Background

1.4.1. The following information is summarized from an Archaeological and Heritage Statement prepared by EDP Ltd (EDP 2022). The information considered most relevant to the proposed geophysical survey has been outlined below.

1.4.2. The assessment has identified no recorded heritage assets within the proposed survey area although records dating from the prehistoric to modern periods are present within the wider study area. A total of 14 listed buildings (Grade II and Grade II*) and a scheduled ancient monument are recorded within this 1km study area (EDP 2022: 15-16).

1.4.3. A number of suspected Bronze Age barrows are located within the study area along with later settlement dating to the Middle Iron Age to Romano-British period at Little Wretchwick Farm (EDP 2022: 17).

1.4.4. Further Romano-British settlement is located to the southeast of the site with pits, ditches, quarries and an associated field system identified during an archaeological evaluation. A further late prehistoric to Romano-British settlement site has been identified through geophysical survey c.1km to the northeast of the site with pits and rectangular enclosures identified along with a possible trackway. A number of isolated features, findspots and fragments of field system, considered to be of this date, are recorded across much of the study area (EDP 2022: 18-19).

1.4.5. Early medieval and medieval remains are concentrated within and around Ambrosden that is thought to have been established by the Saxons. Medieval remains outside of Ambrosden largely consist of agricultural remains including remnants of ridge and furrow. Post-medieval remains include a number of listed buildings, agricultural remains along with industrial activity in the form of brick and tile kilns (EDP 2022: 20-22).

1.4.6. A few Second World War records lie within the study area including two prisoner of war camps and a storage hangar and air raid shelters (EDP 2022: 22-23).

1.4.7. The assessment concluded that there is potential for prehistoric, Romano-British, medieval and post-medieval archaeology although these remains may relate to agricultural activity with these deposits likely poorly preserved due to extensive agricultural activity during the 19th and 20th centuries (EDP 2022: 25).

2. Methodology

2.1. Introduction

2.1.1. Magnetometer survey was selected for the investigation of this site as this was deemed to be the most appropriate technique for the rapid assessment of a site in this geological setting. The survey was carried out using a Bartington Grad601-2 dual fluxgate gradiometer and was conducted in accordance with guidelines set by Historic England (2008) and the Europae Archaeologiae Consilium (EAC 2016).

2.1.2. The survey was undertaken by the Lefort Geophysics survey team between the 6th and 11th of June 2022. Site conditions were variable with firm ground under foot and a slightly varying surface temperature but high vegetation in places. Of the proposed 9.8ha area a total of 8.8ha was covered by geophysical survey. The shortfall in coverage is due to the width of surrounding and internal field boundaries.

2.2. Method

2.2.1. The survey grid nodes were established at 30m x 30m intervals using a Leica Viva RTK GNSS instrument. Positional corrections are provided for this system by SmartNet which gives a precision of approximately 0.03m and therefore exceeds the Historic England and EAC minimum requirements for geophysical survey (English Heritage 2008 and EAC 2016).

2.2.2. The Bartington Grad601-2 gradiometer system has two sensor tubes set at a horizontal separation of 1m; this allows for two lines of data to be collected simultaneously. The upgraded system has an effective sensitivity of 0.03nT. Data were collected at 0.25m intervals along transects spaced 1m apart using the zigzag method. This survey strategy is in accordance with Historic England's minimum requirements and conforms to a Level 1 (prospection) survey, as defined by the EAC (2016).

2.2.3. The survey data were subject to minimal correction processes using Geoplot and in-house software. The processing functions used include:

- Group Zero Median Traverse (GZMT): This was applied to remove minor variations between the two Bartington sensors. This method of processing prevents the removal of archaeological features that run in-line with the traverse direction. Thresholds of ±5nT were applied.
- Zero Median Traverse (ZMedT): This was applied to all grids to remove minute variations between the two Bartington sensors left behind by GZMT. Thresholds of ±1nT were applied.
- Zero Mean Traverse (ZMT): This was applied to grids dominated by ferrous responses where GZMT failed to remove sensor variations. Thresholds of ±5nT were applied.
- Deslope: This was used on selected grids to correct minor grid edge discontinuities introduced by earlier processing steps.
- Destagger: This corrects small errors in traverse position introduced by varying topography and ground cover.

2.2.4. Further details of the survey equipment, fieldwork procedures and methods of processing are described in **Appendix 1**.

3. Results and Interpretation

3.1. Introduction

3.1.1. The gradiometer survey has been successful in identifying a number of anomalies of likely and possible archaeological interest. A number of other features have been detected including numerous agricultural features and at least two modern services. Results are presented as a series of greyscale plots, XY trace plots and archaeological interpretations at a scale of 1:2000 (**Figures 2** to **4**). The greyscale plots are displayed from -2nT (white) to +3nT (black) and the XY trace plots are displayed at ±25nT at 25nT per cm.

3.1.2. A greyscale plot of the raw data is included as an appendix figure which is displayed from -5nT to +5nT (**Figure 5**).

3.1.3. The interpretation of the dataset highlights the presence of potential archaeological features, modern features, geological responses, agricultural features and anomalies of uncertain origin (**Figure 4**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.

3.1.4. Numerous ferrous responses have been observed throughout the gradiometer dataset. These are presumed to be modern and are not referred to, unless they are considered relevant to an archaeological interpretation.

3.2. Gradiometer Survey Results and Interpretation

3.2.1. An elliptical area is defined by positive responses at **1001** to **1003**; the first of these responses at **1001** looks to define a clear ditch but the other two are variable in width and are quite diffuse in places. These diffuse responses may not define a ditch but rather mark a sharp transition between the fill of a broad response and the natural geological background. This broad response is thought to be a quarry that is defined by the overall elliptical outline. The strongest responses are classed as archaeology with weak or diffuse responses classed as possible archaeology.

3.2.2. Some possible internal features are visible around **1004** with adjacent, likely related, responses at **1005**. These are classed as archaeology and possible archaeology.

3.2.3. A similar response to the likely quarry is defined to the SSW by responses at **1006** to **1007**. These could define another quarry but could instead define an enclosed area associated with working of the quarried material. Some of the features that define this area differ in that some are defined by negative responses, it is unclear whether this indicates these may be banks or walls or are simply ditches that have more sterile fills due to regular cleaning during their use. Some internal dividing ditches are visible around **1008**. These responses are classed as either archaeology or possible archaeology.

3.2.4. A third possible quarry pit is defined clearly at **1009** as a sub-oval response with varying internal magnetic values. A concentration of responses around **1010** could also relate to a small extraction area. The strongest responses are classed as archaeology with weakly defined areas classed as possible archaeology.

3.2.5. A number of clear rectilinear enclosures and ditches are visible around **1011** to **1014**. These may define areas where the quarried material may have been worked and processed. The strongest responses are classed as archaeology with weaker or diffuse responses classed as possible archaeology.

3.2.6. A straight ditch at **1015** appears to run in line with the linear response at **1007** to create a near continuous boundary crossing the area. This could define a former property line or may partially define a route running through the quarried areas, linking them to nearby contemporary roads. This weaker response is classed as possible archaeology.

3.2.7. A number of ditches of varying strength cross the eastern and southern portions of the dataset at **1016** to **1022** and appear to define a fragmentary field system. These may pre-date the ridge and furrow as in places the cultivation marks appear to cut and break up these ditches into intermittent responses. A pair of near parallel ditches at **1023** may also relate to this field system. These ditches are classed as archaeology and possible archaeology according to their magnetic strength.

3.2.8. The lower lying northern and western portions of the dataset contain far fewer potential archaeological responses. The only noteworthy exceptions are isolated pit-like responses, such as at **1024**, although some of these may prove to be natural features such as tree throws or are deeply buried ceramic or ferrous objects.

3.2.9. A number of possible field boundaries are visible crossing the dataset at **1025** to **1027**. None are mapped on any of the historic mapping consulted in the Archaeological and Heritage Statement carried out by EDP although **1026** does clearly resemble a former boundary based on the remaining shrubs that still mark its route. These responses are classed as agricultural.

3.2.10. A number of ceramic field drains cross the northwest field at **1028** with ridge and furrow visible across almost the entire survey area.

3.2.11. The remaining responses are trends of uncertain origin. Some, such as at **1029**, may prove to be archaeological whereas others, such as at, **1030** and **1031**, may prove to be geological or agricultural in origin.

3.3. Gradiometer Survey Results and Interpretation: Modern Services

3.3.1. At least two modern services are visible at **1032** with a possible third closely associated with the eastern of the two visible services.

3.3.2. It is not clear if any of the detected services are in active use. It should also be noted that gradiometer data will not be able to detect all services on site. Services made from non-ferrous material are unlikely to generate the distinctive response that would allow for a classification as a service. Plastic pipes are particularly hard to detect for example.

3.3.3. This report and accompanying illustrations should not be used as the sole source for service locations. Service maps should be consulted in addition to employing appropriate equipment (e.g. CAT and Genny) to confirm service locations before any invasive activities are carried out on site.

4. Conclusions

4.1.1. The gradiometer survey has been successful in identifying anomalies of likely and possible archaeological interest. A number of other features have been detected including numerous agricultural features and at least two modern services. The survey and this report are considered to have addressed all of the aims set out for the project.

4.1.2. The quarrying activity may likely relate to extraction of limestone based on the BGS record of the underlying geology and the adjacent enclosed areas may be indicative of this material being processed into lime by kiln. None of the consulted historic maps show any sign of such an installation but it is possible this was abandoned before the tithe maps of the area were drawn. The northern quarry pit is prominently visible at the surface as a broad depression whereas the other possible extraction areas are not as clearly visible as earthworks.

4.1.3. There appears to be a fragmentary field system crossing the southern and eastern edges of the site. Its date and relation to the possible lime kiln and quarry is unclear but there is some indication these ditches may pre-date the ridge and furrow that crosses the site based on areas where the ditches appear to be cut and broken up by some of the furrows.

4.1.4. The majority of detected features attest to this are serving an agricultural and rural industrial function in recent centuries. The fragmentary field system features suggest there may be earlier remains that predate the ridge and furrow that spans the site.

4.1.5. Gradiometer survey has a proven track record of identifying a wide range of archaeological features in a diverse range of geological settings. It is however a possibility that other archaeological features may exist that are not detectable through gradiometer survey. Stone walls composed of a sedimentary rock, for example, may not be visible on a site with similar underlying geology as there is no measurable magnetic contrast between the wall and the surrounding soil. Inhumation burials are also difficult to identify at times as the backfill of the grave is largely unchanged, in terms of its magnetic properties, during the burial process.

4.1.6. The dimensions of the modern services in the gradiometer data are indicative of the strength of their magnetic response; this varies according to the materials used in their construction. The physical extents of the services may therefore differ in the ground from that depicted in the geophysical data. It is not possible to accurately determine the depth of burial of these services through gradiometer survey.

5. References

5.1. Bibliography

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EDP. 2022. *Ploughey Road, Ambrosden: Archaeological and Heritage Assessment.* Unpublished EDP client report. Report reference: edp4579_r002a.

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5.2. Cartographic Sources

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APPENDIX 1: THEORY, SURVEY STRATEGY AND DATA PROCESSING

Basic Theory

Introduction

The two geophysical survey techniques carried out by Lefort Geophysics are magnetometer and earth resistance survey. Magnetometer survey is routinely used for archaeology due to the rapid area coverage achievable, in addition to its successful track record in many different geological settings. Earth resistance survey is slower by contrast, but can reveal archaeological features that may be missed by a magnetometer survey.

Magnetometer Survey

This technique involves measuring minor variations in the Earth's magnetic field; these variations are caused by a number of human induced and natural phenomenon. Humans can enhance the magnetic properties of soils in a number of ways; such as through the creation of ceramic/metallic objects, deposition of settlement waste and through burning. The resulting enhanced soils that fill pits and ditches make these features detectable.

Some natural phenomenon, like underlying geology and the sun, create large scale magnetic variations that can mask weaker archaeological features. A common way of filtering out these large scale effects is to collect data using two magnetometer sensors, one mounted at a fixed distance above the other. The lower sensor is closer to the ground and is therefore more sensitive to shallow, small scale changes; both sensors measure the large scale variations to a similar degree. When data from one sensor is subtracted from the other, the effect is to remove the large scale variations to reveal a clear picture of potential archaeological features. This configuration is known as a gradiometer and the system used by Lefort Geophysics works in this way.

There are several different types of magnetometer sensor available but the two most commonly used for archaeology are fluxgate and caesium vapour. The basic difference between the two is that caesium vapour measures the total strength of the magnetic field whereas fluxgate only measures a component of the field in a particular direction.

The advantages of the fluxgate sensors are their robust and lightweight design coupled with a lower power consumption; these factors make for an excellent piece of field equipment. Caesium vapour magnetometers are considered to be more sensitive with a lower noise level. In most cases this difference in sensitivity and noise is not enough to warrant use of caesium vapour over fluxgate sensors. Use of caesium vapour sensors is considered most advantageous when searching for deeply buried archaeological features.

Earth Resistance Survey

Earth resistance survey works, in simple terms, by passing a weak electrical current through the soil and measuring variations in electrical resistance. Resistance varies according to differences in soil moisture content and by the presence of materials of varying resistivity. A wall, for instance, is likely to be dry and composed of poor conducting materials; this results in a high measured resistance value. A ditch filled with wetter, better conducting material will register a lower resistance value by contrast.

Four electrodes are used to measure resistance, two pass a fixed electric current through the ground (current probes) and the other two sample the voltage required to drive this current (voltage probes). The variations in voltage required to drive the current are indicative of the varying electrical resistance. The four electrodes can be arranged in a

variety of different configurations, the twin-probe array is the widest used of these. The twin-probe involves grouping the four electrodes into two pairs, with a current and voltage probe in each pair. The pairs are separated by a large distance with one set in a fixed position and the other moved across the survey area to sample the varying resistance.

In general terms, the wider the electrode spacing, the deeper the technique can penetrate. The catch is that a wider electrode spacing increases the volume of soil sampled. This can result in smaller features, such as internal walls, being less detectable when investigating to greater depths. The standard probe separation used for commercial archaeology is 0.5m and this is considered suitable for the investigation of most rural sites in Britain.

The main weakness of earth resistance survey is that the quality of results are dependent on climatic conditions on the day and in the weeks running up to the survey. If the site is waterlogged then there is little contrast, the same is true if the site is too dry. This constraint puts the technique at a disadvantage in the commercial sector where waiting for the right conditions is not always possible.

Detailed Survey Methodology

Magnetometer data is collected using a Bartington Grad601-2 dual fluxgate gradiometer system. This has two sensor tubes mounted at a horizontal separation of 1m which allows for the simultaneous collection of two transects of data. Each sensor tube contains two fluxgate sensors arranged as a vertical gradiometer at a separation of 1m. This system can suppress large scale variations that might obscure potential archaeological features.

The Bartington Grad601-2 has an effective sensitivity of 0.03nT when set at a range of ±100nT in grid mode. The standard resolution for a geophysical survey is to collect readings at 0.25m intervals along transects spaced 1m apart. Data is collected in grids measuring 30m x 30m and at the resolution outlined above results in 3600 readings per grid. Higher sample density surveys can be carried out at a 0.125m separation along transects spaced 0.25m apart. This results in 28800 readings per 30m grid.

Magnetometer data can also be collected using a cart system. On this system multiple Bartington Grad601-2 can be mounted with positions logged by a Trimble base and rover GPS system. The advantage of using this system is that each reading has greater positional accuracy compared to grid based data collection. The Trimble 5800 system is capable of a horizontal accuracy of ±1cm and a vertical accuracy of ±2cm.

The earth resistance data is collected using a Geoscan Research RM15 system using the twin-probe array. The mobile electrodes are mounted on a fixed bar with a multiplexer (MPX15) used to allow two transects of data to be collected simultaneously. A probe separation of 0.5m is typically used with data collected at 1m intervals along transects spaced 1m apart, in line with English Heritage minimum requirements.

The 30m x 30m survey grid nodes and base points for the Trimble 5800 system are accurately established in the field using a Leica Viva series RTK GNSS instrument. This system achieves a high level of precision thanks to a network of reference stations operated by the Ordnance Survey and Leica Geosystems, known as SmartNet. These reference stations provide positional corrections that are fed to the system via a mobile internet connection. This enables the system to achieve an accuracy of 0.03m which exceeds the English Heritage minimum requirements (2008).

Data Processing Methodology

The collected gridded gradiometer data are downloaded from the Bartington system using the software provided. Data are saved in a Z format with a separate header file generated for survey parameters. Data are then imported into the processing software Geoplot to correct minor errors. These corrections aim to enhance the results for greater clarity. The processing applied is minimal with no filtering or interpolation used.

The processing steps for gridded data include Group Zero Median Traverse (GZMT) followed by a narrow threshold Zero Median Traverse (ZMedT). This method of processing allows variations between the Bartington sensors to be removed while minimising the potential loss of features that run in line with traverse direction. Other processing steps include deslope, and destagger with Zero Mean Traverse (ZMT) applied to selected ferrous dominated grids.

GZMT works by grouping the 30 traverses of data into four groups according to the sensor used and its orientation during data collection. The median values of each line of data are calculated and from these results an overall median value for each of the four groups is calculated. These four values are used to correct each of the 30 traverses. This is then followed up with ZMedT; this removes minor variations that are a result of instrument drift and preserves archaeological features thanks to a very narrow threshold.

The ungridded magnetometer cart data are downloaded from the acquisition software Nav601 and positions for each reading are calculated in Trackmaker601. This results in an XYZ file of the magnetometer data that can be processed. Gridded data is processed in MagPick to remove variations between Bartington sensors. The most common processing applied is a linear filter to remove variations between sensors.

The earth resistance data are downloaded in Geoplot in the .grd file format. Minor data corrections are then applied in Geoplot. The main difference from the processing of gradiometer data is that filtering is applied to earth resistance data.

The typical processing steps applied to earth resistance data are as follows:

- Despike: Removes anomalous data points that can arise during data collection.
- Edge Match: Corrects for differences between grids that arise when survey is carried out on different days or through the movement of the fixed probes.
- Multiply: This multiplies data in a selected area by a specified positive or negative value and alongside edge match is useful for the correction of grid differences.
- Low Pass Filter: This is used to remove small scale spatial detail and is useful for enhancing broad, weak anomalies.
- High Pass Filter: This removes large scale spatial detail and is useful for filtering out broad geological responses that could obscure archaeological features.

Two methods of data display are used to show gradiometer data: greyscales and XY trace plots. For the display of earth resistance data greyscale plots are used only.

- Greyscale: Presents the data in plan view with a shade of white, grey or black assigned to each reading according to its magnetic or resistance value. At the standard survey resolution each rectangular pixel corresponds to a reading.
- XY Trace: Presents each line of the magnetic data as a graph line with multiple lines overlapping to produce a stack of profiles. The graph running upwards signifies a positive anomaly (red) and running down (black) indicates a negative. This is of help in further characterising a magnetic anomaly as either archaeological or ferrous.

APPENDIX 2: INTERPRETATION CATEGORIES

The interpretation methodology used by Lefort Geophysics divides anomalies into five main categories: archaeological, agricultural, modern, geological and uncertain origin.

The archaeological category is used where a detected anomaly presents a shape or configuration that looks to be indicative of a buried archaeological feature. Further sources of information including aerial photography and historic maps may be incorporated into the final interpretation. This category is sub-divided into two groups based on levels of confidence in the interpretation.

- Archaeology – this is used to classify anomalies with a clear anthropogenic pattern that do not appear to relate to modern or agricultural features.
- Possible Archaeology – this is used for anomalies that give a fairly regular pattern but cannot be discounted as relating to modern, agricultural or geological features.

The modern category is used for anomalies that are presumed to be relatively recent in date. Modern is sub-divided into two categories as follows:

- Ferrous – used for anomalies characterised by a dipolar or bipolar response. Such anomalies can be caused by the presence of iron and ceramic material and are assumed to be modern in origin.
- Modern Service – used for responses considered to correspond to buried pipes and cables. Most detectable services are made from ferrous or ceramic materials.

The agricultural category is sub-divided into five categories as follows:

- Former Field Boundary – used for anomalies that are shown to correspond to the positions of field boundaries marked on historic maps.
- Agricultural – used for anomalies that follow known agricultural features or run parallel to them but do not appear on historic mapping.
- Ridge and Furrow – these are defined by broad and diffuse linear positive and negative anomalies. Ridge and furrow are broad strips of raised ground with parallel ditches that were cultivated during the medieval and post-medieval periods.
- Ploughing – used to define narrow linear trends running through the data created by ploughing scars in the soil.
- Drainage – used to define ceramic field drains or ditches running through a field that are used to keep the soil well drained. Ceramic drains are identified by their distinctive anomaly form whereas ditched drains are identified more by their layout.

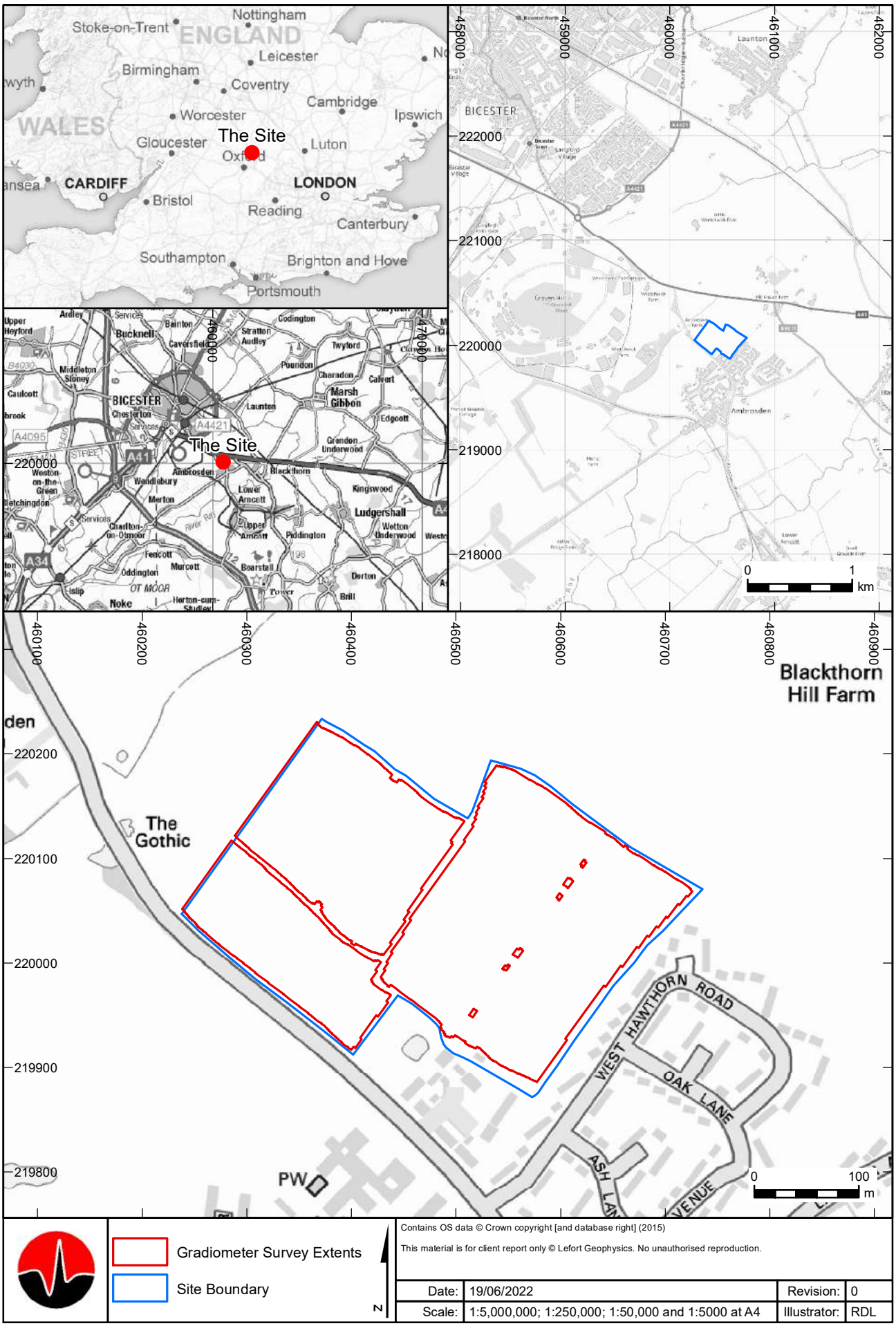
The geological category defines areas of broad and diffuse responses that are not considered to be archaeological. There are two sub-divisions of this category:

- Superficial Geology – used to define broad spreads of responses considered to relate to shallow geological deposits.
- Palaeochannel – used to define linear and curvilinear anomalies that are considered to represent former watercourses.

The uncertain origin category is used for anomalies that cannot be classified confidently in any of the four categories outlined above. There are two sub-divisions of this category:

- Increased Magnetic Response – used to define areas of varying magnetic responses.
- Trend – weak narrow linear responses that do not seem to relate to ploughing.

Other categories may be added in some instances to account for unusual features or where a project specification requires more detailed interpretation. Any additions will be outlined in the introduction of the results section of the survey report.



Site location and gradiometer survey extents

Figure 1

Processing History
Group Zero Median Traverse: ±5nT thresholds applied to all grids
Zero Median Traverse: ±1nT thresholds applied to all grids
Zero Mean Traverse: ±5nT thresholds applied to selected ferrous dominated grids
Deslope: applied to selected grids to remove grid edge discontinuities
Destagger: +2 shift applied to all grids with further shifts of +/-1 applied to selected grids and traverses

Gradiometer Survey Extents

+3nT

-2nT

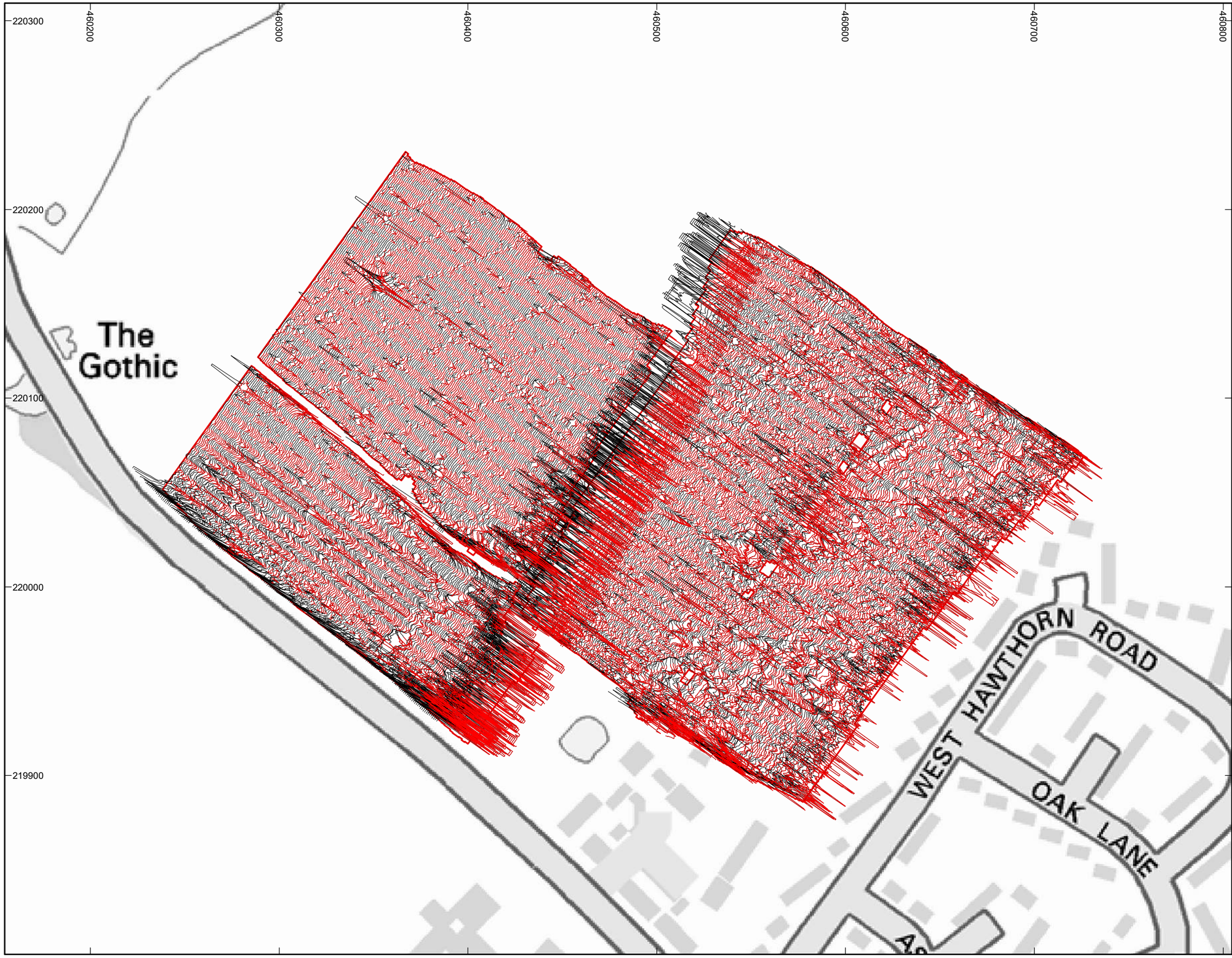
N

0 100 m

Date:	19/06/2022		
Scale:	1:2000 at A3		
Illustrator:	RDL	Revision:	0

Greyscale plot

Figure 2



Processing History

Group Zero Median Traverse: ±5nT thresholds applied to all grids
Zero Median Traverse: ±1nT thresholds applied to all grids
Zero Mean Traverse: ±5nT thresholds applied to selected ferrous dominated grids
Deslope: applied to selected grids to remove grid edge discontinuities
Destagger: +2 shift applied to all grids with further shifts of +/-1 applied to selected grids and traverses

Gradiometer Survey Extents

-25nT +25nT

N

0 100 m

Date:	19/06/2022		
Scale:	1:2000 at A3		
Illustrator:	RDL	Revision:	0

XY trace plot

Figure 3

Processing History
Group Zero Median Traverse: ±5nT thresholds applied to all grids
Zero Median Traverse: ±1nT thresholds applied to all grids
Zero Mean Traverse: ±5nT thresholds applied to selected ferrous dominated grids
Deslope: applied to selected grids to remove grid edge discontinuities
Destagger: +2 shift applied to all grids with further shifts of +/-1 applied to selected grids and traverses

- Archaeology
- Possible Archaeology
- Agricultural
- Drainage
- Ridge & Furrow
- Ploughing
- Modern Service
- Ferrous
- Increased Magnetic Response
- Trend
- Gradiometer Survey Extents

N

0 100 m

Date:	19/06/2022		
Scale:	1:2000 at A3		
Illustrator:	RDL	Revision:	0

Interpretation

Figure 4

460200
460300
460400
460500
460600
460700
460800
220300
220200
220100
220000
219900
The Gothic
WEST HAWTHORN ROAD
OAK LANE
Processing History
No processing applied to the raw data presented.
Gradiometer Survey Extents
+5nT
-5nT
N
0
100
m

Date:	19/06/2022		
Scale:	1:2000 at A3		
Illustrator:	RDL	Revision:	0

Greyscale plot (unprocessed raw data)

Figure 5