



Land at Draycott, Cam, Gloucestershire

Detailed Gradiometer Survey Report

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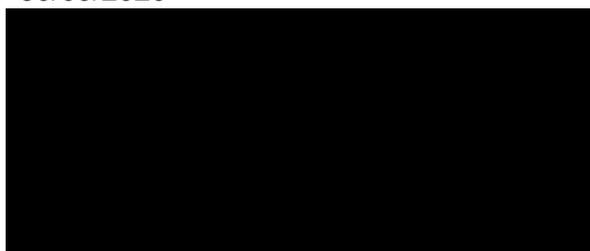
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Summary

A detailed gradiometer survey was conducted over land at Draycott, Cam, Gloucestershire (centred on NGR 374624 201495). The project was commissioned by Persimmon Homes Severn Valley and Robert Hitchins Ltd with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features in support of a planning application for the development of the site for the construction of a school, residential development, and associated landscaping.

The site comprises several arable fields located immediately north-west of the village of Draycott, 3 km north of Cam, and covers an area of 39.5 ha. The geophysical survey was undertaken on 11 – 15 May, 20 – 21 August, and 28 – 30 September 2020. The detailed gradiometer survey has demonstrated the presence of anomalies of archaeological interest.

Two of these relate to linear arrangements of enclosures projecting perpendicular from a boundary or track feature. The third is a single rectilinear enclosure. It is likely that these represent an interconnected area of settlement. This is thought to be Iron Age or Romano-British in date, similar settlements identified in the surrounding area. Large enclosure and boundary features surround the three areas of settlement, suggesting agricultural activity.

Many of the features identified appear to be truncated by ridge and furrow activity. It is possible that further archaeological activity is present on the site but has been heavily plough damaged. Areas of increased magnetic response could be evidence of such features.

To the west of the settlement activity, an area of disturbance has been identified, which appears to respect the boundary of settlement. The origin of this is unclear, but it may be associated with removal of woodland. The strong responses in this area have the potential to mask weaker archaeological anomalies.

There is no evidence for the archaeological features extending in to the north-east of the site. It is likely that this represents a genuine lack of archaeological activity across the north-eastern section of the site.

The remaining anomalies are thought to be modern in origin. These include areas of disturbance associated with the construction of the Midlands Railway Bristol and Birmingham line to the north of the site, footpaths, services, and field drains.

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The fieldwork was undertaken by Brett Howard. Alexander Schmidt processed and interpreted the geophysical data. Alexander Schmidt and Scott Chaussée wrote the report. The geophysical work was quality controlled by Patricia Voke and Tom Richardson. Illustrations were prepared by Alexander Schmidt. The project was managed on behalf of Wessex Archaeology by Tom Richardson.



Land at Draycott, Cam, Gloucestershire

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Persimmon Homes Severn Valley and Robert Hitchins Ltd to carry out a detailed gradiometer survey at land north-west of Draycott, Cam, Gloucestershire (centred on NGR 374624 201495) (**Figure 1**). The survey forms part of an ongoing programme of archaeological works being undertaken in support of two planning applications for the development of the site.

1.2 Scope of document

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

1.3 The site

1.3.1 The site is located immediately north-west of the village of Draycott, 3 km north of Cam, and 11 km south-west of Stroud, in the county of Gloucestershire.

1.3.2 The survey comprises 39.5 ha of agricultural land, divided into eight land parcels, currently under arable cultivation and rough pasture. The site is bounded by the M5 to the north-west, the A4135 and agricultural land to the east, residential property along Draycott Crescent to the south-east, and recreational and further agricultural land to the south-west.

1.3.3 The site is on a slight decline sloping from 29 m above Ordnance Datum (aOD) at the northern-western edge to 37 m aOD at the southern edge.

1.3.4 Two sets of overhead cables traverse the site. The first from the north-west to south-east in the north-eastern corner, and from north-north-west to south-south-east across the west of the site.

1.3.5 The solid geology comprises mudstone of the Blue Lias and Charmouth Formation with overlying superficial geological deposits of Cheltenham sand and gravel over the north-eastern portion and western boundary of the site with alluvium associated with the River Cam immediately to the east (BGS 2020).

1.3.6 The soils underlying the site are likely to consist of typical brown calcareous earths of the Badsey 1 (511h) association in the north-east, stagnogleyic argillic brown earths of the Oxpasture (572h) association across the central portions, and typical stagnogley soils of the Martock (711d) association in the south (SSEW SE Sheet 5 1983). Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.



2 ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 An archaeological desk-based assessment (DBA) was prepared by Wessex Archaeology (2020) for the land at Draycott which examined the potential for the survival of buried archaeological remains within the development area and a 1 km study area. The following background is not exhaustive but is summarised from aspects of the DBA that are considered relevant to the interpretation of the geophysical survey data.

2.2 Summary of the archaeological resource

2.2.1 Two Neolithic pits were uncovered within the site boundary during an unpublished archaeological evaluation in 1961. Findspots near the site include a limestone mace 150 m south of the site and a 'Group VII' stone axe from White House Farm 450 m to the north of the site.

2.2.2 A late Iron Age settlement was identified 300 m to the east of the site during a recent evaluation. Establishment of settlements may have been influenced by proximity to the River Cam, thereby suggesting the potential for further remains in its vicinity (Moore 2006).

2.2.3 Rural settlement frequently continued in a similar fashion between the Iron Age and Romano-British periods. The A38 road 500 m north of the site follows the approximate route between Gloucester (*Nervia Glevensium*) and Bristol (*Portus Abonae*). The site of a possible Roman camp, extant largely as cropmarks, is situated 200 m north of the site. The area surrounding the possible camp was the focus of a fieldwalking survey which recovered 4.5 kg of pottery, the majority of which was Romano-British in origin. A well-preserved Roman villa was discovered 700 m east of the site, prior to construction of a housing development adjacent to Box Road, Cam. The villa has the remains of a hypocaust system and wall plaster from a bathhouse.

2.2.4 A detailed gradiometer survey was undertaken 200 m east of the present site on land at Box Road, Cam (Wessex Archaeology 2020). The double-density survey was undertaken due to that site's proximity to the Roman villa. The survey identified possible bank and pit features. Opposite Box Road, 200 m east of the present site, extensive archaeological investigations have been carried out in recent years. A geophysical survey was conducted over 22.5 ha in this area (Stratascan 2015). The results of the survey detected a number of linear and curvilinear anomalies pertaining to settlement activity. Ridge-and-furrow cultivation and former field boundaries were also identified. Following the geophysical survey evaluative trenching of the anomalies revealed multi-period occupational evidence. Pottery from the site ranged from prehistoric to Iron Age/Early Roman (Cotswold Archaeology 2016).

2.2.5 The place-name 'Draycott' originates from Old English. Its first element, *dræg-*, always appears with another element and indicates a place where something can be dragged, such as timber or boats; the element *-cott* indicates a habitation and may refer to a house or shelter at the head of such a path (Ekwall 1974: 150-151). Cam is recorded as *Camma* in the Domesday survey and appears in a list of other places held by King William (Powell-Smith 2011).

2.2.6 The Benedictine Priory of Stanley St. Leonard was granted the church in Cam in 1156 by Roger of Berkeley and held by the Abbey of Reading although repossessed in the 14th century by Gloucester Abbey (Blunt 1823). The referenced church is that of St. George (Grade I Listed, NHLE 1340962), located 2 km south-east of the site. Draycott Farm, 450 m



to the south of the site, is mentioned in 13th century documentary sources, indicating occupation of the farm by that time (Smith 1964). The Severn Vale National Mapping Project (NMP) located remains of a possible deserted medieval village (DMV) 500 m north-west of the site. Characteristically medieval earthworks are also visible on historical aerial photographs 400 m south-west of the site and included in the NMP survey.

- 2.2.7 Most of the evidence for medieval activity within the wider landscape surrounding the site comprises the remains of ridge-and-furrow ploughing. This has been identified as earthworks within the site itself and its immediate vicinity.
- 2.2.8 By the 16th century, the wool-trade was firmly established in the Cam valley and Gloucestershire became famous for its cloth. As a result, a significant concentration of mills were established within Cam. The remains of Draycott Mills lie immediately south-east of the site and Middle Mill is located 500 m to the south-east.
- 2.2.9 The basis for the woollen industry was the farming community and there is a concentration of largely 17th century architecture. These include Grade II listed farmhouses at Woodend Green Farm (NHLE 1090921) 200 m west of the site and Draycott Farm (NHLE 1340960) 500 m east of the site. Gossington Hall (NHLE 1340546) is a Grade II listed detached dwelling and associated barn (NHLE 1305831), 800 m north-west of the site, constructed by AD 1695.
- 2.2.10 The 1839 Tithe map of the parish of Cam shows the site contains several land parcels divided into a series of irregular field strips. There is a relatively high degree of correspondence between the tithe map field boundaries and the earthworks identified from the NMP, suggesting that those are of post-medieval origin.
- 2.2.11 The original line of the Bristol and Gloucester railway bypassed cam, but a branch line was funded by mill owners to serve settlements in the vicinity of the site, namely Coaley Junction, Cam, and Dursley. The line exists largely as an extant earthwork that lies parallel to the modern A4135 road to the east of the site. The Grade II listed Goods Shed at Coaley Junction (NHLE 1376797) associated with the railway is located 200 m north-east of the site.
- 2.2.12 The present site boundaries and internal divisions are a result of late 20th century boundary insertions and alterations. An estate composed of prefabricated housing built to ease housing shortages following WWII is located 50 m south-east of the site. The construction of the M5 motorway which bounds the site to the north is associated with modern infrastructure, namely an underpass, and removed entirely any archaeological remains within its alignment.

3 METHODOLOGY

3.1 Introduction

- 3.1.1 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team on 11 – 15 May, 20 – 21 August, and 28 – 30 September 2020. Field conditions were generally good throughout the period of survey. An overall coverage of 38.4 ha was achieved with any reduction the result of encroaching hedge row boundaries or modern obstacles. Two small fields in the north-eastern portion of the survey were not surveyed due to the presence of livestock.



3.1.2 The methods and standards employed throughout the geophysical survey conform to current best practice, and guidance outlined by the Chartered Institute for Archaeologists' (CIfA 2014) and European Archaeologiae Consilium (Schmidt *et al.* 2015).

3.2 Aims and objectives

3.2.1 The aims of the survey comprise the following:

- To determine, as far as is reasonably possible, the nature of the detectable archaeological resource within a specified area using appropriate methods and practices; and
- To inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

3.2.2 In order to achieve the above aims, the objectives of the geophysical survey are:

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

3.3 Fieldwork methodology

3.3.1 The cart-based gradiometer system used a Leica Captivate RTK GNSS instrument, which receives corrections from a network of reference stations operated by the Ordnance Survey (OS) and Leica Geosystems. Such instruments allow positions to be determined with a precision of 0.02 m in real-time and therefore exceeds European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015).

3.3.2 The detailed gradiometer survey was undertaken using four Bartington Grad-01-1000L gradiometers spaced at 1 m intervals and mounted on a non-magnetic cart. Data were collected with an effective sensitivity of 0.03 nT at a rate of 10 Hz, producing intervals of 0.15 m along transects spaced 4 m apart.

3.3.3 Portions of the survey were also undertaken using four SenSys FGM650/3 gradiometers spaced at 1 m intervals and mounted on a non-magnetic cart. Data were collected with an effective sensitivity of 0.03 nT at a rate of 20 Hz, producing intervals of 0.08 m along transects spaced 4 m apart.

3.4 Data processing

3.4.1 Data from the survey were subjected to minimal correction processes. These comprise a 'DeStripe' function (± 5 nT thresholds), applied to correct for any variation between the sensors, and an interpolation used to grid the data and discard overlaps where transects have been collected too close together.

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



4 GEOPHYSICAL SURVEY RESULTS AND INTERPRETATION

4.1 Introduction

- 4.1.1 The detailed gradiometer survey has identified magnetic anomalies across the site. Results are presented as a series of greyscale plots and archaeological interpretations at a scale of 1:2000 (**Figures 2 to 5**), 1:2500 (**Figure 6 and 7**) and 1:5000 (**Figure 8 and 9**). The data are displayed at -2 nT (white) to +3 nT (black) for the greyscale images.
- 4.1.2 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous responses, burnt or fired objects, and magnetic trends (**Figure 3, 5, 7, and 9**). Full definitions of the interpretation terms used in this report are provided in **Appendix 2**.
- 4.1.3 Numerous ferrous anomalies are visible throughout the dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.
- 4.1.4 It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be present than have been identified through geophysical survey.
- 4.1.5 Gradiometer survey may not detect all services present on site. This report and accompanying illustrations should not be used as the sole source for service locations and appropriate equipment (e.g. CAT and Genny) should be used to confirm the location of buried services before any trenches are opened on site.

4.2 Gradiometer survey results and interpretation

- 4.2.1 The geophysical survey has identified numerous anomalies that are likely to be associated with archaeological features. These are predominantly located in the south-west of the site and surround two clear sites of probable settlement activity on a north-east to south-west alignment. The features identified are predominantly associated with linear and curvilinear ditch features.
- 4.2.2 A network of interconnected linear anomalies has been identified throughout the south-western and central portion of the survey area. These anomalies appear to extend north-east from a positive linear anomaly traversing the west of the site at **4000**. This anomaly is 630 m long covering almost the entire length of the western boundary of the survey area. At the north the anomaly turns gradually to the south-west for a further 32 m. At the northern end it is 1 m wide and is variably fragmented toward the southern end appearing to be truncated by ridge and furrow cultivation. The central portion of the anomaly is obscured by the modern field boundary. This is likely to be a former trackway or boundary feature, such as a ditch. Two focal points of archaeological activity have been identified extending east from this at **4001** (north) and **4009** (south) (**Figure 5 and 7**).
- 4.2.3 The anomalies at **4001** cover an area of 118 m north-east to south-west and 82 m north-west to south-east (**Figure 5**). A stronger, positive linear anomaly is noted at **4002**, traversing perpendicular to the anomaly at **4000**. This measures 137 m in length and is 2 – 3 m wide. This could indicate a trackway where a concentration of activity is noted. Predominantly to the north of this anomaly, several enclosures have been identified. The two larger and most distinct enclosures measure 21 m x 30 m (**4003**) and 17 m x 40 m (**4004**). Within these enclosures, there are clear internal divisions. Smaller enclosures are clear to the south (**4005**). Surrounding the anomalies at **4001 – 4005**, a negative halo has been identified that indicates up cast material or could be associated with building debris. While it is not possible to comment on the exact provenance of such an area of activity, it is likely these anomalies indicate a localisation of archaeological features such as ditches,

enclosures and pits, and possibly hearths and houses, although no distinct anomalies have been identified in this regard.

- 4.2.4 The fullest extent of this area of activity has not been realised due to modern field boundaries limiting survey. A linear anomaly projects north-west perpendicular to **4002** at **4006 (Figure 5)**. This anomaly continues for 177 m before turning at a right-angle to the south-west for a further 84 m. This indicates a ditch feature forming a larger enclosed area.
- 4.2.5 The anomalies to the south at **4007** cover an area of 90 m north-east to south-west and 36 m north-west to south-east (**Figure 7**). These anomalies consist of positive linear and recti-linear anomalies, similar to those at **4001**, that indicate ditch features surrounded by a negative halo of variable material. A large enclosure is clear in the centre of the concentration at **4008**. This measures 23 m x 27 m and also has internal divisions, which are noted throughout the surrounding area.
- 4.2.6 These anomalies indicate a grouping of ditch, pits, and enclosure features, as well as possible house and hearths, although again, no anomalies have been identified in this regard. A small, weakly positive, recti-linear anomaly is noted at **4009**. The anomaly is 5 – 6 m in breadth and is interpreted as possibly archaeological in origin based on its shape and proximity to other archaeological anomalies. Further linear and recti-linear anomalies are noted to the south-west at **4010**. However, all these responses could indicate later agricultural activity.
- 4.2.7 Enclosing the anomalies at **4007 – 4010**, a large semi-circular, fragmented positive anomaly has been identified at **4011 (Figure 7)**. This indicates a larger, enclosure ditch and appears to respect the anomalies at **4000** and **4007 – 4010**. 103 m to the east, a parallel linear anomaly is noted at **4012**. Although this is heavily truncated, it is likely to represent an underlying ditch feature. It is not clear from the geophysical data whether there is any relationship between the anomalies at **4011** and **4012**.
- 4.2.8 A positive recti-linear anomaly has been identified to the south-east of **4001** and north-east of **4007** at **4013 (Figure 7)**. The anomaly indicates a ditched enclosure measuring 43 m x 36 m. Two parallel positive linear anomalies continue to the south-south-west of the enclosure for 31 m, becoming fragmented at the southern end (**4014**). This projects broadly towards the anomalies at **4007**, but any possible continuation is not clear due to the presence of a former extraction pit (**4028**).
- 4.2.9 Areas of increased magnetic response are noted in the area of archaeological activity (**4015 – 4019**). These could relate to heavily plough damaged areas of archaeological activity associated with the settlement and enclosed areas. This is supported by the presence of ridge and furrow. However, it is also possible that they relate to natural variation in the underlying soils and geological deposits.
- 4.2.10 The anomalies at **4001**, **4007**, and **4013** indicate concentrations of connected settlement activity located adjacent to a possible trackway or boundary ditch (**4000**). This is thought likely to be Iron Age or Romano-British in origin. The anomalies also do not correspond to the historical pattern of land division and the clear ridge and furrow cultivation does not respect their boundaries. Further features of this period were located in the vicinity in earlier geophysical survey and evaluation (Stratascan 2015; Cotswold Archaeology 2016), although further investigation would be required to confirm the date of any underlying features.
- 4.2.11 Further positive linear anomalies are noted traversing the survey area to the north and south of the probable settlement activity (**4020 – 4024 (Figure 5 and 7)**). These anomalies vary in length, are 1 m wide, and become more fragmented (**4020**, **4023**, **4024**) and weaker (**4021**) to the north and south. The responses appear to be heavily truncated by the ridge



and furrow. These indicate boundary ditch features, likely associated with the settlement activity, indicating a surrounding agricultural setting.

- 4.2.12 A notably increased magnetic response is noted across the western boundary of the site (**4025**) (**Figure 5** and **7**). This covers 485 m north-west to south-east and 55 m north-east to south-west. Responses of this type are usually associated with disturbed ground, such as woodland removal. The response appears to respect the boundary feature at **4000** and corresponds with a crop mark visible on satellite images. The exact cause of this is not clear from the data alone, but it is likely associated with removal woodland, although none is noted on available historical mapping, or other landscaping activity. It is possible that archaeological features are present in this area but cannot be identified due to the increased magnetic response. It is also possible that the responses to the east at **4019** are a continuation of this activity.
- 4.2.13 In the north-east of the survey area, two weakly positive, sinuous anomalies have been identified at **4026** and **4027** (**Figure 3**). These anomalies are interpreted as possible archaeology and indicate ditch features. It is possible this is an extension of the settlement and boundary features to the south. However, they could equally relate to later agricultural activity.
- 4.2.14 A broadly square area of increased magnetic response has been identified and interpreted as possible archaeology in the south-west of the site (**4028**) (**Figure 7**). A second anomaly is noted to the south at **4029**. These anomalies correspond broadly to a former extraction pit or pond visible on 1884 OS mapping. The response at **4028** measures 41 m x 32 m and is indicative of an area of infilling activity. The response to the south at **4029**, measures 16 m x 18 m. The origin of any underlying feature at these locations is uncertain and likely predates the late 19th century when they are visible on historical mapping.
- 4.2.15 A third anomaly associated with a former extraction pit or pond visible on 1884 OS mapping is noted to the north of the survey area at **4030**, measuring 8 m in diameter (**Figure 3**). Numerous further discrete positive anomalies measuring 1 – 2 m in diameter have been identified throughout south-western portion of the survey results. Examples of these anomalies can be seen at **4031** and **4032**. While the anomaly at **4030** is likely to date to the medieval or post-medieval period, the anomalies throughout the site are interpreted as possible archaeology and could pertain to further extraction activity or refuse pits associated with nearby settlement activity. However, it is equally possible these anomalies are natural in origin and associated with localised variation in the magnetic susceptibility of the underlying topsoil or geological deposits.
- 4.2.16 The historical pattern of land division has been partially identified by the geophysical survey. Several weakly positive, linear anomalies have been identified at **4033 – 4036** (**Figure 3** and **5**) and **4037** (**Figure 7**). These anomalies are in the north, north-east, and south of the survey area and correspond to former field boundaries visible on 1884 OS mapping. Several weak linear trends are noted separating areas of ridge and furrow that not recorded on the available historical mapping (**4038 – 4040**). It is possible these relate to earlier and unrecorded field boundaries. However, it is equally possible these anomalies are associated with modern agricultural activity.
- 4.2.17 Broadly spaced (4 – 6 m), positive linear anomalies have been identified throughout the majority of survey results on either a north-west to south-east or north-east to south-west alignment. Examples of these are noted at **4041 – 4047** (**Figure 3, 5, and 7**). These largely respect the historical pattern of land division and the boundary features that have been identified (**4027 – 4030**). This is evidence of ridge and furrow cultivation, similar to that which is noted in the surrounding landscape. The relatively straight nature of the anomalies identified suggests a later medieval or post-medieval date.



- 4.2.18 A large area of increased magnetic response has been identified to the north-east of the survey at **4048 (Figure 3)**. This anomaly broadly corresponds to several adjoining field boundaries and a former extraction pit/pond visible on 1884 OS mapping. These features cannot be discerned among the response. It is thought due to its size (140 m x 67 m) that this anomaly is associated with the construction of the Midlands Railway Bristol and Birmingham line noted to the immediate north of the response.
- 4.2.19 Further areas of increased magnetic response have been identified. These are predominantly linear in their alignment and are noted in the north-east (**4049 – 4051 (Figure 3)**) and west (**4052 – 4053 (Figure 5)**) of the site. These anomalies are thought to be associated with land access tracks (**4050**), footpaths (**4049, 4052 – 4043**), and a possible field drain (**4051**).
- 4.2.20 A number of uncertain trends have been identified in the survey results. These are likely associated with recent or modern agricultural. It is possible these pertain to field drains in the north-east of the site (**4054 (Figure 3)**) or tyre ruts in the south-west of the site (**4055 (Figure 7)**). Where these responses overlap the increased magnetic response in the west of the survey results (**4056**) an archaeological origin cannot be ruled out, although further investigation would be required to confirm this.
- 4.2.21 Several highly magnetic dipolar linear anomalies have been identified throughout the site that are on variable alignments (**4057 – 4063**). These are indicative of underlying services, such as pipes or cables. A number of smaller linear dipolar anomalies have been identified in the south-east of the site (**4064**). These are interpreted as field drains.
- 4.2.22 The remaining anomalies are thought to be modern and are interpreted as ferrous in origin. These largely pertain to peripheral interference from boundary fences, buildings, trackways, and roads.

5 DISCUSSION

- 5.1.1 The detailed gradiometer survey has been successful in identifying anomalies that are archaeological in origin. These are concentrated around three areas in the west of the site. Two of these relate to linear arrangements of enclosures projecting perpendicular from a boundary or track feature. The third is a single rectilinear enclosure. It is likely that all three of these areas are connected, although the continuation is obscured by more recent features (an extraction pit) and modern field boundaries. This is thought to represent an area of Iron Age or Romano-British settlement, similar to those identified in the surrounding area. Large enclosure and boundary features surround the three areas of settlement, suggesting agricultural activity.
- 5.1.2 Many of the features identified, particularly those to the north and east, appear to be truncated by ridge and furrow activity. This is evident by the fragmented nature of the anomalies identified. It is possible that further archaeological activity is present on the site but has been heavily plough damaged. Areas of increased magnetic response could be evidence of such features.
- 5.1.3 To the west of the settlement activity, an area of disturbance has been identified, which appears to respect the boundary of settlement. The origin of this is unclear, but it may be associated with removal of woodland. The strong responses in this area have the potential to mask weaker archaeological anomalies.
- 5.1.4 There is no evidence for the archaeological features extending in to the north-east of the site. Former field boundaries and possible pit features have been identified here, suggesting that the survey has been successful. It is likely that this represents a genuine lack of archaeological activity across the north-eastern section of the site.



- 5.1.5 Anomalies associated with the medieval and later agricultural landscape have been identified across the site. Ridge and furrow is evident across much of the site. The majority of this is relatively straight in nature, suggesting a later medieval date. Several boundary features have also been identified.
- 5.1.6 The remaining anomalies are thought to be modern in origin. These include areas of disturbance associated with the construction of the Midlands Railway Bristol and Birmingham line to the north of the site, footpaths, services, and field drains.



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APPENDICES

Appendix 1: Survey Equipment and Data Processing

Bartington Grad-01-100L

The magnetic data for this project were acquired using a non-magnetic cart fitted with 4x Bartington Grad-01-1000L magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 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 an effective resolution of 0.03 nT over a ± 100 nT range, and measurements from each sensor are logged at intervals of 0.25 m. All of the data are then relayed to a Leica Viva CS35 tablet, running the MLgrad601 program, which is used to record the survey data from the array of Grad601 probes at a rate of 10 Hz. The program also receives measurements from a GPS system, which is fixed to the cart at a measured distance from the sensors, providing real time locational data for each data point.

The cart-based system relies upon accurate GPS location data which is collected using a Leica Viva system with rover and base station. This 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 European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015) for geophysical surveys.

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 0.15 m intervals along traverses spaced up to 0.25m apart.

SenSys FGM650/3

The magnetic data for this project were acquired using a non-magnetic cart fitted with four SenSys FGM650/3 magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 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 an effective resolution of 0.03 nT over a ± 100 nT range, and measurements from each sensor are logged at intervals of 0.25 m. All of the data are then relayed to a Leica Viva CS35 tablet, running the MLgrad601 program, which is used to record the survey data from the array of probes at a rate of 20 Hz. The program also receives measurements from a GPS system, which is fixed to the cart at a measured distance from the sensors, providing real time locational data for each data point.

The cart-based system relies upon accurate GPS location data which is collected using a Leica Viva system with rover and base station. This 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 European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015) for geophysical surveys.



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 0.125 m intervals along traverses spaced up to 0.25m apart.

Post-processing

The magnetic data collected during the detail survey are downloaded from the Bartington cart 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.

The cart-based system generally requires a lesser amount of post-processing than the handheld Bartington Grad 601-2 fluxgate gradiometer instrument. This is largely because mounting the gradiometers on the cart reduces the occurrence of operator error; caused by inconsistent walking speeds and deviation in traverse position due to varying ground cover and topography.

Typical data and image processing steps may include:

- GPS DeStripe – Determines the median of each transect and then subtracts that value from each datapoint in the transect. May be used to remove the striping effect seen within a survey caused by directional effects, drift, etc.
- GPS Base Interpolation – Sets the X & Y interval of the interpolated data and the track radius (area around each datapoint that is included in the interpolated result).
- Discard Overlaps - Intended to eliminate a track(s) that have been collected too close to one another. Without this, the results of the interpolation process can be distorted as it tries to accommodate very close points with potentially differing values.

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. XY plots are available upon request.
- Greyscale – Presents the data in plan 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 four main categories: archaeological, modern, agricultural, and uncertain origin/geological.

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

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

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

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

The agricultural category is used for the following:

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

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

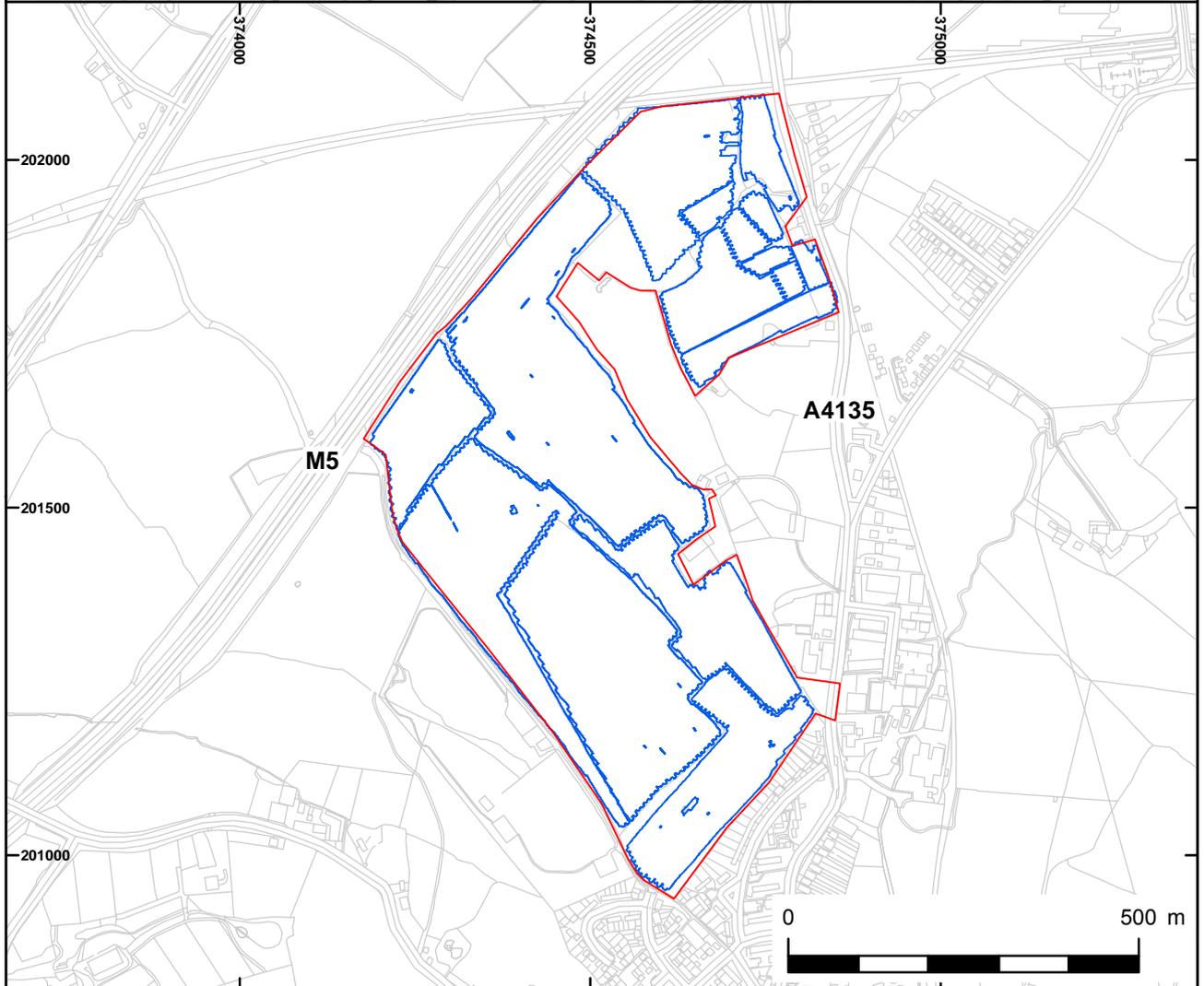
- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They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



Appendix 3: OASIS form

Project Details:

Project name		Land at Draycott, Cam, Gloucestershire			
Type of project		Detailed gradiometer survey (Field evaluation)			
Project description		<p>The site comprises several arable fields located immediately north-west of the village of Draycott, 3 km north of Cam, and covers an area of 39.5 ha. The geophysical survey was undertaken between 11th to 15th May and 8th August to 30th September 2020. The detailed gradiometer survey has demonstrated the presence of anomalies of archaeological interest. These anomalies are located in the south-west of the survey area. The underlying features are likely to be ditches and pits that are largely concentrated on two areas of apparent settlement activity. Traversing the western edge of the survey area a linear anomaly could indicate a trackway or boundary feature.</p> <p>Several further linear anomalies extend into the surrounding survey area that are likely to indicate boundary features associated with a former field system peripheral to the settlement. These linear anomalies likely predate the later features identified as the former boundary features that correspond to features visible on historical OS mapping as well as the ridge and furrow cultivation that is prominent throughout the survey results and appears to have impacted the archaeological features.</p> <p>The concentrations of settlement activity are tentatively considered to be Iron Age to Romano-British in origin and could be associated with activity from these period noted within the wider study area.</p> <p>The remaining anomalies are likely to date to the post-medieval or modern period, consisting of mostly agricultural use including later former boundaries, trackways and field drains as well as several modern services.</p>			
Project dates		Start: 11-05-2020		End: 30-09-2020	
Previous work		Not known			
Future work		Not known			
Project Code:	228191	HER event no.	N/A	OASIS form ID:	wessexar1-405471
		NMR no.	N/A		
		SM no.	N/A		
Planning Application Ref.					
Site Status		None			
Land use		Cultivated Land 3			
Monument type				Period	
Project Location:					
Site Address	Land north-west of Draycott, Cam			Postcode	GL11 5ER
County	Gloucestershire	District	Stroud	Parish	Cam
Study Area	39.5 ha	Height OD	29 – 37 m aOD	NGR	374624 201495
Project Creators:					
Name of Organisation		Wessex Archaeology			
Project brief originator		Persimmon Homes Ltd	Project design originator		Wessex Archaeology
Project Manager		Tom Richardson	Project Supervisor		Brett Howard
Sponsor or funding body		Persimmon Homes Ltd	Type of Sponsor		Client
Project Archive and Bibliography:					
Physical archive	N/A	Digital Archive	Geophysical survey and report	Paper Archive	N/A
Report title		Land at Draycott, Cam, Gloucestershire Detailed Gradiometer Survey Report		Date	2020
Author	Wessex Archaeology	Description	Unpublished report	Report ref.	228191.03



 Site boundary

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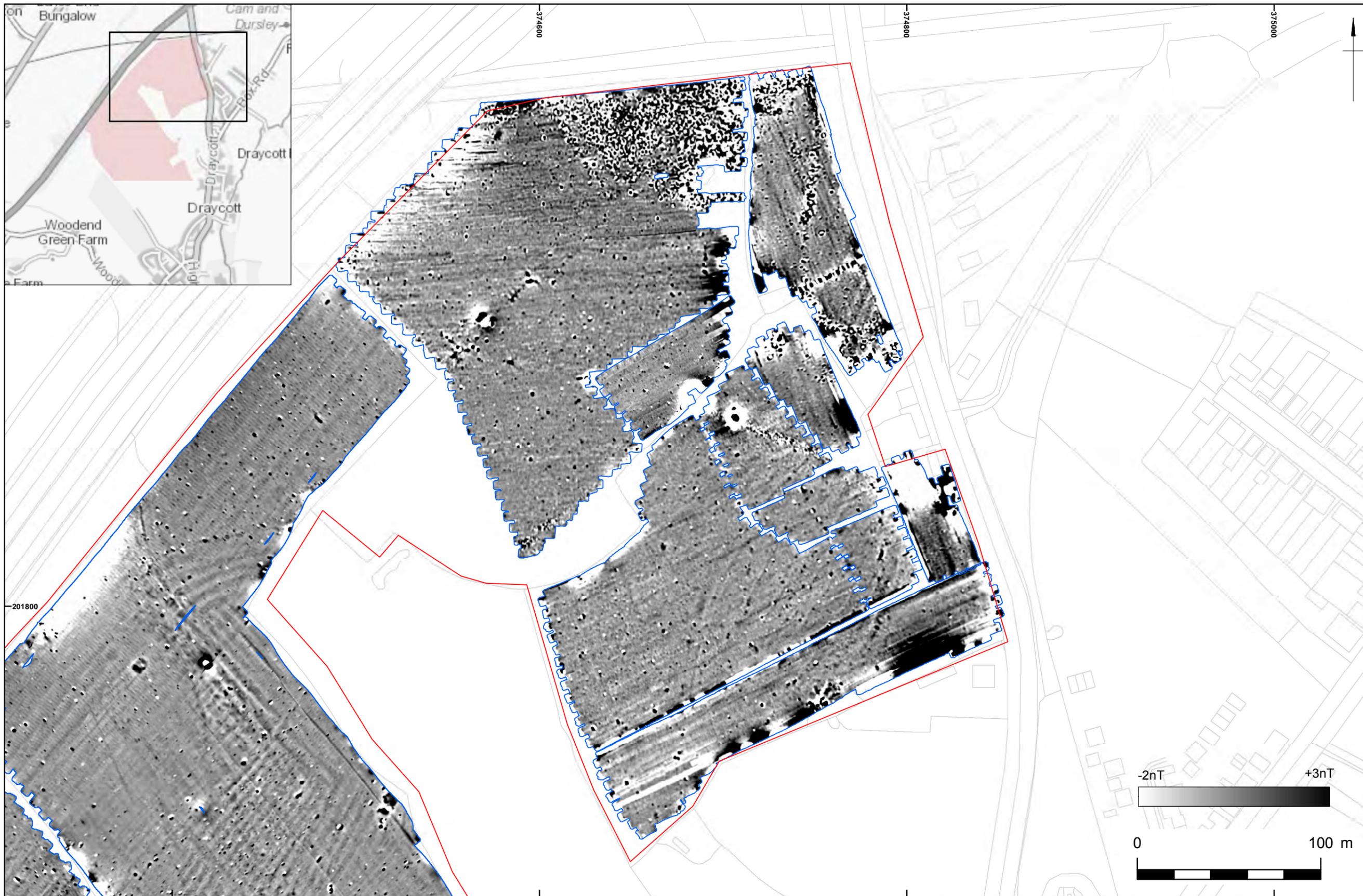
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Site location and survey extent

Figure 1



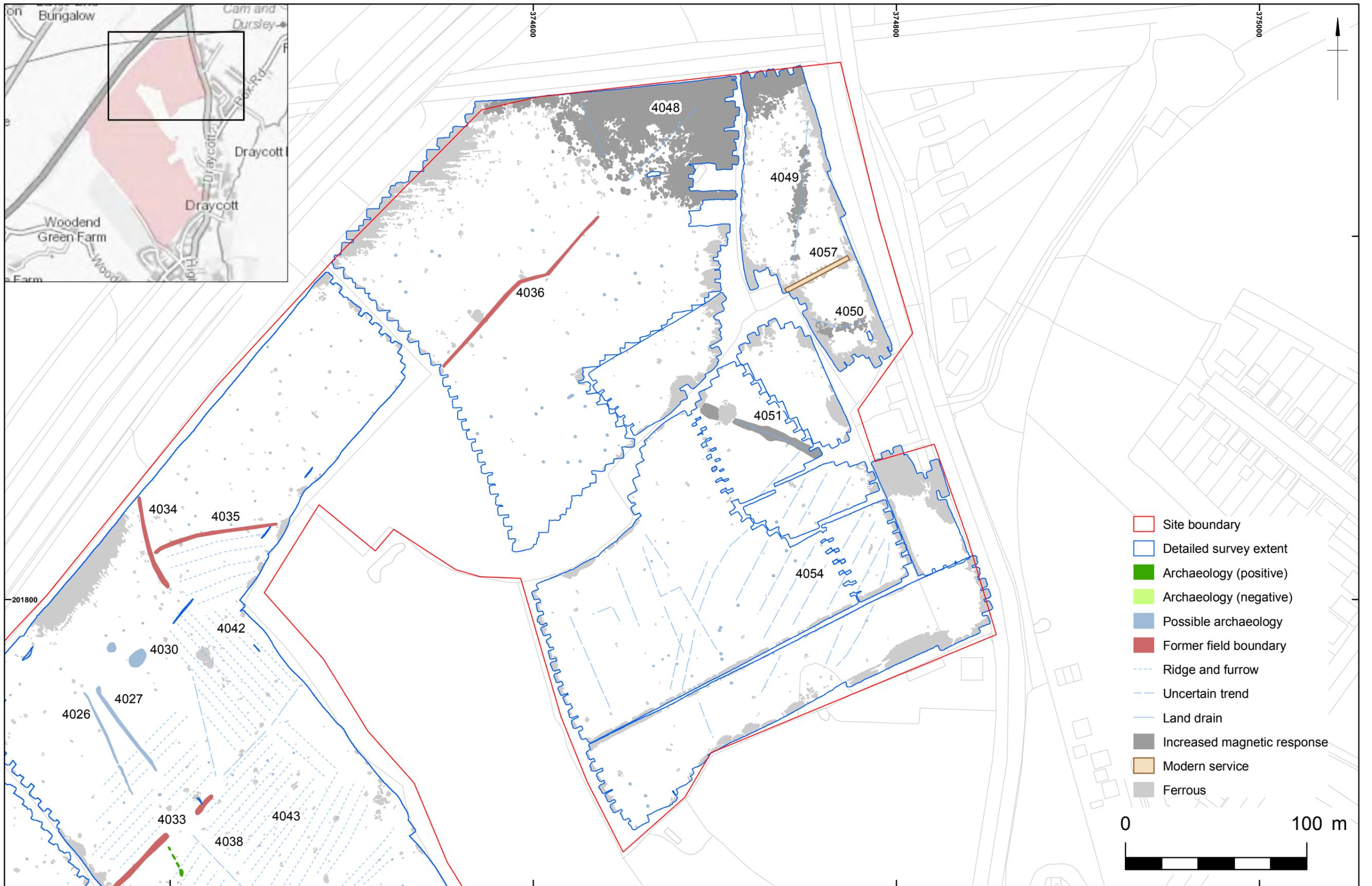
Site Boundary
 Detailed survey extent

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Detailed gradiometer survey results: greyscale (north-east)

Figure 2



- ▭ Site boundary
- ▭ Detailed survey extent
- ▭ Archaeology (positive)
- ▭ Archaeology (negative)
- ▭ Possible archaeology
- ▭ Former field boundary
- - - Ridge and furrow
- - - Uncertain trend
- Land drain
- ▭ Increased magnetic response
- ▭ Modern service
- ▭ Ferrous



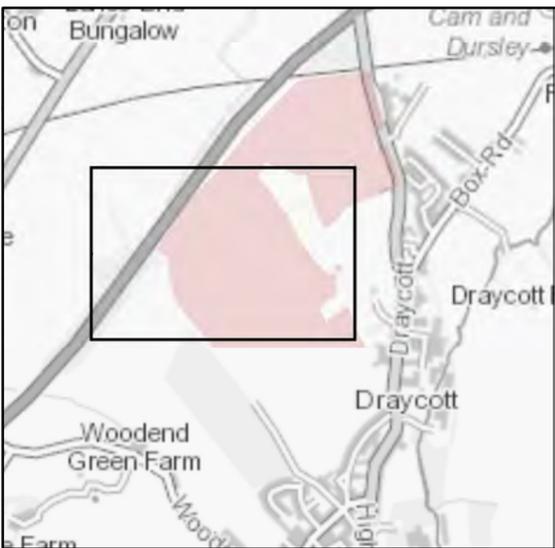
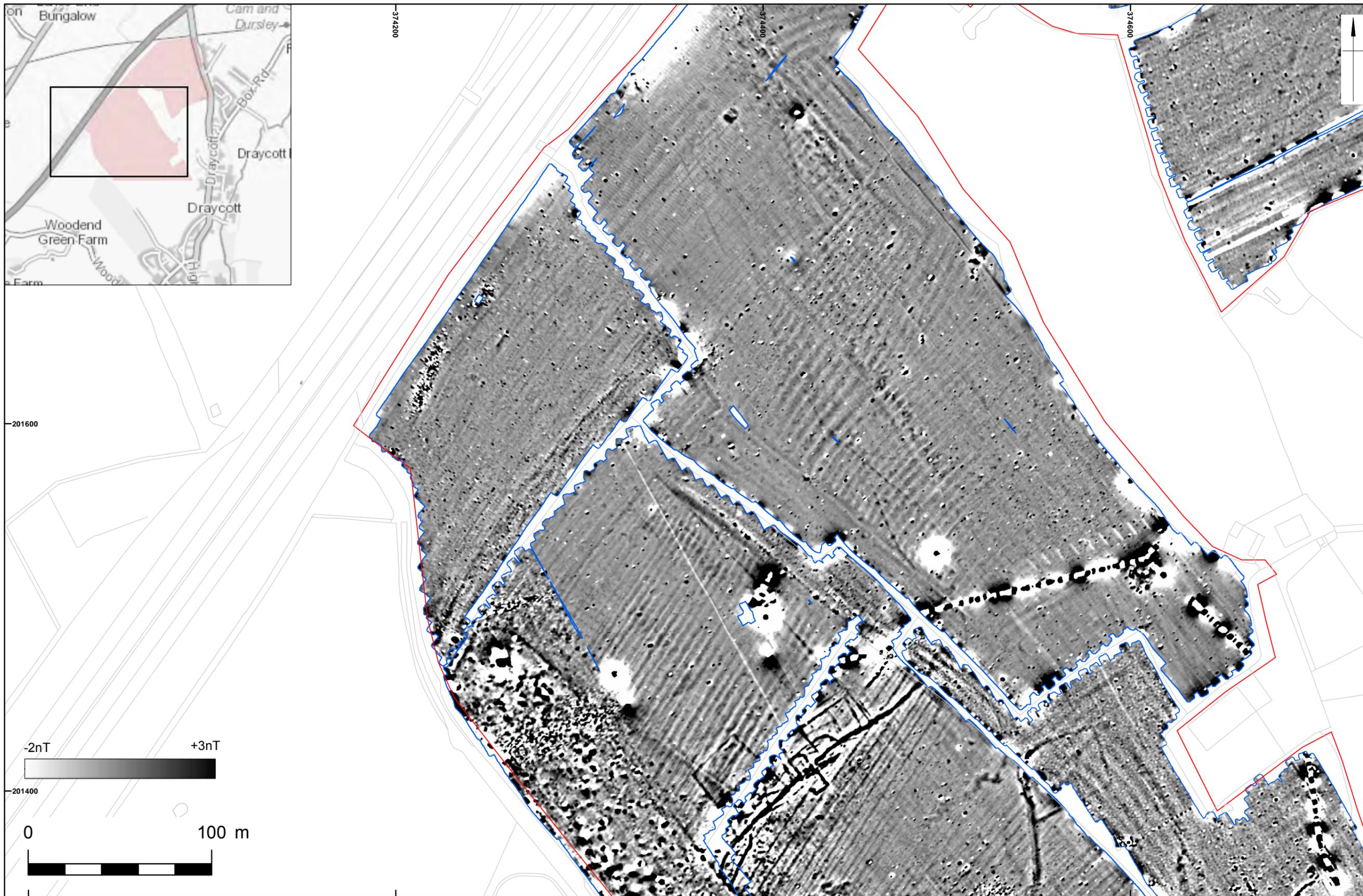
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Detailed gradiometer survey results: interpretation (north-east)

Figure 3



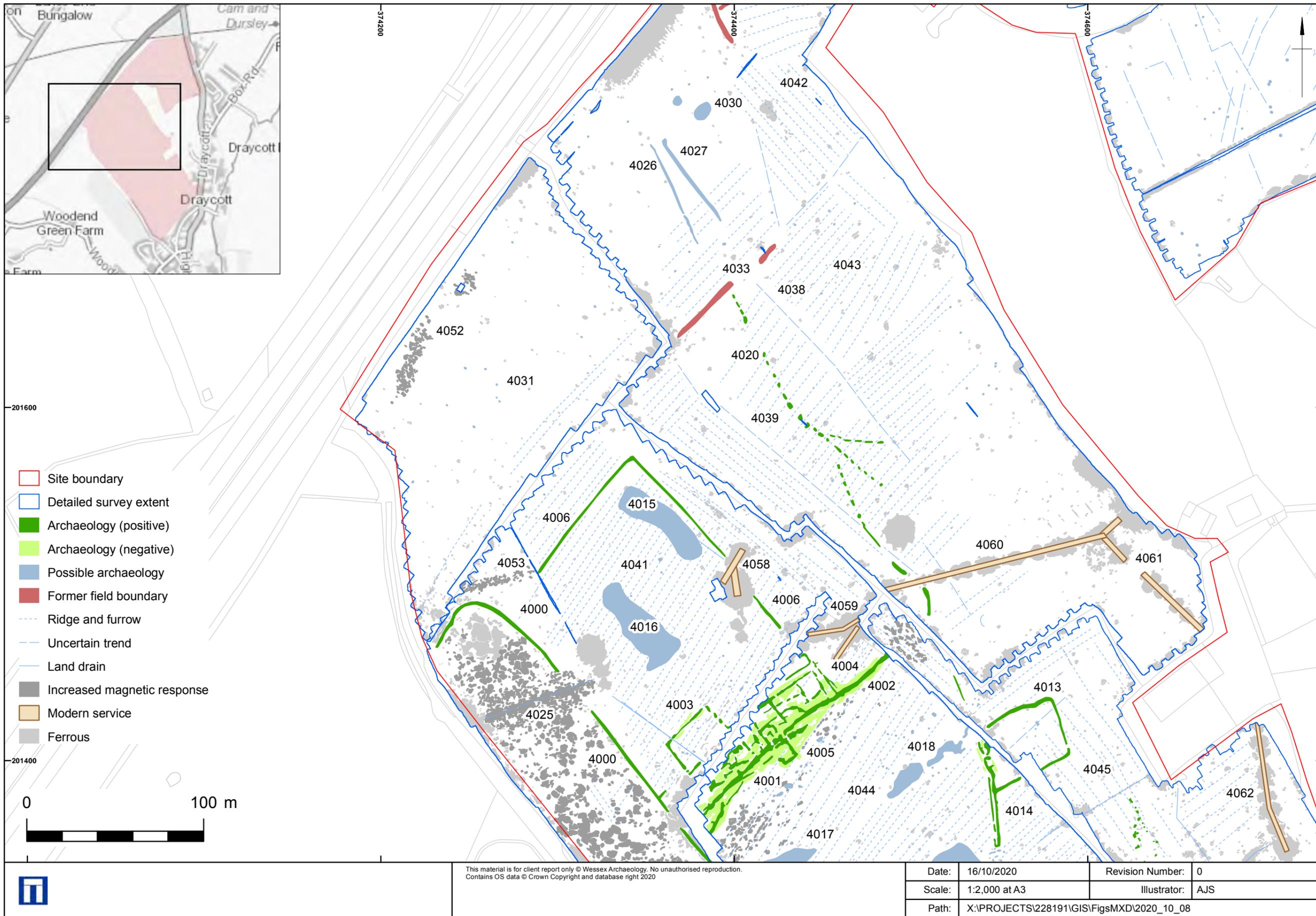

▭ Site Boundary ▭ Detailed survey extent

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Detailed gradiometer survey results: greyscale (centre)

Figure 4



Detailed gradiometer survey results: interpretation (centre)

Figure 5



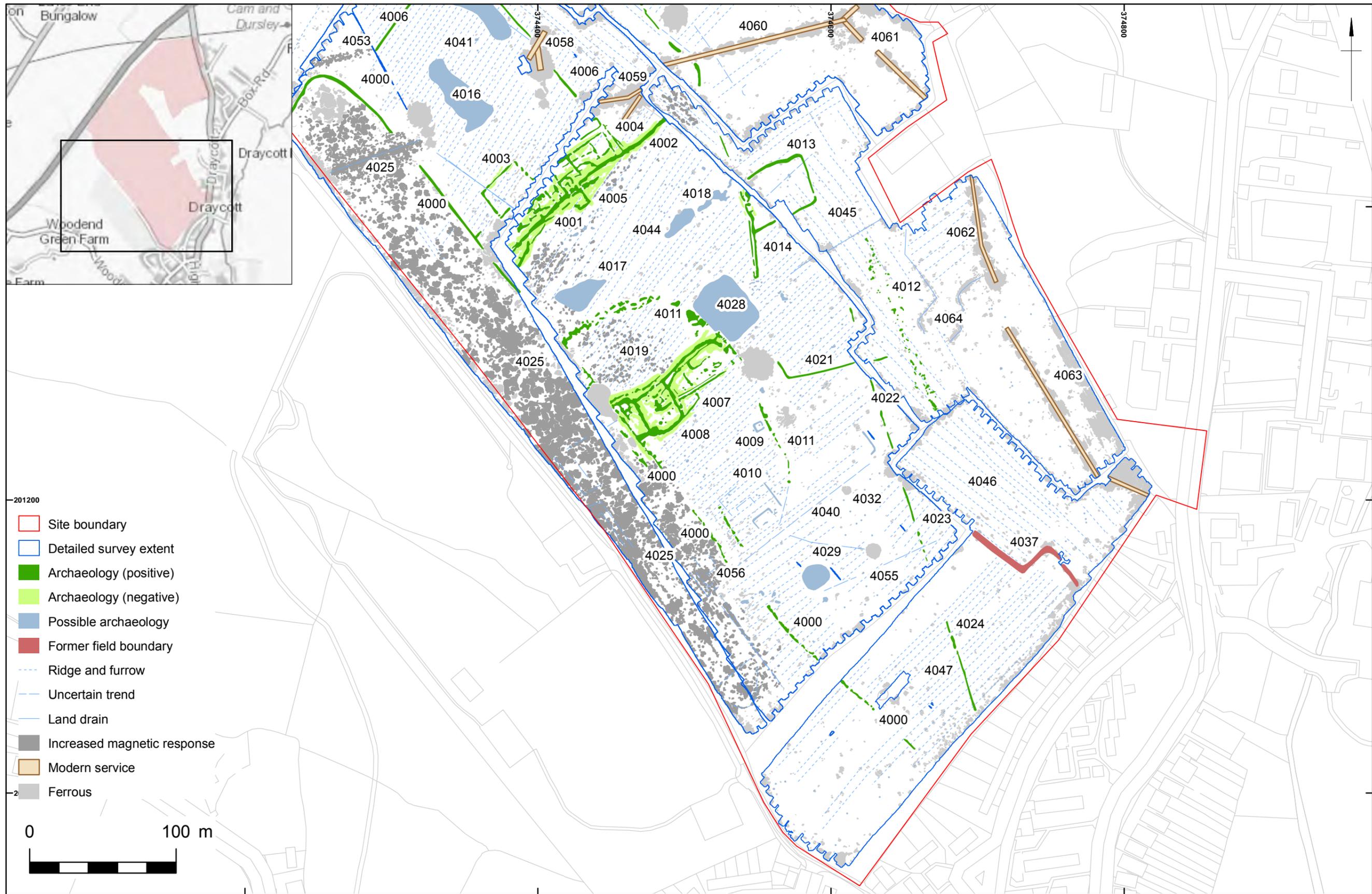
Site Boundary
 Detailed survey extent

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Detailed gradiometer survey results: greyscale (south)

Figure 6



- 201200
- ▭ Site boundary
- ▭ Detailed survey extent
- ▭ Archaeology (positive)
- ▭ Archaeology (negative)
- ▭ Possible archaeology
- ▭ Former field boundary
- - - Ridge and furrow
- — — Uncertain trend
- — — Land drain
- ▭ Increased magnetic response
- ▭ Modern service
- ▭ Ferrous

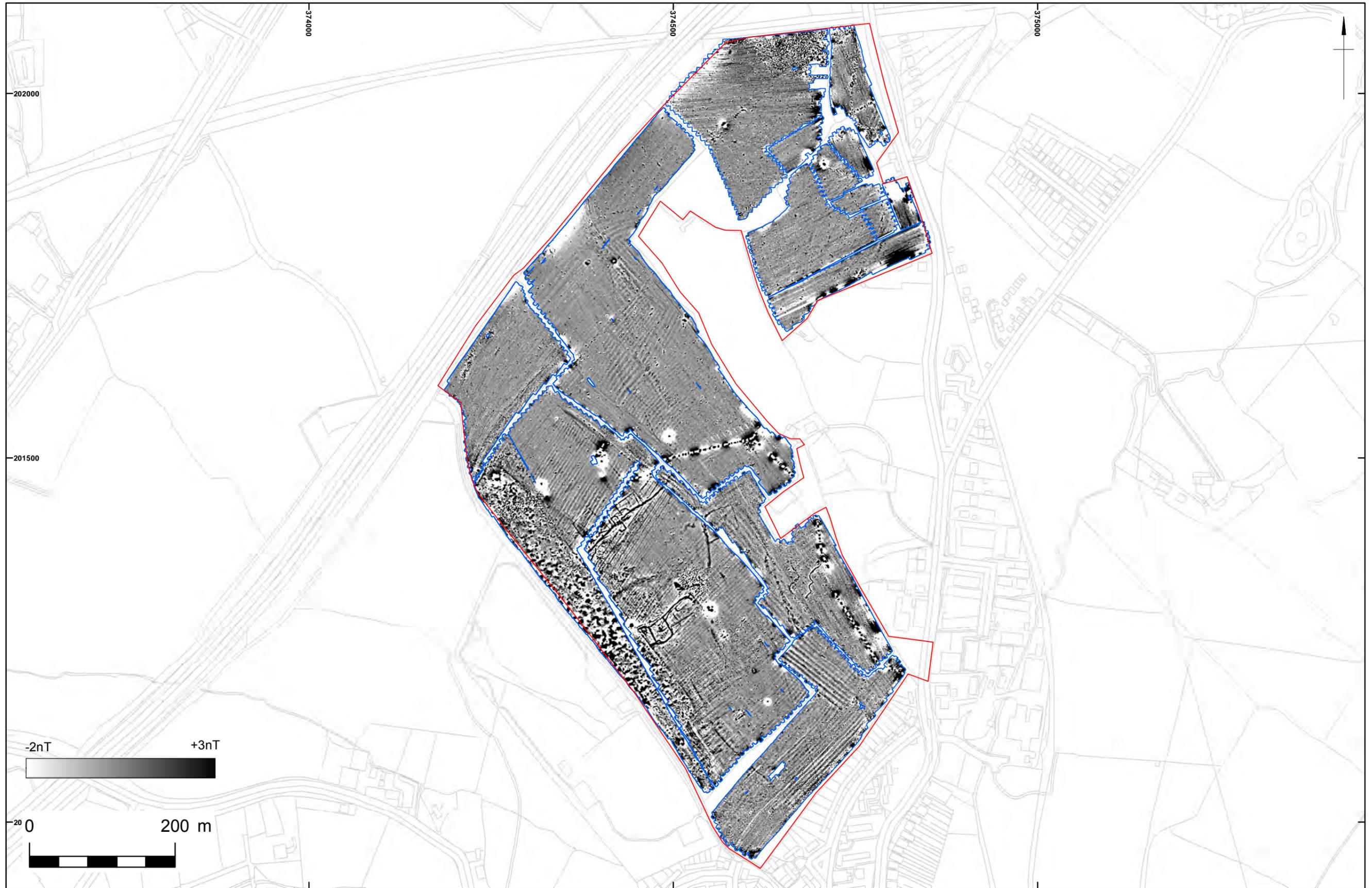


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Detailed gradiometer survey results: interpretation (south)

Figure 7



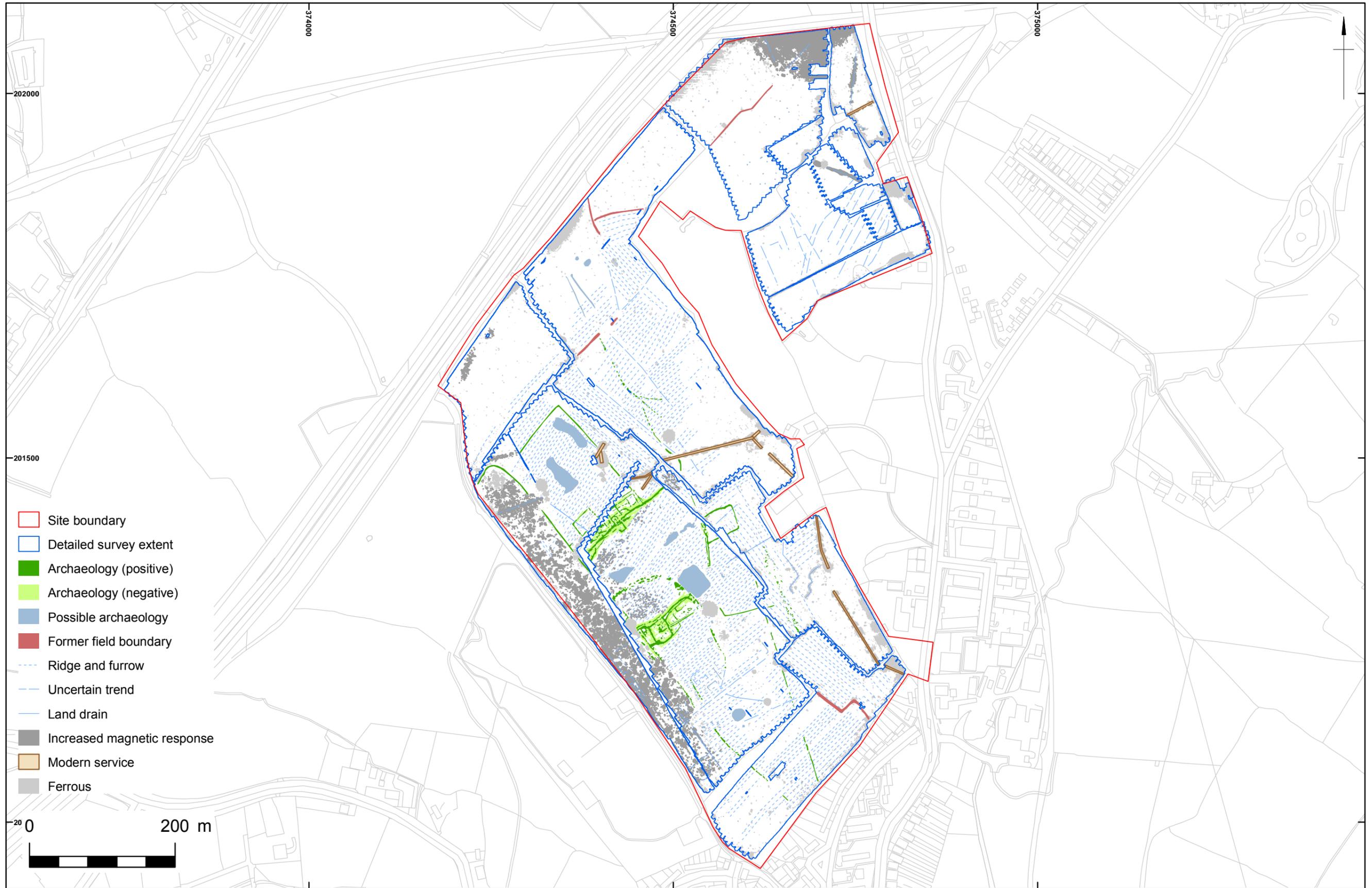
Site Boundary
 Detailed survey extent

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Detailed gradiometer survey results: overall greyscale plot

Figure 8



- Site boundary
- Detailed survey extent
- Archaeology (positive)
- Archaeology (negative)
- Possible archaeology
- Former field boundary
- Ridge and furrow
- Uncertain trend
- Land drain
- Increased magnetic response
- Modern service
- Ferrous



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Detailed gradiometer survey results: overall interpretation

Figure 9



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