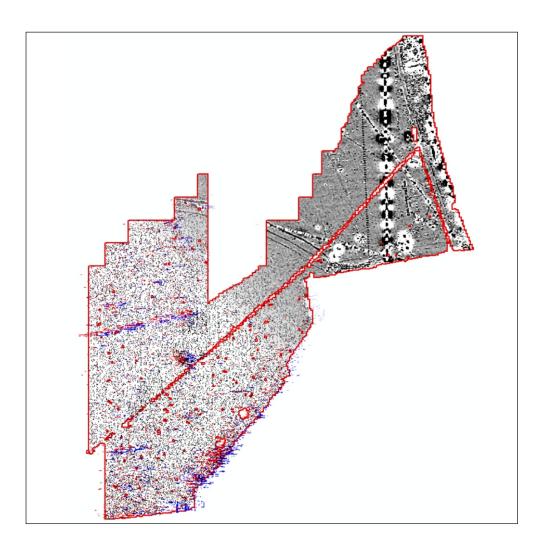


making sense of heritage

Old Sarum Airfield 2014 Salisbury, Wiltshire

Detailed Gradiometer Survey Report



Ref: 66013.02 February 2015

geoservices



Old Sarum Airfield 2014 Salisbury, Wiltshire

Detailed Gradiometer Survey Report

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Summary

A detailed gradiometer survey was conducted over land at Old Sarum Airfield, Salisbury, Wiltshire. The project was commissioned by Feilden + Mawson LLP on behalf of Old Sarum Airfield Ltd with the aim of establishing the presence, or otherwise, and nature of detectable archaeological features on the site. This project was part of an ongoing programme of archaeological works being undertaken to inform development in three areas along the airfield perimeter (Areas A-C). The geophysical survey reported here investigated Area C, Areas A and B having been surveyed previously. The survey was undertaken in three phases 5th-8th August, 4th September and 20th October 2014.

Area C comprises two pasture fields on the northern edge of Ford, approximately 3.25km NNE of the centre of Salisbury. The site lies within an *Area of Special Archaeological Significance*, which relates to the rich prehistoric landscape that extends across this part of southern Wiltshire. Cropmarks extending into the survey area include a continuation of a 'Wessex Linear', a prehistoric land boundary of likely Bronze Age date. Old Sarum Airfield dates from 1917 and remained in military service until 1979: Areas A-C lie within the Old Sarum Airfield Conservation Area, which includes the historic flying field. Previous archaeological investigations have revealed various features from the prehistoric to modern in date, including a ring ditch of likely prehistoric date; the continuation of the Portway, a Roman road; and numerous features relating to the use of the military airfield.

The gradiometer survey covered 12.3ha and has demonstrated the presence of anomalies of archaeological interest, along with ploughing, some trends of uncertain origin and several modern services. A large amount of ferrous features and several modern services are visible close to the village of Ford. The data also revealed the continuation of the Wessex Linear, along with a curving track and two rectilinear enclosures. A number of small anomalies could represent pits; however these may prove to be natural features as they form no discernible pattern to suggest settlement related activity.

The remaining anomalies detected appear to be either agricultural in origin or to relate to features of the historic airfield.

Old Sarum Airfield 2014 Salisbury, Wiltshire

Detailed Gradiometer Survey Report

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The fieldwork was undertaken by Jen Smith, Alistair Black, Patrick Dresch and Alistair Salisbury. Ross Lefort processed the geophysical data which was interpreted by Lizzie Richley and Ross Lefort. This report was written by Ross Lefort. The geophysical work was quality controlled by Ben Urmston, Lucy Learmonth and Dr. Paul Baggaley. Illustrations were prepared by Ross Lefort and Karen Nichols. The project was managed on behalf of Wessex Archaeology by Chris Moore.

Detailed Gradiometer Survey Report

1 INTRODUCTION

1.1 **Project background**

- 1.1.1 Wessex Archaeology was commissioned by Feilden + Mawson LLP to carry out a geophysical survey over 12.3ha of land at Old Sarum Airfield, Salisbury, Wiltshire (Figure 1), hereafter "the Site" (NGR 415500, 133125). The survey forms part of an ongoing programme of archaeological works being undertaken to inform a master plan for development on three potential areas for development along the airfield perimeter (Areas A-C, Figure 1).
- 1.1.2 The geophysical survey reported here investigated Area C; Areas A and B were subject to survey previously (GSB prospection 1999; Archaeological Surveys 2007).
- 1.1.3 The aim of the geophysical survey was to establish the presence/absence, extent and character of detectable archaeological remains within the survey area. This report presents a brief description of the methodology followed, the detailed survey results and the archaeological interpretation of the geophysical data.

1.2 Site Location and Topography

- 1.2.1 The survey area comprises two pasture fields on the northern edge of the village of Ford, approximately 3.25km NNE of the centre of Salisbury and 8.65km south of Amesbury (**Figure 1**). The survey area is defined by field boundaries in the south and east with the limits of the proposed development defining the northern and western limits of the survey area. Within the survey area is a concrete perimeter road, which formerly linked the technical area of the airfield to the domestic quarters in the south-eastern corner at Ford.
- 1.2.2 The Site is located on the southeast facing slope of the valley of the River Bourne with the land along the northwest edge at a height of around 75m aOD and the southeast edge at a height under 70m aOD. The River Bourne flows past the Site a short distance to the southeast towards its confluence with the River Avon at Salisbury.

1.3 Soils and Geology

- 1.3.1 The bedrock geology under the Site is recorded as Seaford chalk formation along the east and Newhaven chalk formation to the west, both geologies date to the Cretaceous period. No superficial deposits are recorded at the Site although head deposits of clay, silt, sand and gravel (Quaternary) are recorded outside the survey area to the east (BGS).
- 1.3.2 The soils underlying the Site are likely to be brown rendzinas of the 343h (Andover 1) association (SSEW 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.



1.4 Archaeological Background

- 1.4.1 Previous archaeological works carried out by Wessex Archaeology include the production of a Desk-Based Assessment (DBA) (Wessex Archaeology 2007a and 2014) followed by two archaeological field evaluations (Wessex Archaeology 2007b and 2008). Geophysical surveys were carried out by GSB Prospection in 1999 over Area B2 and by Archaeological Surveys in 2007 over Areas A, B1 and a small part of Area C. The results of this work is summarised below and will be referred to where relevant in the interpretation of the geophysical data.
- 1.4.2 The Site lies within an Area of Special Archaeological Significance, defined in the adopted Local Plan, which relates to the rich prehistoric landscape that extends across this part of southern Wiltshire. Designated heritage assets within a 1km Study Area include the prominent Iron Age hillfort of Old Sarum (Scheduled Monument No. 26715). The DBA has revealed some cropmarks that extend into the survey area including some considered to relate to the continuation of a 'Wessex Linear' prehistoric land boundary of likely Bronze Age date.
- 1.4.3 The airfield dates from 1917 and remained in military service until 1979: the grass flying field remains in active use. Areas A-C lie within the Old Sarum Airfield Conservation Area, which was designated in 2007 and includes the historic flying field and related buildings including two Grade II* listed aircraft hangars and the Grade II listed workshops and interwar station headquarters. In WW2 the airfield served as an assembly point for materials and equipment ahead of D-Day; a 1945 aerial photograph shows the airfield perimeter track running through Areas A, B1 and C; a series of features relating to a possible camp or depot in Area C; and the sites of the battle HQ and a pillbox within Area B2.
- 1.4.4 The previous geophysical surveys revealed a wide array of features ranging in date from the prehistoric to modern, including a ring ditch assumed to be a ploughed out round barrow of likely Bronze Age date (Area B1); the continuation of the Portway Roman road (Area A); and numerous features relating to the use of the military airfield (Areas A and B1). The geophysical survey carried out by Archaeological Surveys (2007) included an area over the Wessex Linears that extend into the present survey area (Area C).
- 1.4.5 Two phases of evaluation in 2007 and 2008 targeted anomalies identified from the geophysical surveys of Areas A and B. The first phase, undertaken in October 2007, confirmed the survival of the agger and flanking ditches of the Roman road in Area A (Wessex Archaeology 2007). The second phase of trial trenching, undertaken in January/February 2008 investigated the ring ditch in Area B1 but found no conclusive dating evidence (Wessex Archaeology 2008). A number of features related to the 20th century airfield comprised a gravel trackway thought to be a runway perimeter track; a reinforced concrete structure believed to be a military magazine; and a rubbish pit in Area A, possibly the remains of a detonator store recorded on the 1927 Air Ministry airfield layout plan.



2 METHODOLOGY

2.1 Introduction

- 2.1.1 The detailed magnetometer survey was conducted using a Bartington Grad601-2 dual fluxgate gradiometer system. The survey was conducted in accordance with English Heritage guidelines (EH 2008).
- 2.1.2 The geophysical survey was undertaken by Wessex Archaeology's in-house geophysics team in three phases on 5th to 7th August, 4th September and 20th October 2014. Field conditions at the times of the surveys were variable, with parts of the survey area under long grass. A total of 12.3ha was surveyed.

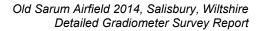
2.2 Method

- 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 (EH 2008).
- 2.2.2 The magnetometer survey was conducted using a Bartington Grad601-2 fluxgate gradiometer instrument, which has a vertical separation of 1m between sensors. Data were collected at 0.25m intervals along transects spaced 1m apart with an effective sensitivity of 0.03nT, in accordance with EH guidelines (EH 2008). Data were collected in the zigzag method.
- 2.2.3 Data from the survey was subject to minimal data correction processes. These comprise a zero mean traverse function (±5nT 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.
- 2.2.4 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 a small number of anomalies of likely, probable and possible archaeological interest across the Site, along with several modern services. Results are presented as a series of greyscale and XY plots, with corresponding archaeological interpretations, at a scale of 1:1500 (Figures 2 to 7). An additional figure showing the overall interpretation has been produced at a scale of 1:2500 (Figure 8). The data are displayed at -2nT (white) to +3nT (black) for the greyscale image and ±25nT 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 4** and **7**). 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 but it should be noted that some may prove to relate to 20th century airfield installations.





- 3.2.1 The most significant anomalies are three parallel linear ditches running through the middle of the survey area around **4000** on a northwest-southeast alignment. These ditches have magnetic values over +3nT for the most part with some weaker regions around +1.5nT. The ditches are separated by a distance of approximately 7.5m. These ditches match the position of recorded cropmarks identified in the DBA and most likely form part of a 'Wessex Linear'. These features have been classed as *archaeology* with weaker sections of ditch classed as *probable archaeology*.
- 3.2.2 A pair of parallel curvilinear ditches is present around **4001**; these ditches have fairly weak values of around +1nT and are separated by a distance of approximately 7m. The function of these ditches is unclear but they may define a track of unknown date. This feature has been classed as *probable archaeology* due to the weak magnetic values obtained from the ditches.
- 3.2.3 A ditch is visible at **4002** that runs near parallel to the suspected Wessex Linear located 50m to the northeast. It has fairly weak magnetic values around +1nT and has been classed as *probable archaeology* due to its proximity to the parallel Wessex Linear.
- 3.2.4 A group of ditches forming a rectilinear enclosure are visible around **4003**; the ditches have very weak magnetic values that are typically less than +1nT. The enclosure is aligned roughly northwest-southeast and appears to be open on its northeast side with no sign of any internal features. Its function is unclear and it could relate to agricultural activity or could form part of the former airfield complex; nothing is visible on any of the maps consulted that corresponds to this feature. This feature has been classed as *possible archaeology* due to its weak values and the uncertainty of its function.
- 3.2.5 Another group of stronger ditches are visible around **4004**; these have magnetic values over +3nT and their spiked profile in the XY trace plot suggests that a significant amount of ferrous/ceramic material is present in the fill.
- 3.2.6 A fragmentary linear anomaly visible within the extensive areas of increased magnetic and ferrous responses appears to run parallel to the south and southeast field boundary at **4005** therefore it is possibly associated and has been classed as *agricultural*.
- 3.2.7 There are some regular ferrous anomalies running through the data such as a line of ferrous responses at **4006**; the function of these features is unclear and they could represent modern agricultural installations or airfield features.

3.3 Gradiometer Survey Results and Interpretation: North (Figures 5 to 7)

- 3.3.1 A ditch with magnetic values around +1nT is visible in the northern half of the data at **4007** it is parallel to the suspected Wessex Linear located over 50m to the southwest at **4000**. It is unclear whether this ditch is related but its alignment clearly respects the linear and this ditch has been classed as *probable archaeology* accordingly.
- 3.3.2 Other ditches located in the data have alignments generally consistent with ploughing trends and existing field divisions, such as at **4008**. These are considered more likely to represent recent agricultural features than archaeology, but have been classed as *possible archaeology* as they do not correspond to mapped agricultural features.
- 3.3.3 A short linear ferrous feature has been interpreted as agricultural at **4009**; its function is unclear, however, and it could conceivably relate to some form of airfield feature. A parallel pair of negative anomalies around **4010** marks the edge of the road that runs



through the survey area. They have been classed as agricultural but are likely to relate to the development of the airfield.

- 3.3.4 A series of modern services run through the northeast half data at **4011** to **4015** with the service at **4014** partially obscuring the suspected Wessex Linear: these services are discussed in more detail in the next section of the report.
- 3.3.5 Several lines of ferrous responses run through the data at **4016** and **4017**; these are considered to define former fence lines, although none are shown on any of the maps consulted.
- 3.3.6 There are numerous small sub-oval shaped positive anomalies scattered across the entire dataset. They have magnetic values ranging from +1nT to over +3nT and could either be small archaeological features or are natural hollows. Previous experience working in this geology has shown many such features to be natural tree throws, whereas only a small number prove to be pits; it is simply not possible confidently to tell the difference from geophysical data alone. All of these anomalies have been classed as *possible archaeology* to reflect this uncertainty.
- 3.3.7 The remaining anomalies detected include weak linear trends of uncertain origin. It is unclear whether these features indicate the presence of archaeological, modern or geological features.

3.4 Gradiometer Survey Results and Interpretation: West (Figures 2 to 4)

- 3.4.1 The geophysical survey area was extended in October 2014 to fill a gap between the previous surveys carried out GSB Prospection and Archaeological Surveys.
- 3.4.2 The continuation of the Wessex Linear can be seen at **4018** and is crossed by a service. An L-shaped ditch is visible around **4019** that appears to extend off of the linear with a second shorter linear section parallel to the east-west ditch of the enclosure; all ditches have magnetic values over +3nT have been classed as *archaeology*. Very little is visible within this enclosure to suggest it relates to settlement, there are some linear trends of uncertain origin, ploughing trends and large ferrous anomalies suggesting that these are probably of modern origin and not associated with the L-shaped ditch.
- 3.4.3 A pair of broad linear features is visible further south at **4020** and **4021** with varying magnetic values from +0.5nT to values over +3nT. They terminate close to the enclosure and run roughly perpendicular to the Wessex Linear. It is likely that they relate to the wider prehistoric landscape divided by the Linear and are therefore classed as *probable archaeology*.
- 3.4.4 Other linear features on similar alignments can be seen at **4022** to **4025** and these have magnetic values ranging from around +2nT to under +0.5nT. They have been classed as *probable* or *possible archaeology* depending on the strength of their magnetic responses.
- 3.4.5 Numerous pit-like anomalies are scattered across the dataset, most are classed as possible archaeology but there are a few clear exceptions such as the example south of **4026**. This anomaly is sub-circular in shape with magnetic values in excess of +3nT and has been classed as *probable archaeology*, most likely representing a pit.
- 3.4.6 There are linear trends running through the data that are considered to be of uncertain origin. There are examples around **4027** that run parallel to **4020** and **4021**; these could



represent much older ploughing trends and are distinct in alignment and response from the numerous parallel ploughing trends visible elsewhere across the dataset.

3.4.7 A couple of weak linear features at **4028** and **4029** define a change in the observed ploughing direction. **4028** presents a clearer continuous feature whereas **4029** is weak in places and is defined as a trend for most of its length. Both of these features may prove to be former field boundaries and have been classed as *agricultural* as a result.

3.5 Gradiometer Survey Results and Interpretation: Modern Services

- 3.5.1 Several modern services are visible running through the data with large pipes visible at **4011** and **4012** and smaller pipes at **4013** and **4014**. All services extend from Ford to the south and continue beyond the northern or western extents of the survey area.
- 3.5.2 A possible fifth service is visible at **4015** that appears to represent a cable, although it is possible that this represents some other buried metal object given it terminates in the middle of the field. A sixth possible service is visible around **4030** and appears to represent a pipe; it is not visible as a continuous feature and this may indicate some disturbance. This probable pipe appears to terminate at the possible field boundary at **4029** and this may suggest it served an agricultural function.
- 3.5.3 It is not clear from the geophysical data whether the services identified are in active use. It should also be noted that 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 CONCLUSIONS

4.1 Discussion

- 4.1.1 The detailed gradiometer survey has been successful in detecting anomalies interpreted as of likely, probable and possible archaeological interest, as well as ploughing trends and agricultural ditches. A large amount of ferrous features and several modern services are visible close to the village of Ford.
- 4.1.2 The most interesting feature is the suspected Wessex Linear previously known from cropmarks. This is composed of three ditches and is likely to have formed a major land division; the cropmarks extend across the flying field and continue north of the Portway, where they were investigated in 2006. Two weaker ditches at **4002** and **4007** and running parallel to it on either side at a spacing of approximately 50m from the nearest ditch could form part of a wider field system co-axial with the Linear.
- 4.1.3 Other features have been detected that appear to respect the Wessex Linear including an enclosure at **4019** and two linear features running perpendicular at **4020** and **4021**. It would seem that this linear is associated with a wider network of smaller scale land divisions.
- 4.1.4 Other weak ditch responses in the data include a curved trackway at **4001** and a rectilinear enclosure at **4003**. The date and exact function of these features is unclear but they may prove to be of interest.
- 4.1.5 A number of small anomalies are possibly archaeological and could represent pits, although it is possible that many may prove to be natural features such as tree throws: these features form no discernible pattern that might suggest a focus of settlement related activity. However, 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.
- 4.1.6 The remaining anomalies detected appear to be either agricultural in origin or to relate to features of the historic airfield. The linear ferrous anomaly at **4009** looks very similar to an anomaly detected by Archaeological Surveys in Area A that upon excavation turned out to be a modern track (Archaeological Surveys 2007; Wessex Archaeology 2008); it is possible that this feature also represents a track of similar construction.
- 4.1.7 The relative dimensions of the modern services identified by the gradiometer survey are indicative of the strength of their magnetic response, which is dependent upon the materials used in their construction and the backfill of the service trenches. The physical dimensions of the services indicated may therefore differ from their magnetic extents in plan; it is assumed that the centreline of services is coincident with the centreline of their anomalies, however. Similarly, it is difficult to estimate the depth of burial of the services through gradiometer survey.

5 REFERENCES

5.1 Bibliography

Archaeological Surveys Ltd, 2007. Old Sarum Airfield: Geophysical Survey. Unpublished client report.

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

GSB Prospection,1999. *Old Sarum Airfield Salisbury – Geophysical Survey.* Unpublished client report. Report ref. 99/92.

Institute for Archaeologists, 2011. *Standards and Guidance for Archaeological Geophysical Survey.* Unpublished Guidance.

Wessex Archaeology, 2007a. *Old Sarum Airfield, Salisbury, Wiltshire: Historic Environment Desk-Based Assessment*. Unpublished client report. Report ref. 66010.00.

Wessex Archaeology, 2007b. Old Sarum Airfield, Salisbury, Wiltshire: Archaeological Evaluation (Areas A and B). Unpublished client report. Report ref. 66010.11.

Wessex Archaeology, 2008. Area A, Old Sarum Airfield, Salisbury, Wiltshire: Archaeological Field Evaluation. Unpublished client report. Report ref. 66012.01.

Wessex Archaeology, 2014. Old Sarum Airfield, Salisbury, Wiltshire: Archaeological Desk-Based Assessment. Unpublished client report. Report ref. 66013.01.

5.2 Cartographic Sources

British Geological Survey

http://www.bgs.ac.uk/discoveringgeology/geologyofbritain/viewer.html [accessed July 2014]

Soil Survey of England and Wales, 1983. *Sheet 5, 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 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.

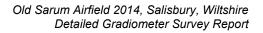
The gradiometers have an effective resolution of 0.03nT over a $\pm 100nT$ range, and measurements from each sensor are logged at intervals of 0.25m. All of the data are stored on an integrated data logger for subsequent post-processing and analysis.

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 magnetometer;
- 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 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 subdivided 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 modern category is used for anomalies that are presumed to be relatively modern in date:

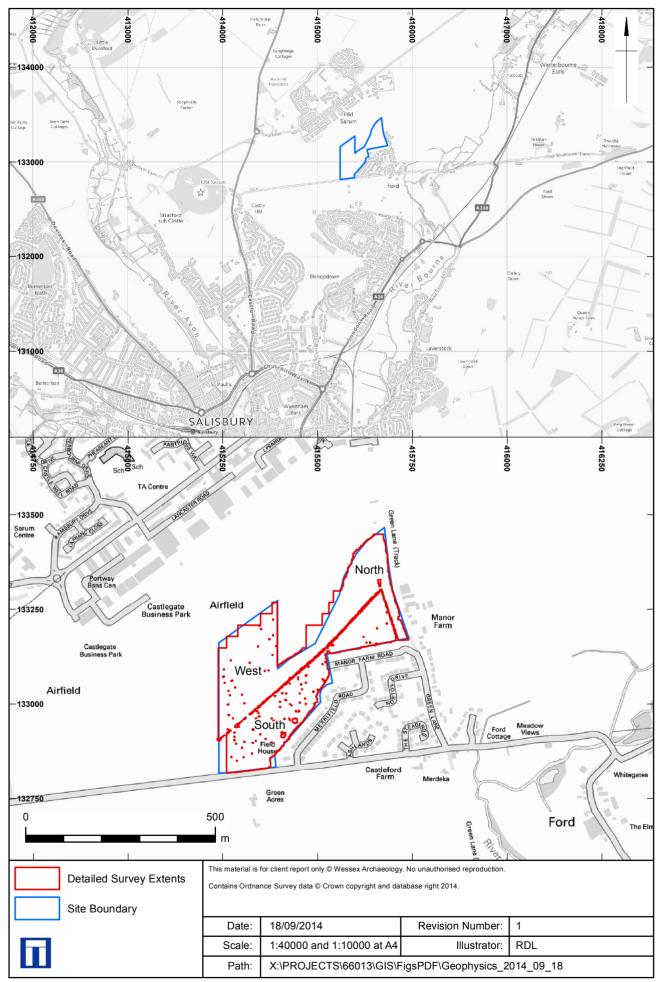
- Ferrous used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Modern service used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

The agricultural category is used for the following:

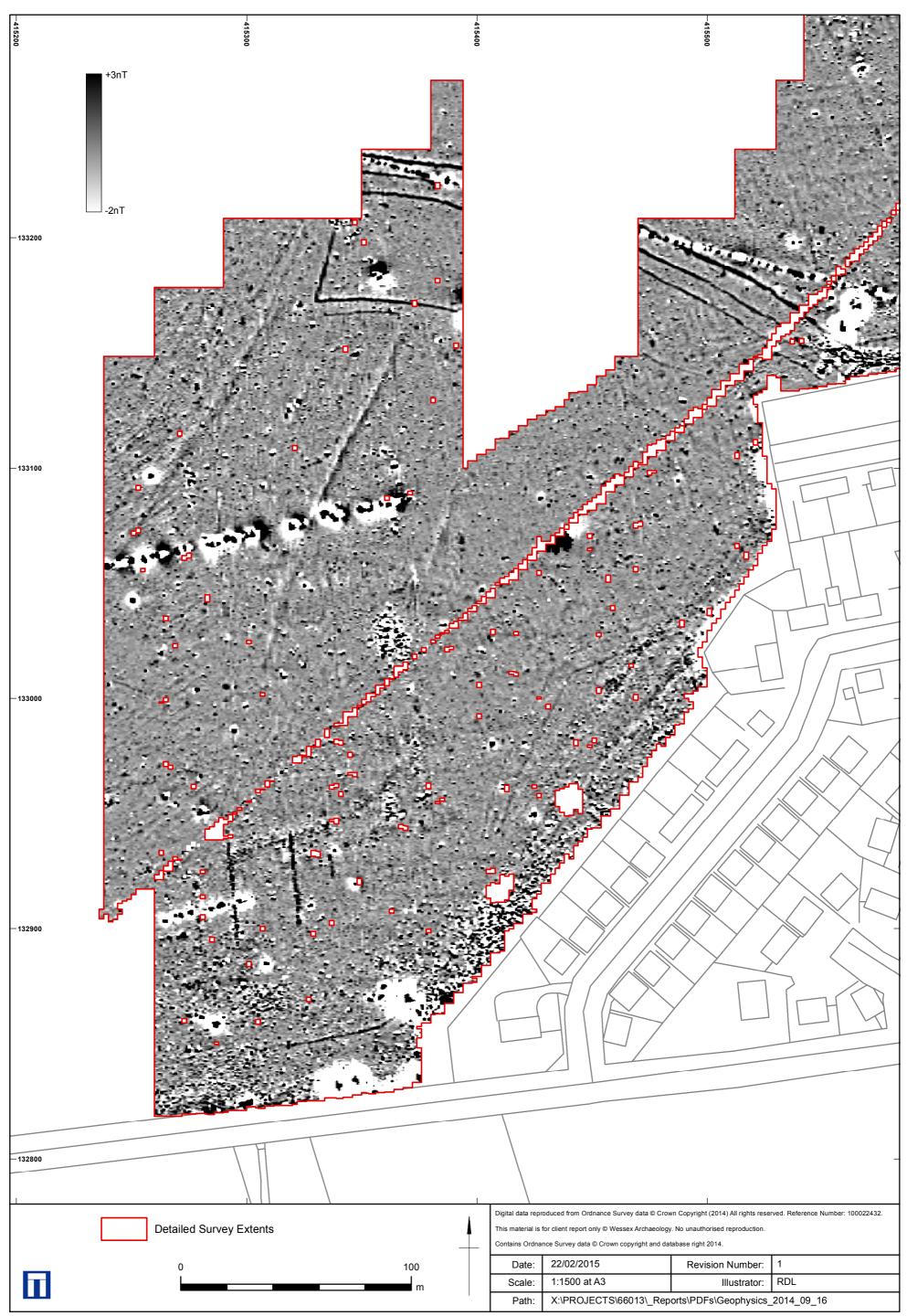
- Former field boundaries used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Agricultural ditches used for ditch sections that are aligned parallel to existing boundaries and former field boundaries that are not considered to be of archaeological significance.
- 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:

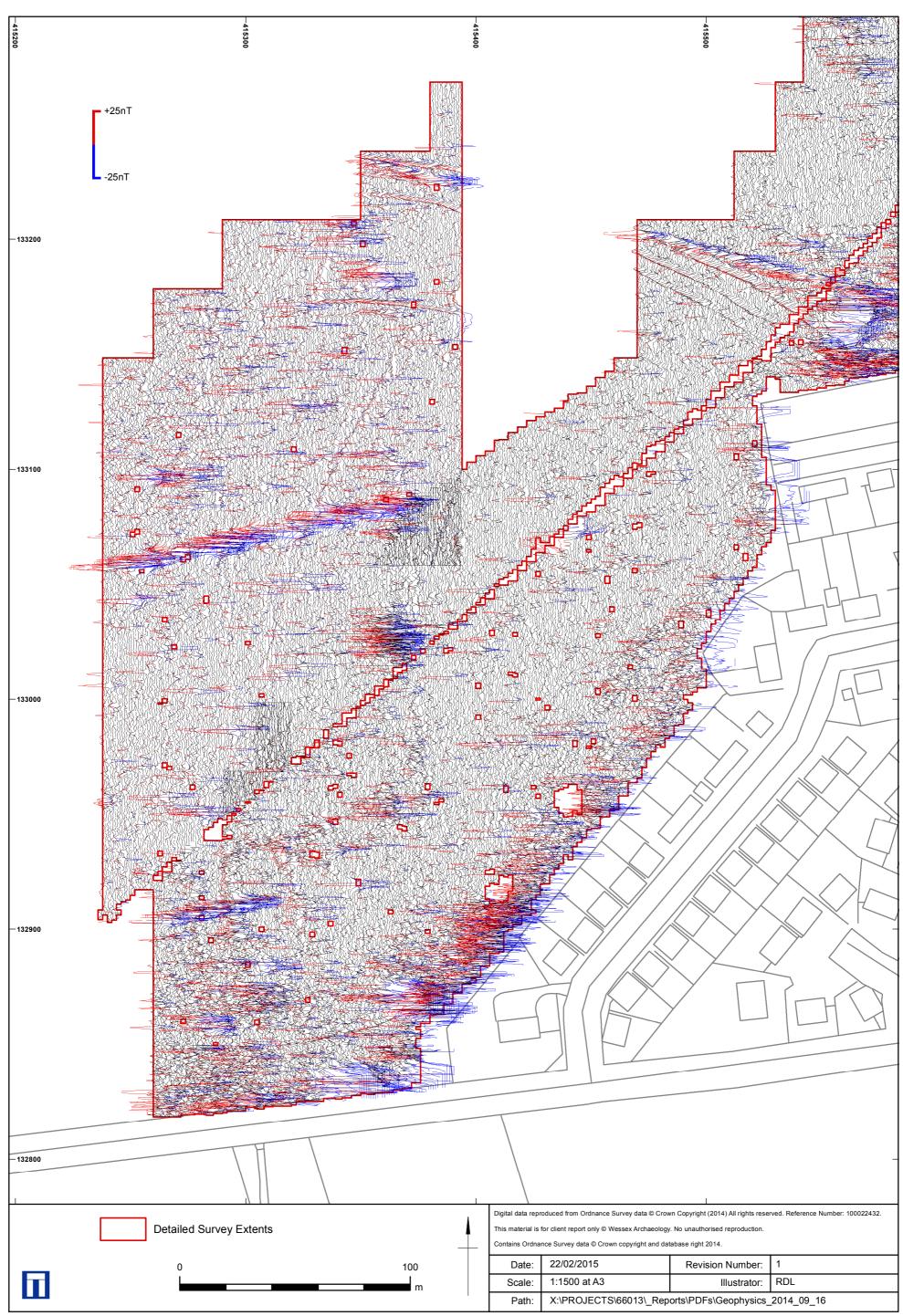
- Increased magnetic response used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend used for low amplitude or indistinct linear anomalies.
- Superficial geology used for diffuse edged spreads considered to relate to shallow geological deposits. They can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



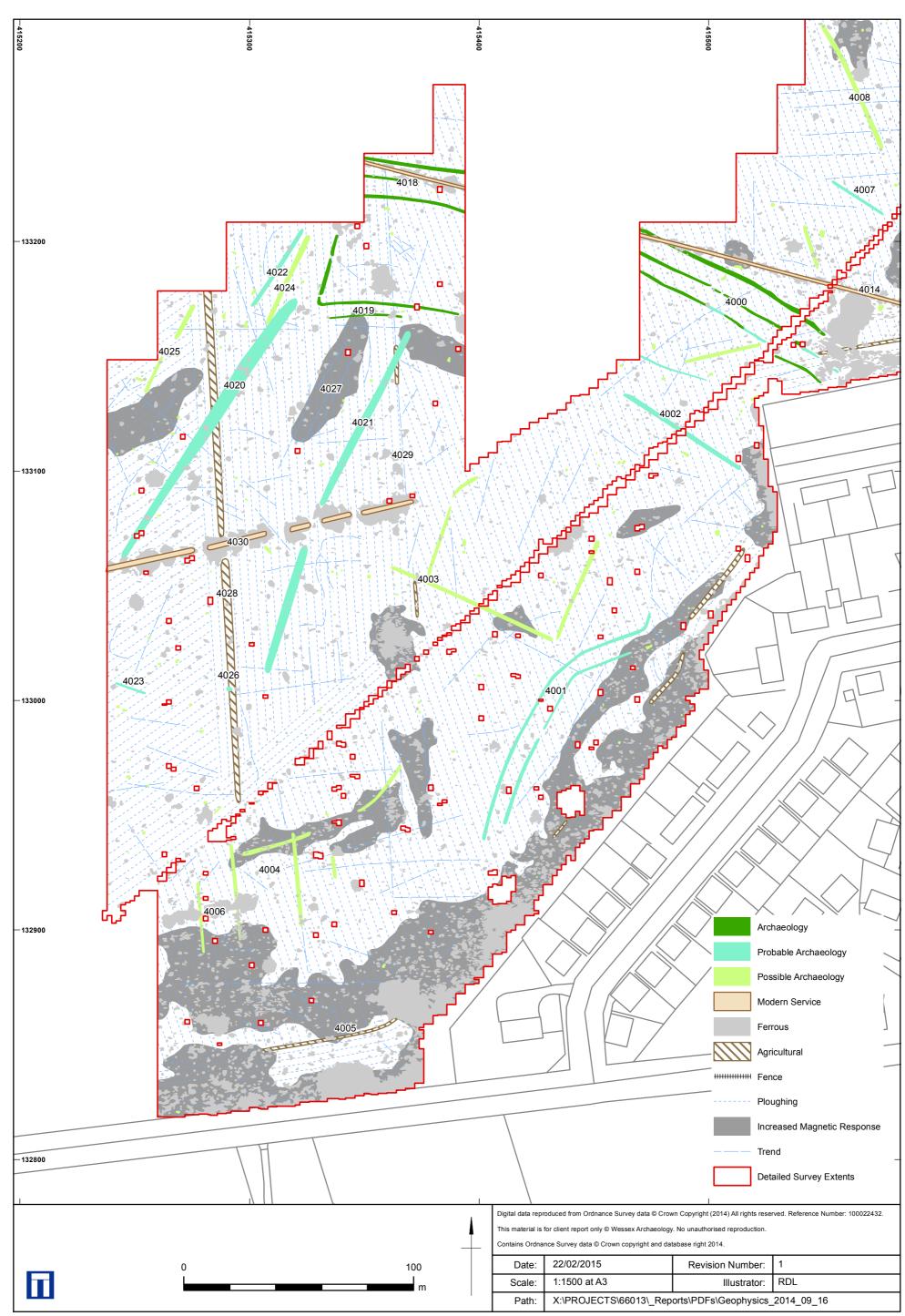
Site location and detailed survey extents



Greyscale plot, south



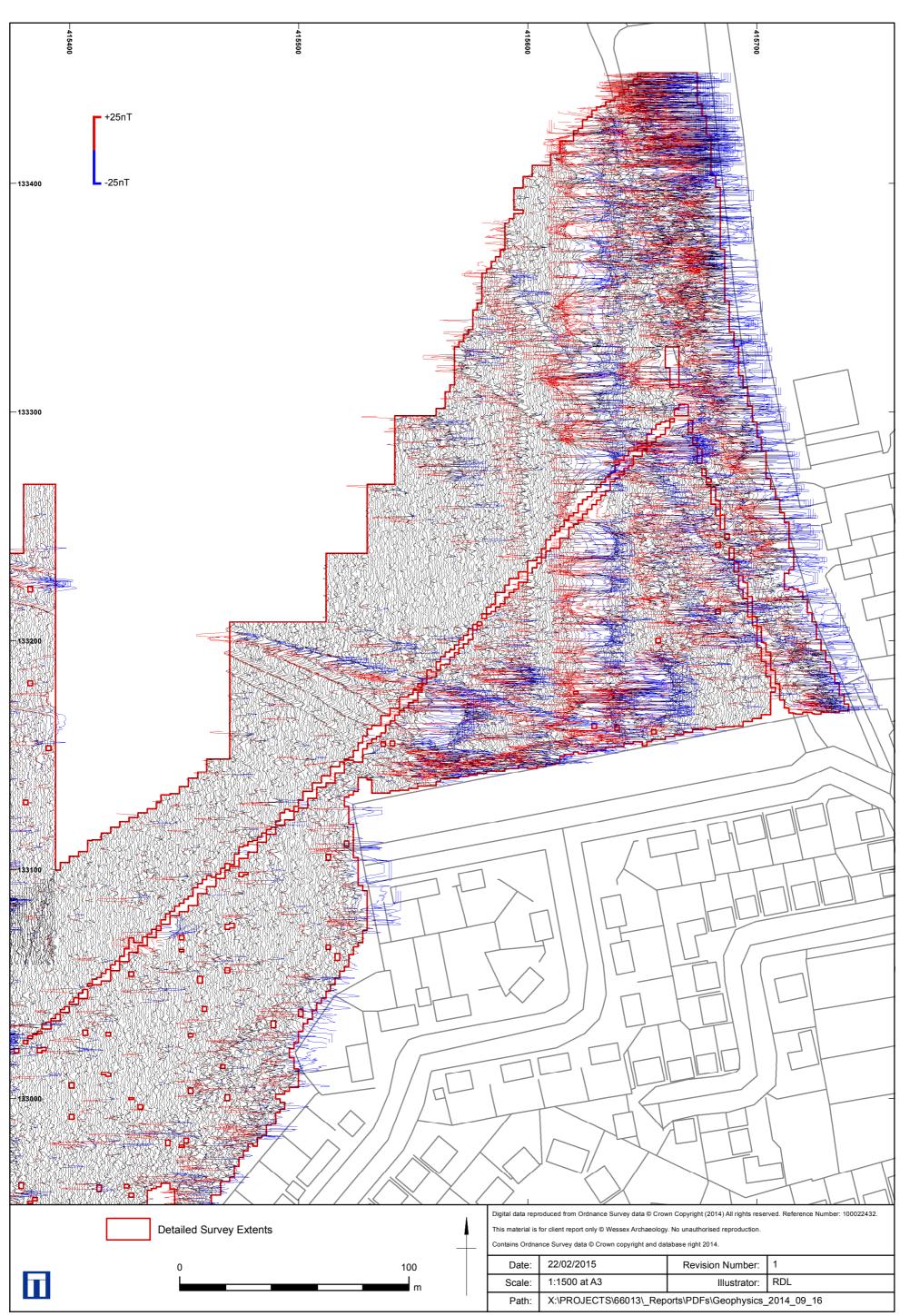
XY trace plot, south



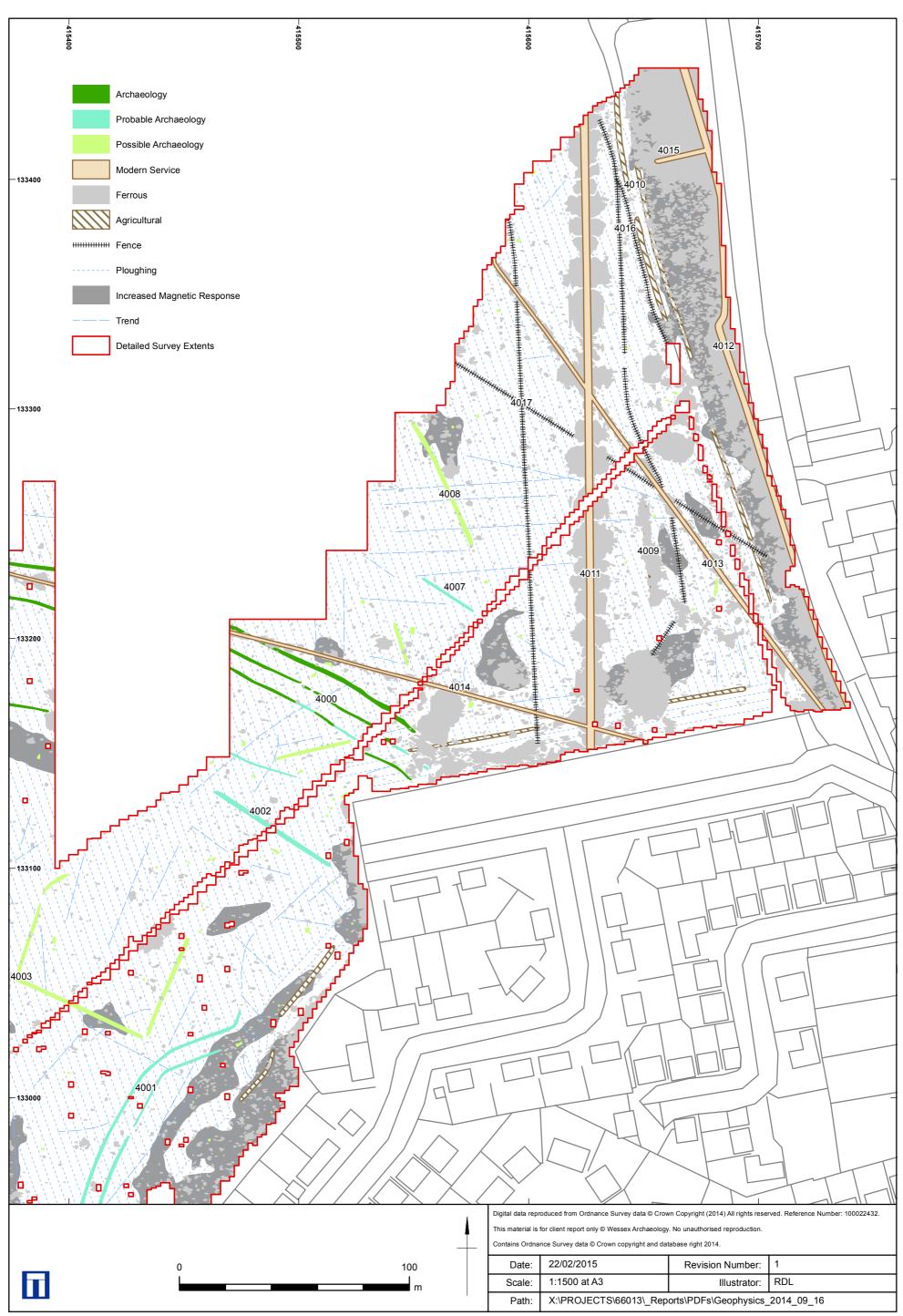
Interpretation, south



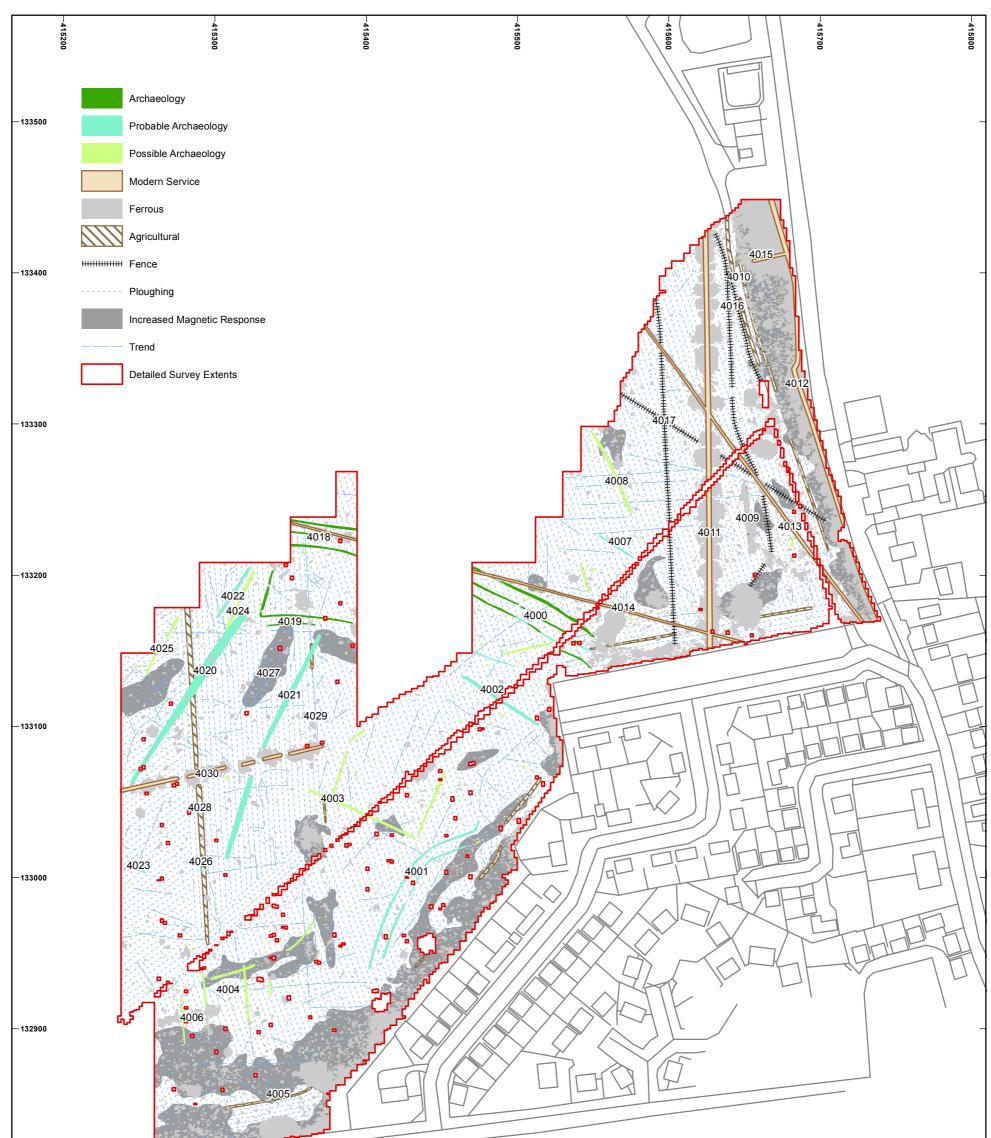
Greyscale plot, north



XY trace plot, north



Interpretation, north



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Overall interpretation





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