BATH & CAMERTON ARCHAEOLOGICAL SOCIETY

Geophysics at Saltford – Phase 2, 2016

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Bath and Camerton Archaeological Society

Abstract

This survey was the second phase of a geophysical survey of a field known as Coffin Field to the south of Keynsham Manor, Manor Road, Saltford. The first phase, which was completed in the autumn of 2015, is the subject of a previous report.

The survey was carried out jointly by volunteers from the Bath and Camerton Archaeological Society and the Saltford Environment Group (SEG) on the 1-2 and 8-10 November 2016. Twin-probe resistance meters and a magnetometer were used.

During this second phase, the magnetometry of the field was completed so that a number of features could be seen for the first time or seen as a whole. Lidar data, which became available during the course of the survey, added extra information.

The results suggest that there is a large structure, probably of Roman origin, at the far south of the field. It would appear to be encompassed within a pair of parallel ditches extending westwards. There would also appear to be a smaller structure in the north-west corner of the field, where ground disturbance was noted in the 2015 survey.

In the eastern portion of the field, the magnetometry has identified a feature which may possibly be a washing pool. The 2015 survey area just clipped this feature which it appeared might be a pond. It is now apparent this is not the case.

Lidar images show that there are features in the adjoining fields that may be related to the survey site. In particular the images have identified what would appear to be rectangular enclosures. There are also signs of other possible structures.

Geophysics at Saltford, Phase 2, 2016

Roger Vaughan and John Oswin

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Preface

Bath and Camerton Archaeological Society is an amateur society, which has built a high reputation in geophysics for long term, large area research projects. It has a very full set of geophysics equipment. The survey at Saltford was carried out at the request of, and in conjunction with, Saltford Environment Group (SEG) which is a local community association concerned with environmental and sustainability issues affecting the village. The survey was undertaken by volunteers from both organisations.

Acknowledgements

We would like to thank the landowner, Adam Stratton, for kindly allowing access to the field, to BACAS for providing the survey equipment and to all the volunteers for their help and enthusiasm: Terri Bell, Ray Buchanan, Rick Crowley, Frances Eggbeer, Phil Harding, Richard Hatton, Chris Higgs, Mike Headford, Stella Hurley, John Knapper, Jeremy Lewis, Keith Miller, Bob Mordle, Janet Pryke, John Richards, Wendy Russ, Andrew Stainer and Roger Wilkes.

Thanks are due to Phil Harding for supplying the photographs used in this report, to Andy McGrandle of BigAnomaly for the Lidar data and images, and to John Richards for his contribution to the mapping. Lidar data were open source issue from the Environment Agency. Crown copyright.

We acknowledge the use of Dorset Explorer in preparing the map for figure 1.1. Google Earth was also used in preparation of overlays.

Figure 1.2 is taken from an Ordnance Survey map on which there is Crown copyright. We acknowledge the use of this map in compiling this report.

1 Introduction

1.1 Location

The field involved in this project lies to the south of Keynsham Manor, Manor Road, Saltford in the Unitary Authority of Bath and North East Somerset. It is shown as Field 3137 on the 1965 1:2500 scale Ordnance Survey National Grid series map, and on older County series maps as Field 794. The field is centred on ST 673664.

Figure 1.1. Location map showing Saltford and the area of survey between Saltford and Keynsham.

The field is of an irregular shape with hedgerows, interspersed with small trees, delineating its boundaries. It is used for arable farming. There is a small pond hidden amongst undergrowth in the eastern hedgeline. The land rises gently towards the southern boundary.

Figure 1.2. Map showing location of the field and of Roman find-spots within it. Courtesy Ordnance Survey, Crown copyright reserved.

A study of old Ordnance Survey maps has revealed that there was once a trackway running north to south approximately 60 metres from, and parallel to the present western boundary.

1.2 Background

The survey was carried out at the request of the Saltford Environment Group (SEG) who are researching and recording the history of the village. They were interested to know more about this field as it appeared to be of particular archaeological interest.

In 1948 a stone coffin complete with skeleton had been found in the field when the farmer was removing a tree. Buried two feet below the surface it was identified as being of Roman origin. Made from oolitic Bath stone, it was of a similar type and age to other coffins that had been discovered in various locations in and around the City.

The year after the coffin had been found, some trial trenches had been dug to determine whether there was any other evidence of Roman occupation. The excavations had unearthed pottery fragments, coins, nails and utensils as well as 'oyster shells too numerous to record'. There was a suggestion that there may have been a road in this location, but whether this was of Roman origin was unable to be determined.

A detailed report describing the finding of the coffin and the subsequent excavations appears in the Proceedings of the Somerset Archaeological and Natural History Society published in 1950. Ordnance Survey maps published in the 1960s show the locations within the field where the coffin and other Roman materials are said to have been found (figure 1.2). There are relevant entries in the Bath and North East Somerset Historic Environment Record (ref MBN 1241, MBN 1242 and MBN 1243).

In more recent years, metal detectorists have reported discovering Roman coins in the field and other artefacts including Roman brooches and a late bronze age axe blade have also been found (Portable Antiquities Scheme references ID GLO-F02B7D, ID GLO-F0A334, ID GLO-D087E2 etc). Oyster shells and pottery fragments can be spotted when field walking.

1.3 Date of survey

The survey was carried out on Tuesday 1 November, Wednesday 2 November, Tuesday 8 November, Wednesday 9 November and the morning of Thursday 9 November 2016. Working hours were from 09.30 to mid afternoon.

1.4 Personnel

The survey was led by Dr John Oswin MA PhD CSci FGS, Geophysics Team Leader for Bath and Camerton Archaeological Society (BACAS), who was assisted by a team of volunteers from both BACAS and SEG.

1.5 Scope

This report describes the geophysical survey undertaken in 2016 as a combined BACAS/SEG project. The report may make references to earlier work, but only in support of this work.

2 Method

The 2016 survey was a continuation of work from 2015, already reported, and methods continued from that year. The grid was set out in 20 m squares again, based on a line passing under the central wire of the overhead electrical line which just cuts the northern edge of the field, with the origin based on the pole at the centre of the northern hedge.

For both resistance and magnetometer surveys, the start point was in the south-west corner, 1 m from the south-west corner of each square, the first traverse being northwards (Oswin, 2009, fig 5.8c, p115). The magnetometer gathered data at 4 points per metre along lines 1 m apart, giving 1600 points per complete square. The resistance meters gathered data at 2 points per metre along lines 1 m apart, giving 800 points per metre. Grid numbering was re-started at 101. The order in which grids were surveyed is given in Appendix A.

Figure 2.1. Bartington 601-2 magnetometer in use during the survey. Resistance survey in progress in the background. This was in the first week, before the field was rolled.

Magnetometer (Bartington 601-2) data were downloaded via Bartington proprietary software, the de-striped processed using BACAS proprietary software and then mapped using INSITE v3. The resistance meters (TR/CIA and Geoscan RM15) were downloaded using BACAS proprietary software and mapped using INSITE v3.

The field had been ploughed and drilled by the first day of the survey. The surface was sufficiently dry and not too rough for walking with the magnetomer. After the first week, the field was rolled. This provided a more satisfactory surface, but all grid markers had to be removed at the end of the first week and re-instated at the beginning of the second week.

A total of 4.5 days were used for the survey in 2016. This just allowed completion of the whole field with the magnetometer. This had been the principal aim of the exercise, given that the earlier work had shown the magnetometer to be much more effective in finding features. The resistance survey was continued in the hope it would show more detail of the structure just beginning to emerge in 2015, but no attempt was made to complete the field. A few grids were also surveyed using the RM15 resistance meter fitted with a long bar for 1 m probe separation. Time did not allow for any resistivity profiles.

An extra method deployed in 2016 was the use of lidar data. This enabled contour data to be prepared and also earthworks to be observed in this and in neighbouring fields.

3 Results

3.1 Magnetometry

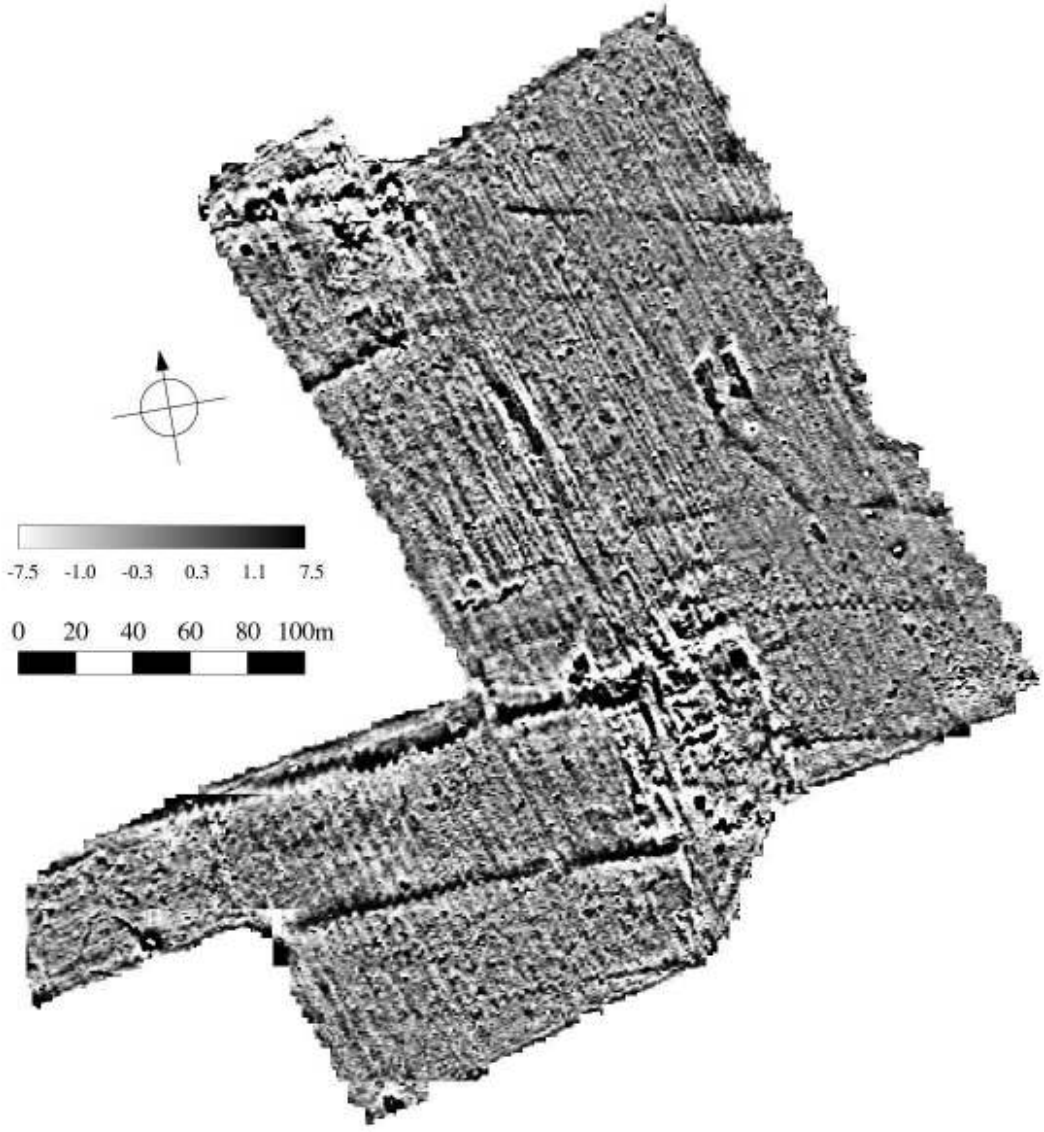

Figure 3.1. Full magnetometer survey of Coffin Field.

It was just possible to survey the whole field with magnetometry in the time available, approximately 200 grids including the 2015 results. The complete survey is shown in figure 3.1. The plot is obviously dominated by the lines of ploughing, but other features stand out from this. The principal features are marked in figure 3.2. The field is irregular in shape and is most likely an amalgamation of earlier, smaller fields. A north – south line divides the field quite evidently. To the east of this, a series of east – west lines, unevenly spaced, may be part of an earlier field system, perhaps mediaeval. In figure 3.2, these have been indicated by straight lines, although they are in fact slightly curved.

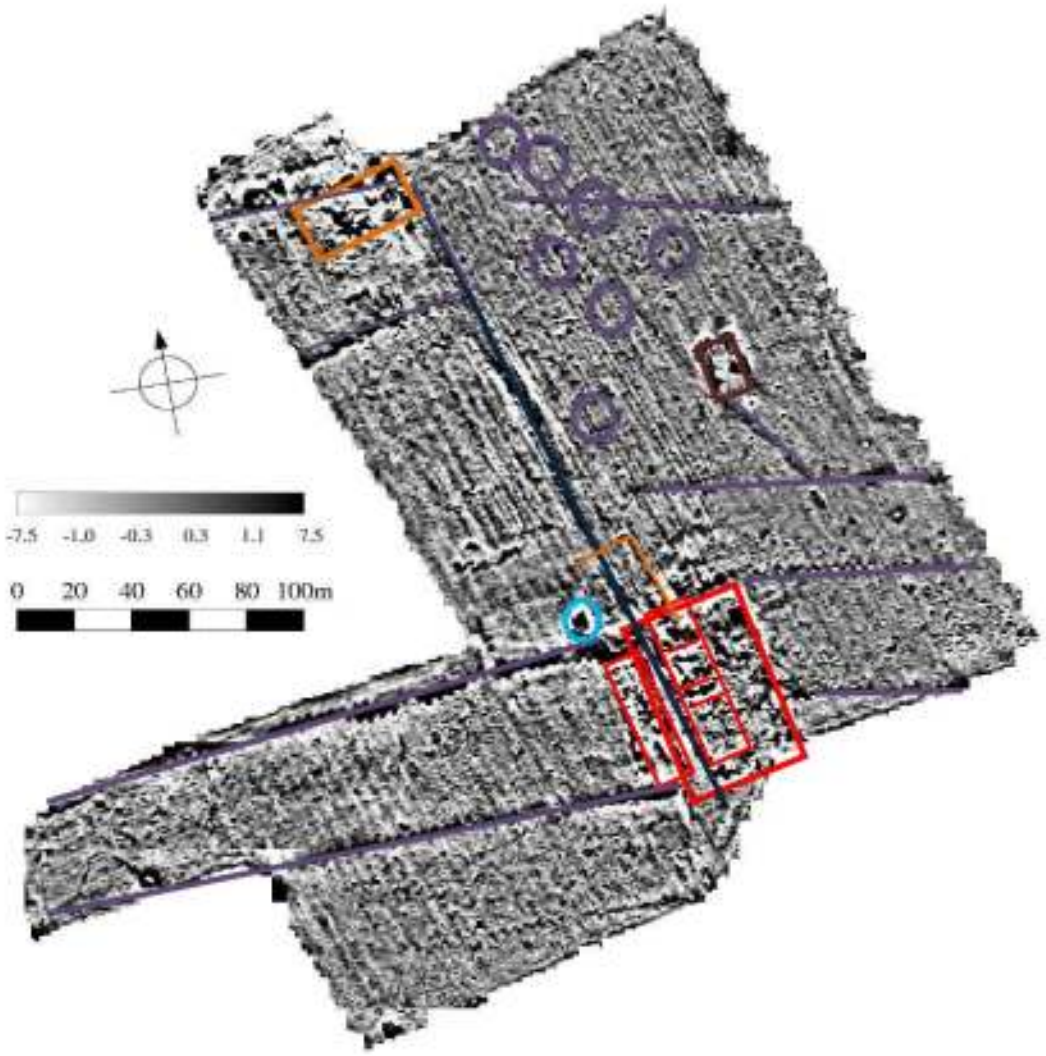

Figure 3.2. Magnetometer survey of Coffin Field, marked up with principal features

In the centre of the eastern portion, is a pair of short, intense strong lines (purple). It is not obvious what these represent, possibly the sides of a washing pool. The 2015 survey area just clipped the western edge of the feature and had tentatively suggested it was the edge of a pond. The 2016 results show that this was not the case. Strong lines heading west and north of this close by may represent a modern trackway.

To the north and west of that feature, a number of circles can be made out through the plough lines. These may represent prehistoric round houses. That would be consistent with findings from the survey of the Golf Course a few hundred metres to the east (Oswin, 2013). At the far south of the eastern portion of the field is an area very disturbed in magnetometry, but apparently forming rectangles (marked in red in figure 3.2). This would appear to be a major structure probably of Roman date. It is curious that it lies across the contours rather than along the slope.

Immediately to the west, this structure is encompassed by a pair of lines, probably ditches, heading west. Field boundaries appear to have been aligned on them, but they could well be older and likely of Roman origin if the structure is also Roman. Just to

the north, near the structure, a large magnetic signal is marked in figure 3.2 in blue. This might possibly be the find site for the coffin, based on its location, but it is beyond geophysics to tell.

A small portion of the survey has been re-made as figure 3.3. This gives a magnified view of this structure, but as is often the case, magnetometry does not give a clear unambiguous description of this structure. It can be seen to be large and suggests masonry set into a bed of material of different magnetic signature, so it could well be a large building.

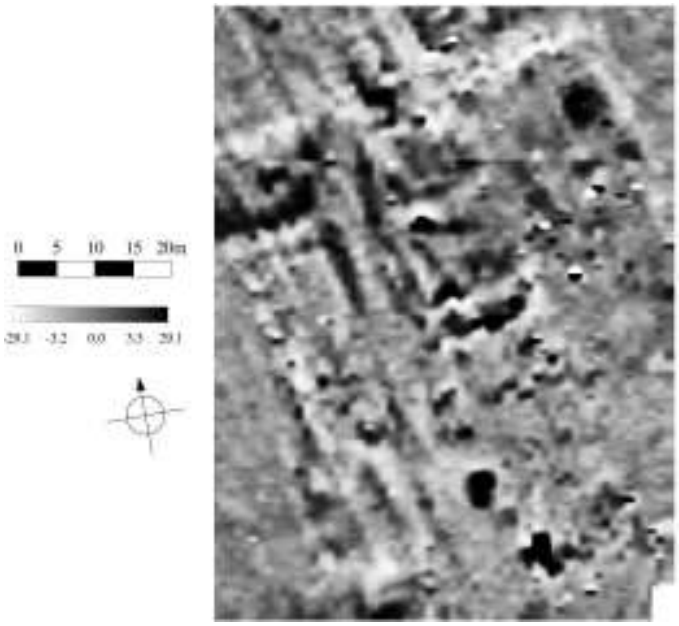

Figure 3.3. Southern portion of field containing large structure, to provide greater detail of magnetometry.

In the north – west of the field, another pair of lines head west. At the eastern end of these, an area of magnetic disturbance appears to indicate a structure, shown brown in figure 3.2, although this is smaller than that at the south end of the field, and seems to be aligned with the contours. Magnetometry has not provided a clear image.

3.2 Twin-Probe Resistance

Pace of survey using resistance was sacrificed to ensure the magnetometer survey was completed, but a number of grids were added. Figure 3.4 shows an overlay of the resistance coverage on that of the magnetometer. The resistance plot is in red while magnetometry is green, for contrast. With the overlay, there is some indication of activity in the area where the building is, and the ditches heading west can be picked up as low resistance. Otherwise, the plot is dominated by ploughlines.

A small number of grids were also surveyed using the 1 m probe separation bar on the RM15, repeating some of the standard resistance grids, in case features were deeper than expected. Figure 3.5 shows the output from this restricted survey, overlaid on a portion of the resistance and magnetometry survey. This gave some limited detail, but did not suggest deeper features, so either there is little remaining masonry for this structure and only footings survive below the old ground surface, or the topsoil is so brashy that it masks any surviving masonry.

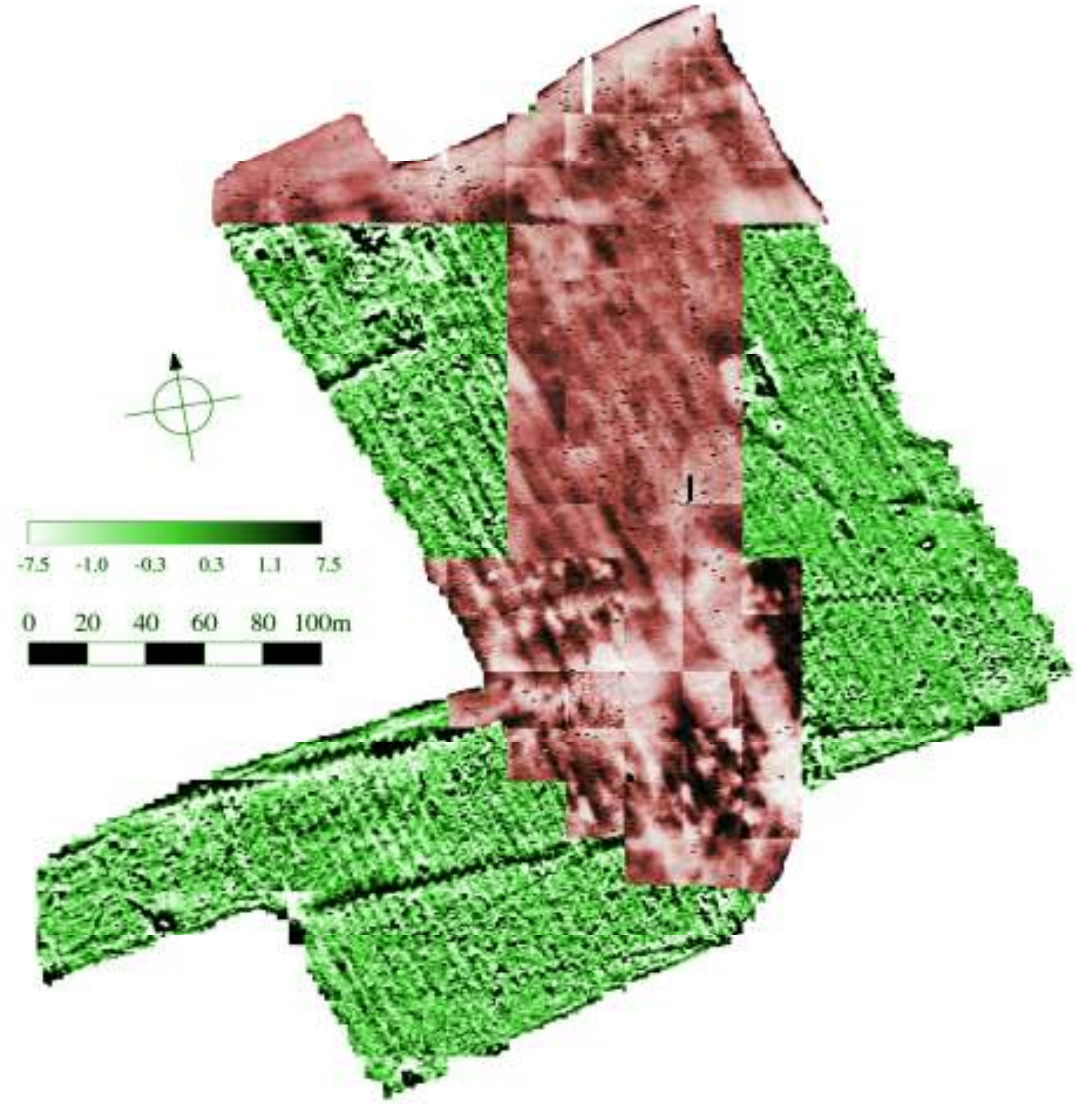

Figure 3.4. Overlay of resistance plot (red) on magnetometer plot (green).

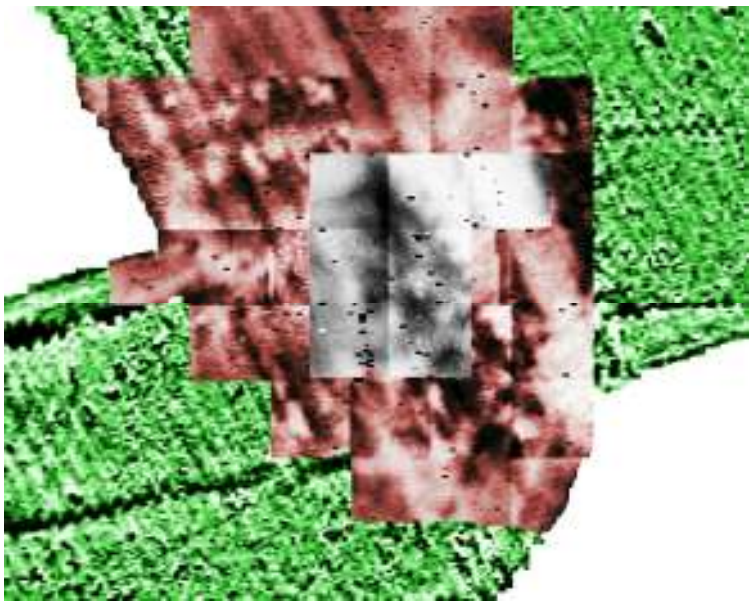

Figure 3.5. Deep-looking resistance plot (grey) overlaid on normal resistance (red) and magnetometry (green).

The main output of the resistance meters is shown in figure 3.6. The plot is dominated by ploughlines, which match those from the magnetometer plot. Although these are somewhat suppressed in the vicinity of the large structure shown by magnetometry, the resistance plots do not add extra detail.

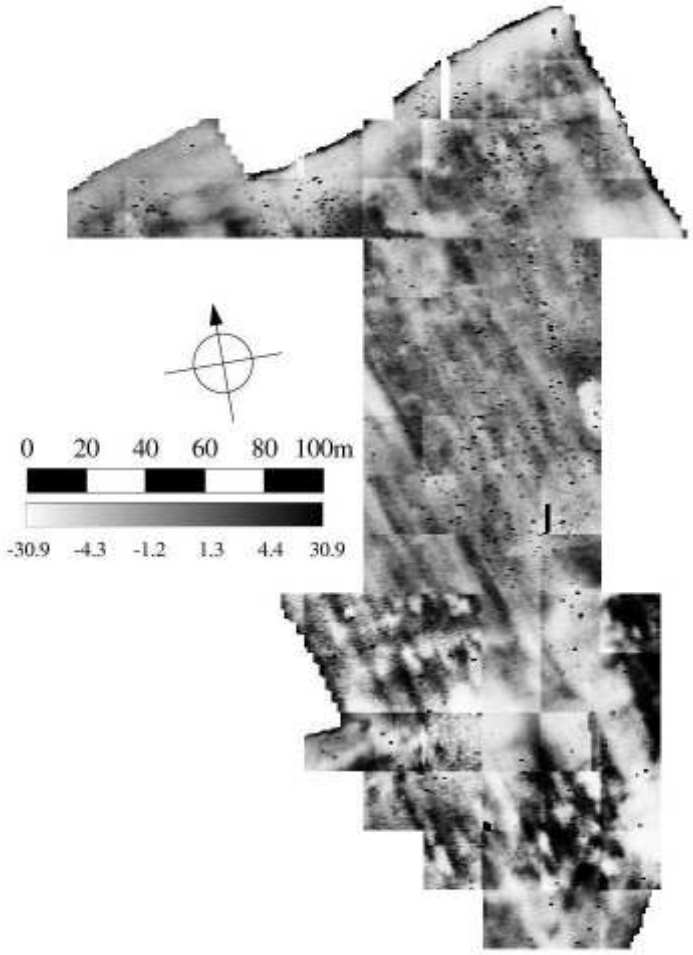

Figure 3.6. Full plot of twin-probe resistance survey.

3.3 Lidar

The introduction of lidar analysis was relatively late to the project, and may not be regarded by many as fieldwork, but it at least provides detail that would otherwise require extra fieldwork to collect, and also by nature of its wide area coverage also adds extra detail beyond the bounds of the geophysical survey.

All lidar results shown in this report are based on the digital terrestrial model (DTM) data set, based on final return, so representing ground surface.

Checks in 2015 had revealed that lidar coverage within Saltford parish did not extend as far south as Coffin Field, but towards the end of the survey in 2016, lidar coverage was found by Andy McGrandle of BigAnomaly, who also provided an initial analysis and display. This is shown in figure 3.7 as an oblique view of landscape from Google Earth overlaid with earthwork detail. Note that the lidar coverage includes fields to

the east, north and west, but the southern edge of Coffin Field only just comes within the area of coverage.

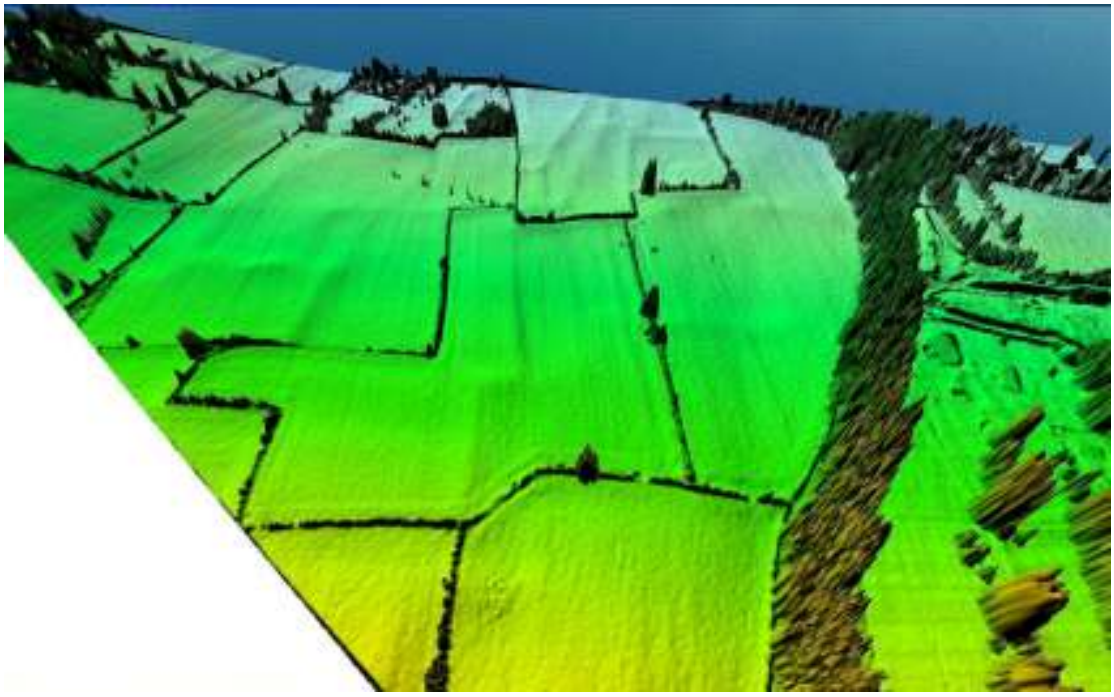

Figure 3.7. Processed lidar data for the area, showing Coffin Field and surrounding area, kindly supplied by Andy McGrandle of BigAnomaly.

Figure 3.8. Lidar-generated contour map (5 m interval), showing Coffin Field geophysical survey and surrounding fields. North to top. The irregular areas of contour on the right show earth movements on the nearby golf course.

The earthworks revealed by lidar will be discussed in detail later, but the initial use of the technique was to provide a contour map of the field, to add extra detail to the geophysics results. Figure 3.8 shows a contour map with contours at 5 m intervals over Coffin Field and surrounding area, demonstrating a relatively even gradient, land rising to the south.

Contouring at 1 m intervals has also been generated and this is intended for use with the magnetometry plot in particular. A steeper slope can be seen towards the south end of the field by the line which leads off west from the large structure's northern end. Perhaps this is an indication of a platform for that structure. Otherwise, these contours suggest a relatively even gradient throughout the field.

Figure 3.9. Magnetometry overlaid by 1 m contour map to provide extra detail. Note steeper bank towards southern end of field – contours are closer for 1 m. Heights have not been included to avoid extra clutter. For absolute heights, refer to figure 3.8.

4 Discussion: The Wider Picture

The 2016 survey brought two benefits: it completed the magnetometry survey so that a number of features could be seen for the first time or seen complete; the lidar data now available of the field added extra information, and particularly added information about neighbouring fields that had not necessarily been known before, It is useful that the lidar data covered fields to the north and north-west in particular, but it is a pity that Coffin Field is only just included and no extra information can be gleaned about fields to the south, south-west and south-east. Understanding of Coffin Field has also been enhanced by surface finds, tree-throws, metal detecting and the earlier small-scale excavations (Jeffreys, 1950).

Lidar information does not supplement such information but offers complementary information in the form of landscape archaeology. This is seen best from sun-shaded images rather than from contour plots, and this was hinted at by use of figure 3.7, but study of these data can reveal more about the earlier landscape. The visibility of this landscape depends much on the sun angle chosen.

Figure 4.1 shows Coffin Field and surrounding fields as if illuminated from the sun at azimuth 300 º, elevation 20 º, giving optimum visibility conditions. Even so, ploughlines tend to dominate and mask fine detail. Use of a southern sun reduces the visibility of the ploughlines, but also all other features. The slanting edge in the south-west corner is the limit of the lidar data.

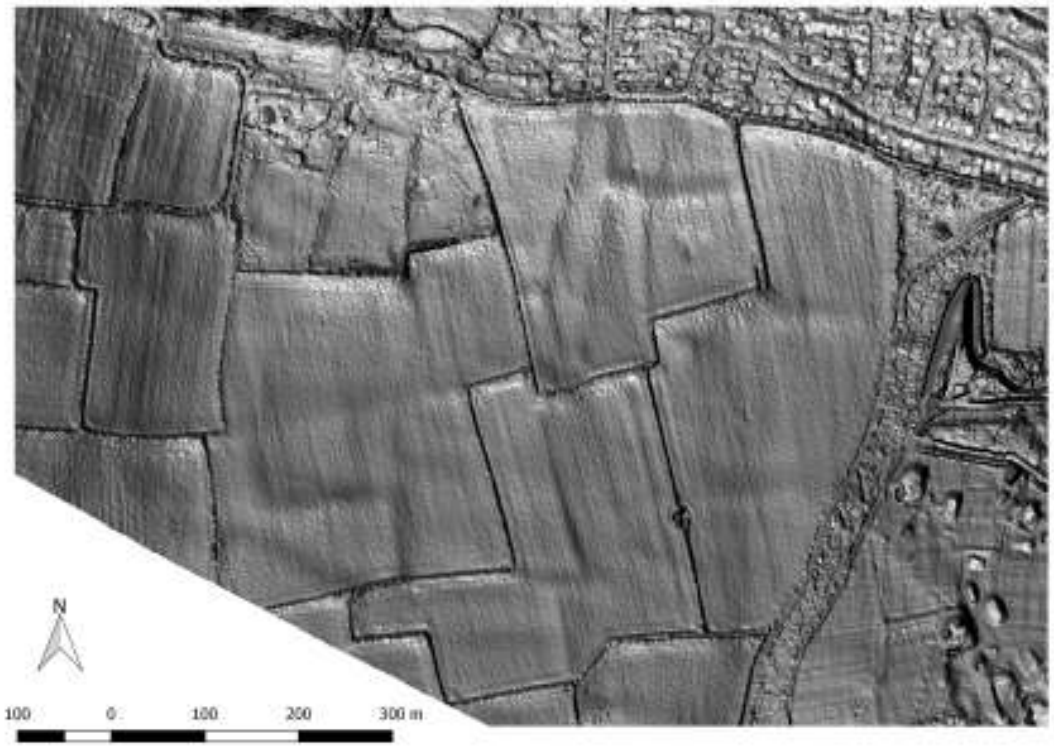

Figure 4.1. Coffin Field (bottom centre), and surrounding fields, illuminated from bearing 300 º, sun elevation 20 º. The bottom flat and slanting edges mark the extent of the lidar data.

The principal visible lines have been drawn over in figure 4.2 to bring them to the eye's notice better. Other features may be there but they are more obscure, or are obviously related to the plough or to modern field boundaries. Features in Coffin Field have been shown in green; they mainly relate to features observed by magnetometry. Sites of possible structures have been shown as blue rectangles. The magnetometry combined with the lidar is shown in figure 4.3.

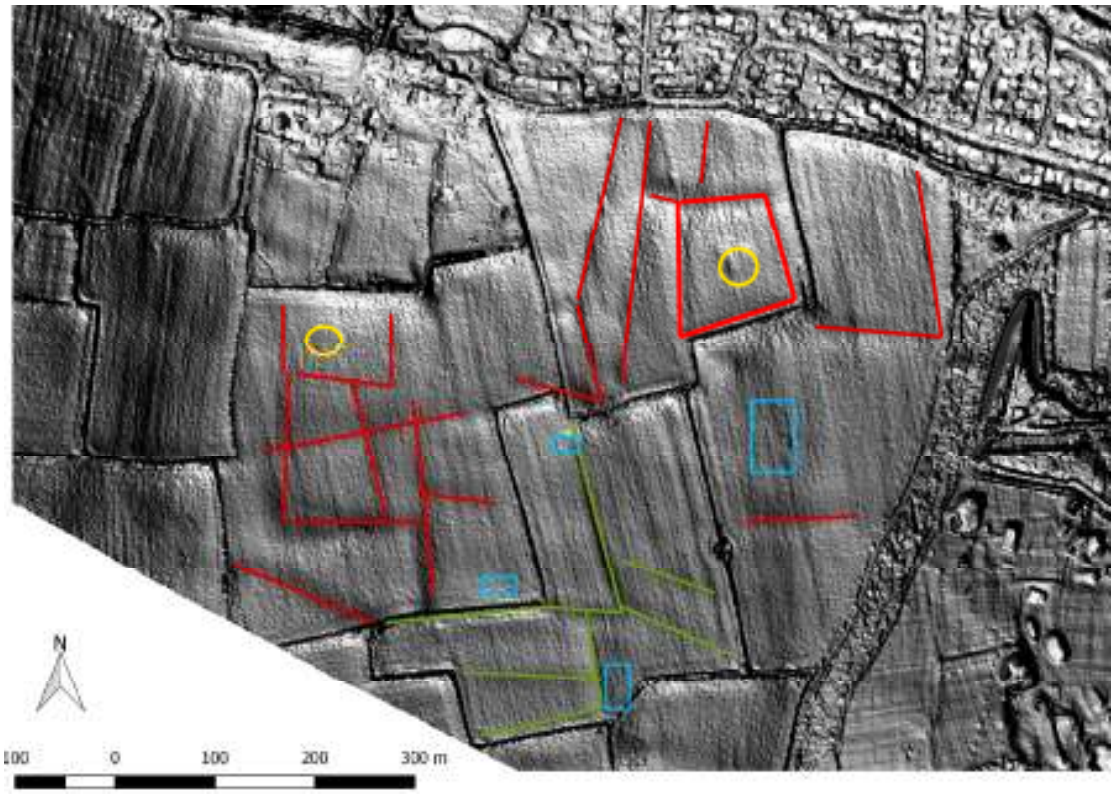

Figure 4.2. Lidar image (from figure 4.1) marked up with principal features of archaeological interest. Blue marks possible structures. Mounds shown in orange and very strong features shown in red.

The field of strongest features is that immediately north of Coffin Field, between it and Manor Road. The greatest interest is in a sub-rectangular enclosure on the eastern side of the field, which appears to have a slight mound at its centre. There are also strong indications of parallel banks on the western side of this field. Some features also continue east and south into the next field (immediately east of Coffin Field) with slight signs of a structure about 150 m south of the mound.

Features also show in lidar in the field to the west of Coffin Field, including another, but fainter, sub-rectangular enclosure with a central mound. To the south of this are banks probably representing an earlier field system, possibly Roman. In the far south-east are possible signs of a structure.

Ideally, these three fields should be subject to at least magnetometer survey, certainly the field immediately north of Coffin Field. If the other fields were also surveyed eventually, area coverage would be about 500 m by 400 m, with the addition of that previously surveyed within the Golf Club grounds.

Figure 4.3. Magnetometry of Coffin Field, showing surveyed features and their relationship to features observed by lidar.

It is a pity that there is not lidar coverage of the area to the south, as that may have shown more evidence of ancient fields and features. Given the results of this survey and the earlier survey on the golf course (Oswin, 2014), it is possible that Coffin Field is a part of an ancient farmed landscape to the south of Saltford village, still observable using modern archaeological detection techniques.

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Bath and North East Somerset Historic Environment Record (Ref MBN 1241, MBN 1242 and MBN 1243)

Portable Antiquities Scheme: ID refs GLO-F02B7D, GL0-FOA33 & GLO-D087E2

Appendix A Grid Layout

A1 Magnetometer

The grid map for the entire survey is shown in figure A1. This includes grids 1 to 59 from the 2015 survey, while those from 2016 start at 101. The survey was done with a Bartington 601-2 dual fluxgate gradiometer, which was walked in zig-zag fashion, but which downloaded data as parallel lines, using Bartington proprietary software. Readings were taken at 4 per metre along lines 1 m apart, giving 1600 readings per 20 m square. Grids were all started at the south-west corner, first traverse heading north, as indicated by the arrows in figure A1. The survey pattern started 1 m east of grid corner, in accordance with Oswin, 2009, fig 5.8 (c), p 115.

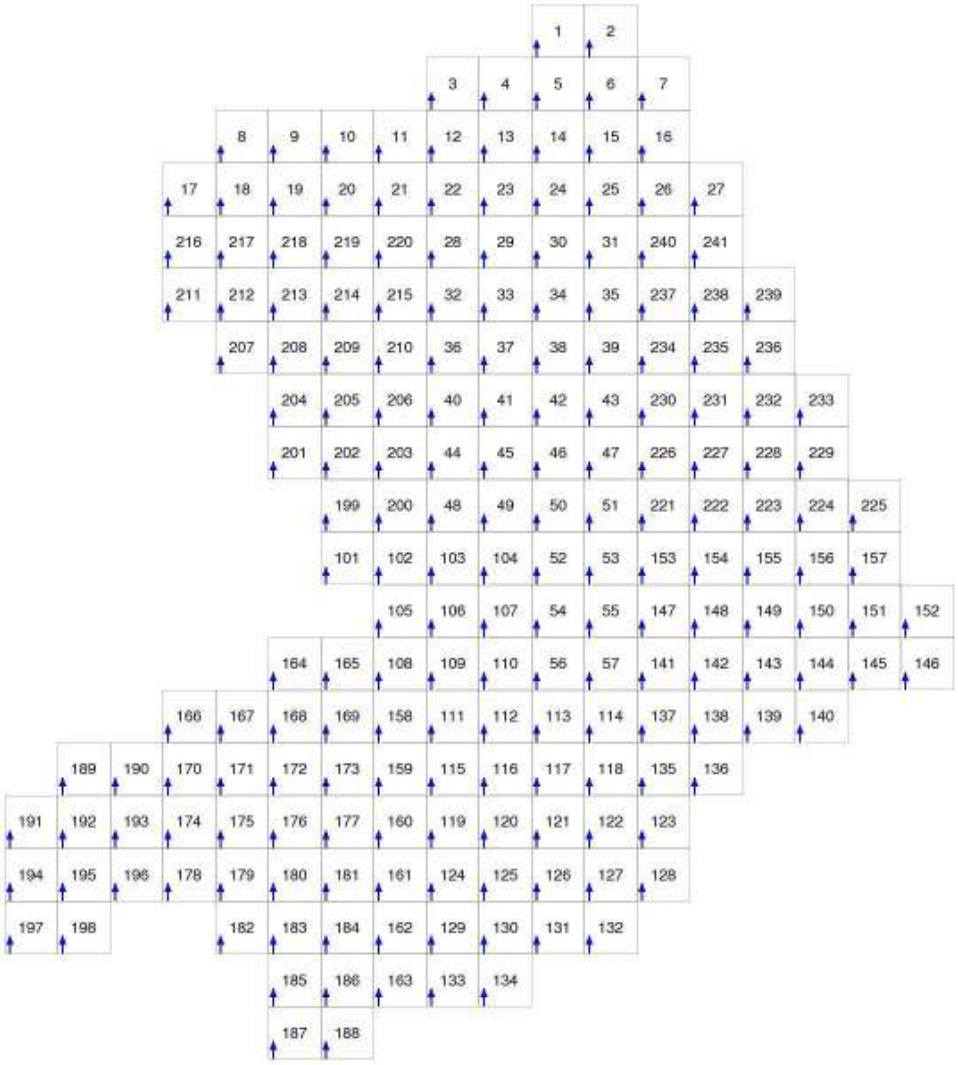

Figure A1. Magnetometer grid map. Arrows indicate start position and initial direction.

Downloaded data were de-striped using BACAS proprietary software and mapped using INSITE v3.

A2 Twin-Probe Resistance

The overlay of the resistance survey area on the magnetometer was shown in figure 3.4. The area surveyed by resistance with 1 m probe separation was also shown in that figure. The grid map for the main resistance survey is shown in figure A2. Two resistance meters were used: a TR/CIA device, which was walked in zig-zag fashion but which downloaded data as parallel lines; and a Geoscan RM15D which was walked in zig-zag fashion and also downloaded data in zig-zag mode. Both devices took 2 readings per metre along lines 1 m apart, giving 800 readings per 20 m square.

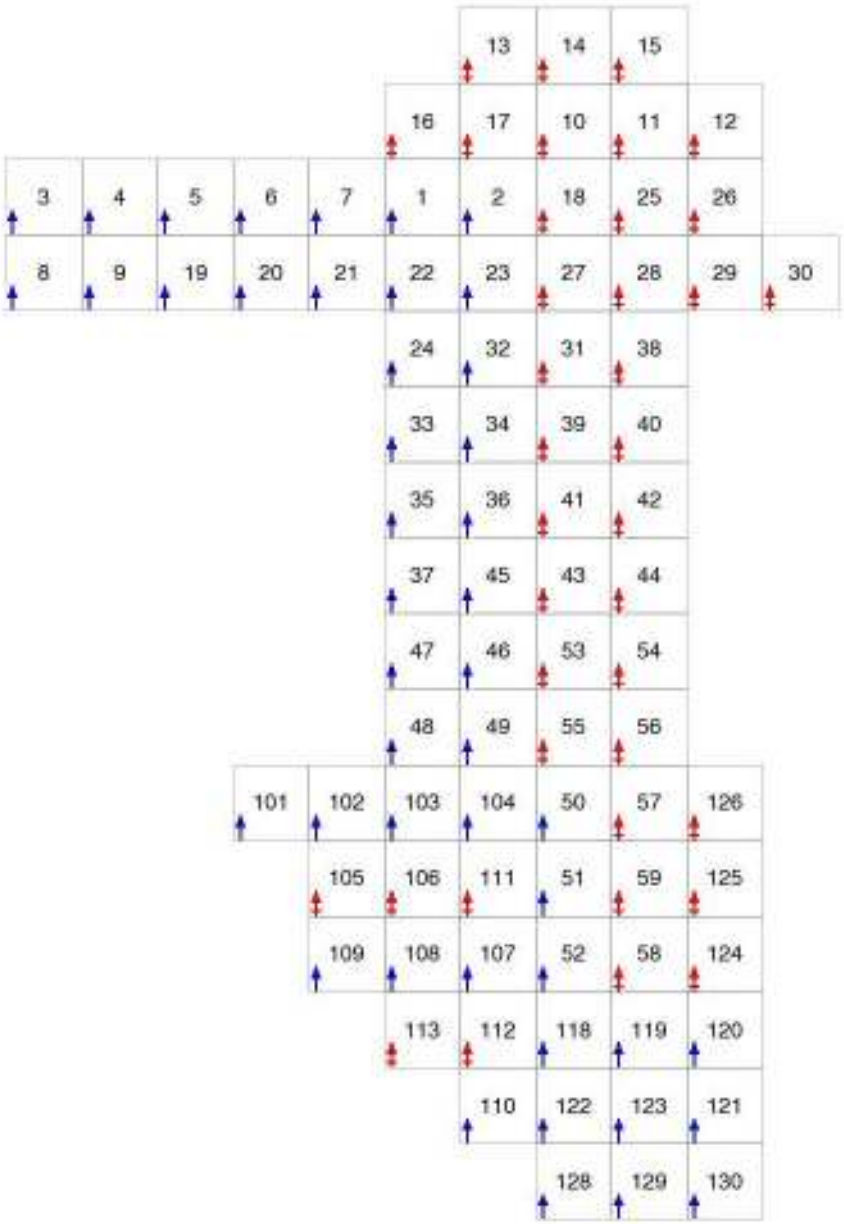

Figure A2. Resistance grid map. Red crossed arrows for zig-zag: RM15 meter; blue arrows for parallel: TR/CIA meter. Arrows show start point and initial direction.

The parallel data from the TR/CIA are indicated by blue arrows on the grid map. The zig-zag data from the RM15 are indicated by crossed red arrows. In both cases, grids were started in the south-west corner, first traverse heading north, in accordance with Oswin, 2009, figure 5.8 (c), p115.

The grid layout for the small area sampled using 1 m probe separation is given in figure A3. Only the RM15 could be used for this, so all data were zig-zag.

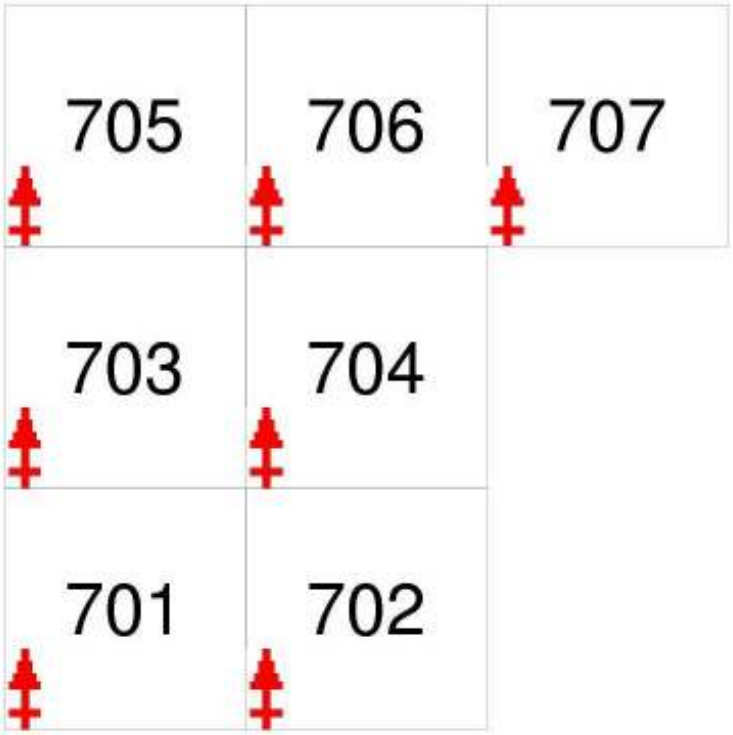

Figure A3. Grid map for deep-looking resistance, using RM15 (zig-zag). Arrows indicate start position and initial direction.

For both instruments, the data were downloaded using BACAS proprietary software and mapped using INSITE v3.