Geophysics at Castle Cary

Manor Farm

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June 2011

Abstract

As part of a Heritage Lottery funded project in 2011, a Geophysical survey was undertaken for Castle Cary Museum and project managed by Matthew Charlton and the Bath and Camerton Archaeological Society, using a fluxgate gradiometer, twin-probe resistance and ground-penetrating radar on the lawn of Manor Farm, Castle Cary. The aim of the survey was to understand the relationship of the site to the castle and whether there were any signs of a castle moat and evidence of the original manor house. The resistance survey indicated the possible outline of an earlier building and features, with Radar results added further data to the survey.

Acknowledgements

Sincere thanks go to Mr John Churchouse of Manor Farm for all his support and in providing permission and access to his land.

Special thanks go to Somerset County Archaeologist Bob Croft and Rob Illes of English Heritage for their continued support as well as the granting of a Section 42 license to undertake the geophysical survey.

Thanks also go to the Bath and Camerton Archaeological Society volunteers, as well as those members of the Castle Cary Museum who took part in the survey

Graphics by Google Earth.

This project was made possible by funding from the Heritage Lottery Fund.

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1 Introductory

1.1 Location and typography

Castle Cary is a small town in south-east Somerset, lying within the Jurassic belt of geology, approximately at the junction of the upper lias and the inferior and upper oolites. Building stone is plentiful, and is orange to yellow in colour. This is the source of the River Cary, which now runs to the Bristol Channel via King's Sedgemoor Drain and the River Parrett, but prior to 1793 it petered out within Sedgemoor. The town is centred at ST640322. A location map is shown in figure 1.1.

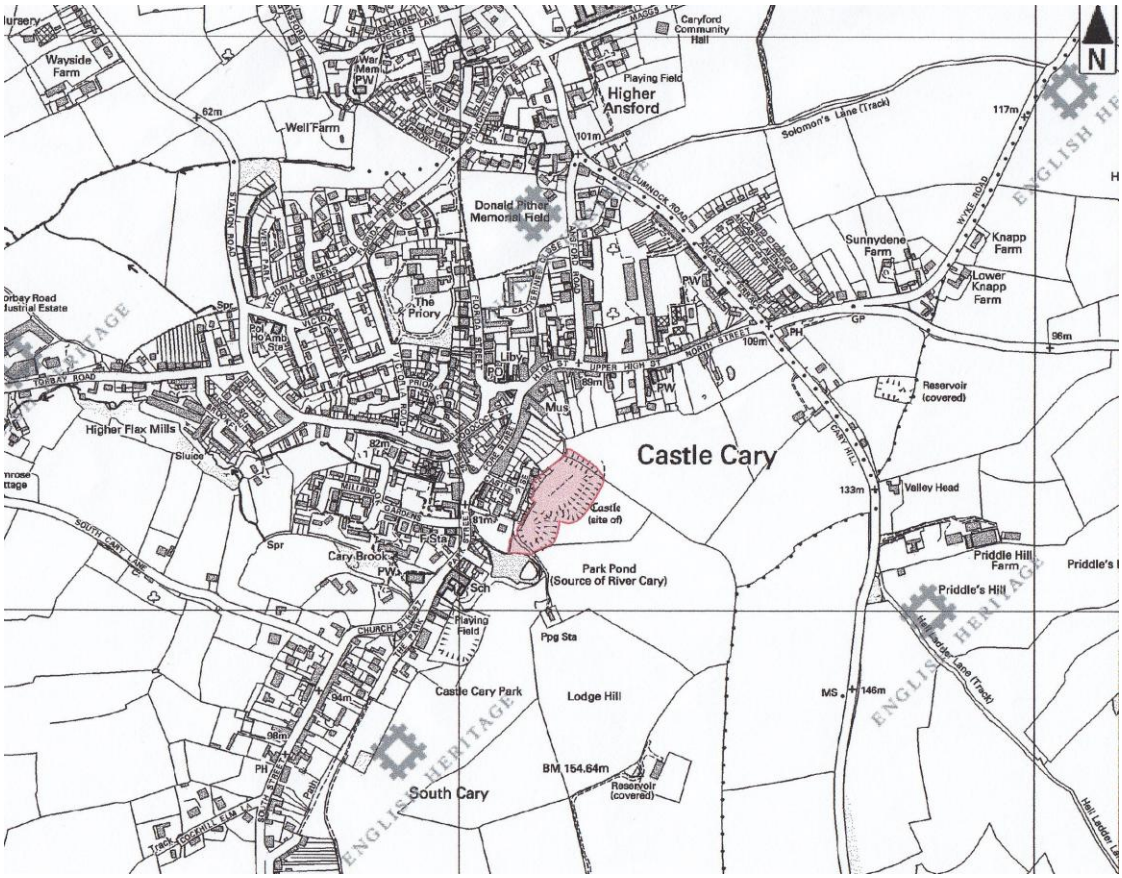

Figure 1.1 Location map showing Manor farm south west of the scheduled area

Castle Cary castle is on the hill overlooking the town from the south-east, and survives as earthen ramparts to the inner and outer baileys. The northern part of the monument has been removed in recent times to provide space for farm buildings, and these have been replaced latterly by houses.

Manor farm is situated on the lower slopes of Lodge Hill formed by Upper Lias sand formations comprising of a soft yellow sandstone, with some harder concretions similar to Yeovil Sands. The hill is capped by Inferior Oolite Limestone – Hadspen stone – a soft yellow brown limestone used as a local building material (Prudden

2003). Manor Farm is situated below the inner bailey to the west centred on ST641321 and is shown in figure 1.2, with a section of the garden within the scheduled area. The inner bailey itself was later reduced to make way for buildings which now lie under the present Manor Farm.

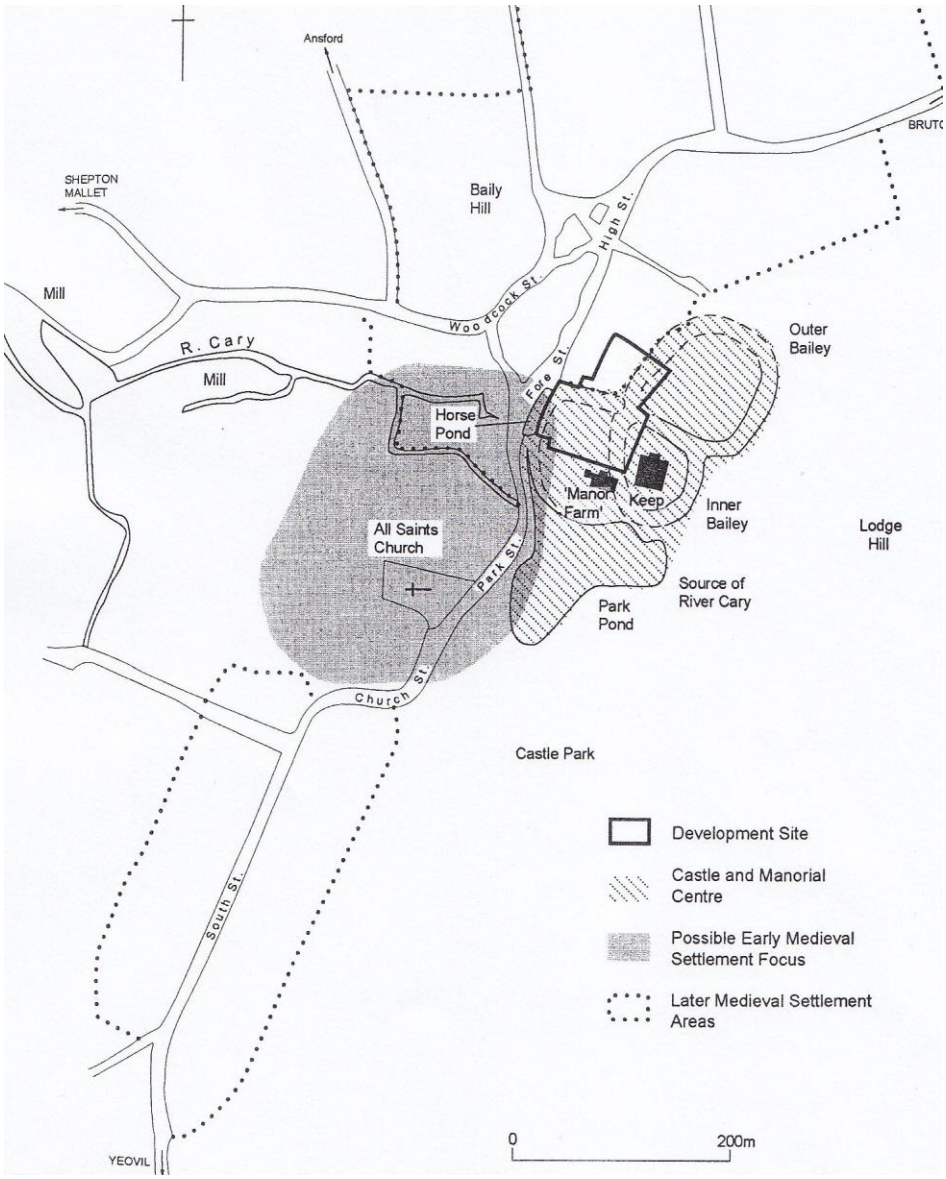

Figure 1.2. Manor farm site situated to the west of the keep (after Aston and Leech 1977).

1.2 Background

Castle site and Manor farm

The castle site is a Medieval Motte and Bailey castle with the foundations of a stone keep, as well as an inner and outer bailey which contain a series of three earthworks

representing possible building platforms or Post Medieval pillow mounds. A recent geophysical survey in 2011 has provided new evidence as to the possible structures situated in the outer bailey (Oswin and Charlton 2011).

The foundations of the Norman keep were excavated in the 1890's, and it was suggested that the lower mound had been built up after the construction of the Keep in the late 11th or early 12th century (Gregory 1890). The castle was besieged by King Stephen in 1138, and again in 1153.

The earliest visible remains at Castle Cary are those of the Castle and its constituent earthworks (SMR 53640), sited to the east of the town. Excavations in the area of Manor Farm (SMR 11632, 11639, 11640) located further baileys of the castle suggesting that the inner and outer baileys were of one phase. A section of the ditches showed evidence of what appeared to have been deliberate backfilling, possibly as early as the 12th century. One of these ditches was later re-dug to provide one side of a moat around the later Manor House (SMR 11641).

It was thought that after the second siege in 1153, the castle was demolished as a result of the destruction on baronial strongholds following the uprising, and some of the stone was used in the construction of the new manorial centre immediately to the west, overlaying the former castle ditch. This new manorial site may have been in more of a practicable position, making it more accessible and easily integrated with the new urban development (Prior 2004).

Excavations by Leach and Ellis on Manor farm between 1999-2001 suggested a primary phase of Romano-British activity which included the remains of a lime-burning kiln, as well as 150 sherds of Romano-British pottery. A finely modelled bronze figurine of a *lar* was found in the limekiln, which may have come from a nearby villa site (Leach 2010). This period was followed by the construction of an early Norman ringwork with evidence of beam foundation trenches, as well as pits and a possible posthole, and was followed by the creation of an inner and outer bailey during the early 12th century (Leach and Ellis 2003).

After the abandonment of the castle during the late 12th century, a later moated medieval manor house was constructed with associated buildings, including mills recorded in 1426, which were probably connected with the manor moat (Victoria County History 2006), this establishment is referred to as 'Manor Place' by the early 16th century.

The Manor Farmhouse which stands today was built by Richard Colt Hoare sometime before 1829, and was constructed on a rubble platform which partly overlays the demolished medieval manor house and built within the memory of one of Castle Cary's historians, Collinson, who in 1791, described the ruined manor and the new construction (Richardson 2003). Collinson writes that the manor house stands on the east side of the street with several fine arches and other remains surviving, with a great part of it recently demolished, with apartments surviving as converted store rooms. To the left of the house and within twenty feet of the walls was a large piece

of water of nearly two acres now almost choked up with weeds and rubbish, but still retaining the name of Park Pond (Collinson 1791).

In March 2011 a license was obtained from English Heritage to undertake a geophysical survey on the scheduled monument (no. 33722) at Castle Cary in South Somerset, which included an area of Manor farm. The survey was carried out under licence from English Heritage (case no. SLOOOO1078), and with permission from the local landowner, Mr John Churchouse and the survey also included an area of the garden of Manor farm which was not scheduled.

The survey was carried out on behalf of Castle Cary museum by the Bath & Camerton Archaeological Society under the nominated representatives Dr John Oswin and Matthew Charlton, and took place over a three day period with participation from Castle Cary museum.

The geophysical survey formed part of a wider project concerned with improving interpretation of historic sites in and around Castle Cary.

1.3 Dates of Survey

The survey was conducted on Monday and Tuesday 28th and 29th March 2011, as part of more extensive surveys on the castle site.

1.4 Personnel

The project was organised by Matthew Charlton of Enthuseit Ltd on behalf of Castle Cary Museum.

The Geophysical survey was undertaken by BACAS volunteers led by John Oswin and Owen Dicker. Assistance was given by members of the Castle Cary Museum.

1.5 Scope of this report

This report concentrates on survey work at Manor Farm, and includes surveys by magnetometer, twin-probe resistance and ground-penetrating radar. The survey was conducted both within and without the scheduled area. The results of these surveys will also be discussed in relation to the full surveys of the castle site, which were described in Part 1 of this series on geophysics at Castle Cary.

2 Equipment used

2.1 Grids

The areas to be surveyed were divided into 20 m squares. Two squares could just be installed on the lawn of Manor Farm, starting just below the terrace, just before the eastern flowerbed. The farther end was just short of the vegetable beds. The squares were not necessarily complete as hedge and pond intruded in the south, and some isolated trees also lay within the squares.

It was decided to start the survey at the corner of the lawn near the flowerbeds, as this was a convenient and reproduceable point. This meant starting in the north-east corner, heading south on the first traverse, which is opposite to normal procedure. This means that on printouts, magnetic north is approximately 180 ° to grid north.

A further triangular area to the east, about 0.8 m above the level of the lawn, was included in the survey, but its grid square was not related to those on the lawn and its placement on the plan is within a metre of true. This was within the scheduled area.

Radar surveys were conducted over a smaller, unobstructed area within the two grid squares on the lawn, and also on an area of concrete driveway between the house and the castle earthworks.

2.2 Magnetometry

The magnetometer used was a Bartington 601-2 twin fluxgate gradiometer. This has two separated detectors 1m apart, so allows two traverses to be done at once. It is illustrated in figure 2.1. It was set to take readings at 4 per metre at a pace of 1.0 m/s on lines 1 m apart. Top and bottom baselines had markers (flags and pegs respectively) set as aiming points for the operator. As with other sensitive magnetic detectors, the operator has to be magnetically clean, so the instrument is not suitable for general public use.

Figure 2.1. Bartington 601-2 twin fluxgate gradiometer

The small portion of the scheduled area in Manor Farm garden proved to have such high levels of iron interference that magnetic survey here was impossible.

2.3 Twin probe resistance

The twin-probe resistance meter used was a TR/CIA device. It twin-probe is shown in figure 2.2. The meter was set to take 2 readings per metre along traverses 1 m apart and triggered by making good electrical contact with the ground as it was moved between readings. It was moved along guide ropes with ½ metre marks sown into them, and the guide ropes were moved in turn along baselines with metre markings. The TR/CIA meter could also be used for resistivity profiling, but this method was not used at Manor Farm.

Figure 2.2 The TR/CIA twin-probe resistance meter

2.4 Ground-penetrating radar

The radar is a MALA X3M, with 250 MHz and 500 MHz antennae. Only the 250 MHz antenna was used at Castle Cary. The radar is illustrated in figure 2.3. It is pulled like a sled, while the wheel at the rear measures distance along any traverse and sends this information to the processor to provide real-time display of signal vs. depth. A set of 4 traverses 1 m apart were conducted over a length of 25 m on the concrete driveway between the inner bailey and Manor Farm. Wave speed was not measured, but a figure of 100 mm/ns was assumed through the concrete.

2.5 Software

Magnetometer and twin-probe resistance data were processed using INSITE. This may be regarded generally as obsolete, but bacas prefers it for its very versatile grid mapping function. Data from the resistance meters were downloaded via bacas proprietary software and imported into INSITE. Data from the Bartington was downloaded by Bartington proprietary software and processed by a bacas proprietary de-stripe software before being imported into INSITE.

Radar data were processed using REFLEXW software.

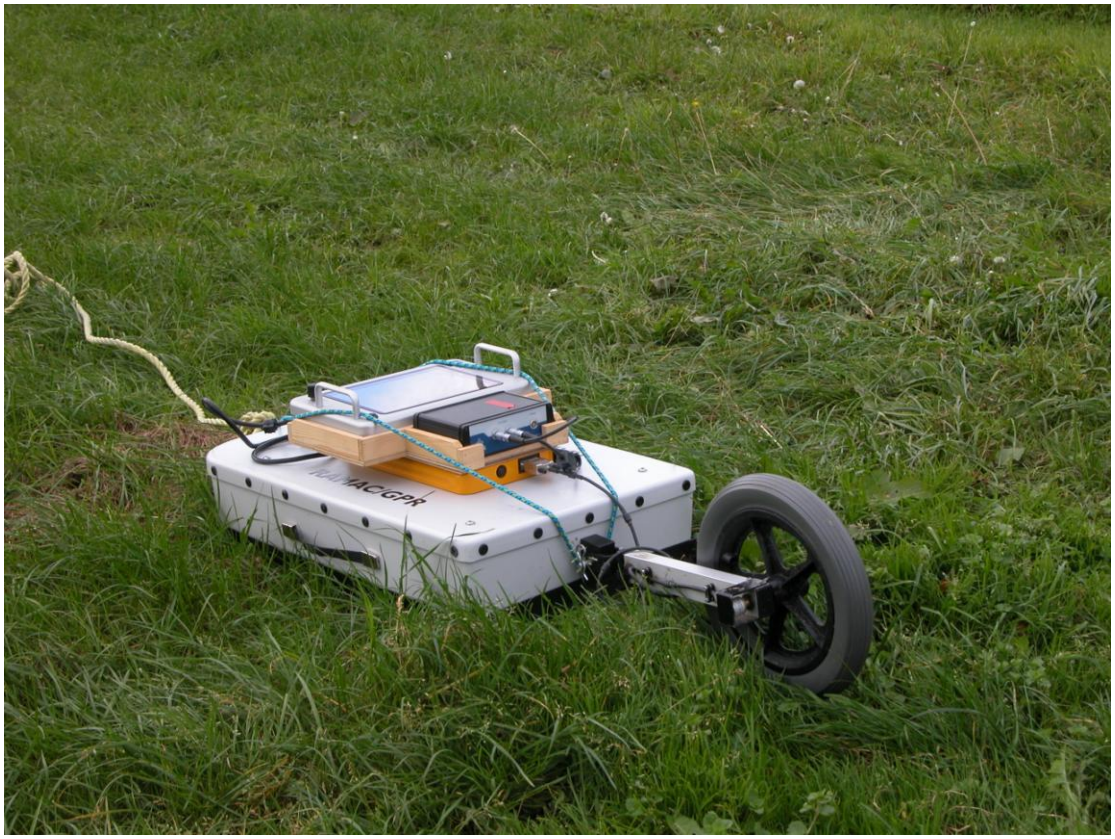

Figure 2.3 The MALA X3M ground-penetrating radar

3 Survey results

3.1 Magnetometer

A magnetometer survey was conducted over the two grid squares on the lawn of Manor Farm. The third square on the raised garden could not be surveyed because of excessive magnetic interference from nearby iron. Even on the lawn, there were a number of spikes suggesting buried iron. There was one area of consistent high anomaly, but this was rather amorphous so provided little diagnostic evidence. The results of the survey on the lawn are shown in figure 3.1.

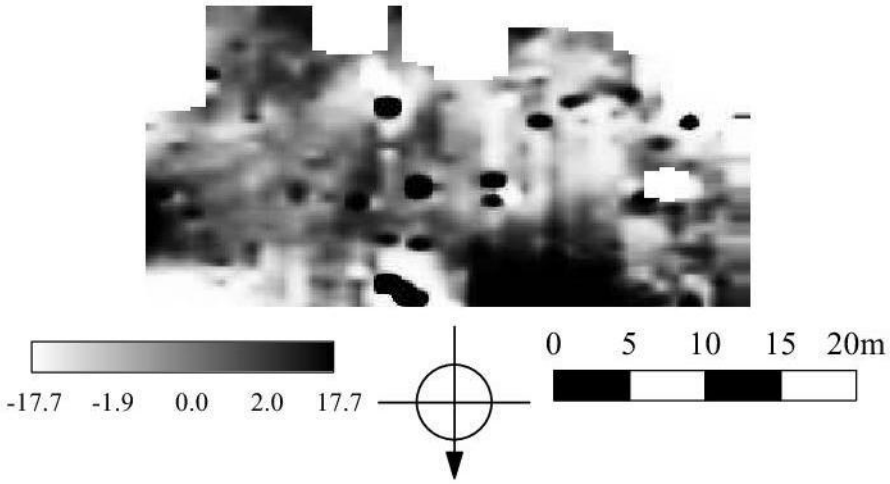

Figure 3.1 Magnetometer survey of Manor Farm garden

3.2 Twin-probe resistance

Three grids were surveyed using the twin-probe resistance meter. Two of these were the subject of the magnetometer survey and the third was an irregular shaped grid to the east of the lawn, on the raised patch of grass. This survey was rather more successful than the magnetometer survey. The results are shown in figure 3.2. Note again, that the start point was in the north-east corner, so the figure shows south to the top. In order to ease interpretation, the results are also shown overlaid on an aerial photograph of Manor Farm. This is figure 3.3. Note that these were not full 20 m squares as the coverage was interrupted by trees, hedge and the edge of the pond.

The principal feature to note is the strong masonry features along the northern edge of the survey. These appear to continue under the terrace on which the present house stands. This may represent demolition rubble from early phases of the manor house. There is also an intrusion further out into the garden at the centre of this plot, which almost certainly represents an earlier phase of building.

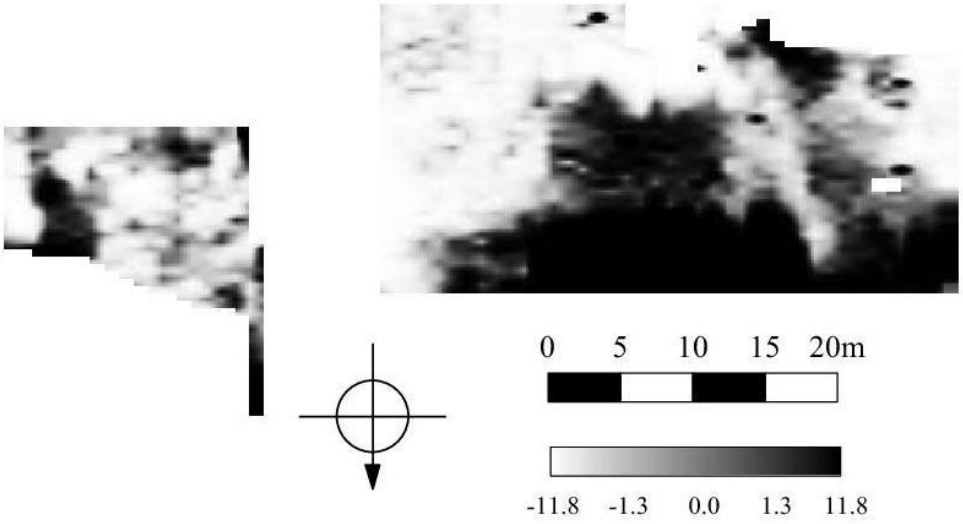

Figure 3.2 Twin-probe resistance survey in Manor Farm garden

To far right and also to far left (on the raised garden section), there are signs of masonry lines, which are diagonal to this building and parallel to each other. These do appear to represent walls, but it is not clear whether they relate to a particular phase of the manor house or to the earlier castle. Certainly, they do not form an alignment with any features at Manor Farm.

Figure 3.3. Resistance survey overlaid on Manor Farm garden

3.3 Ground-penetrating radar

Two areas at Manor Farm were subject to a radar survey. The first was on the lawn. This was smaller in area than the 40 by 20 grid subject to resistance survey in order

to avoid obstruction from trees. Figure 3.4 shows how this area related to the resistance survey. The area started 4 m south of the baseline and extended 9 m south (that is, ten traverses were done at 1 m intervals). The coverage extended from 5 m to 33 m along the baseline, providing an area 28 m by 9 m.

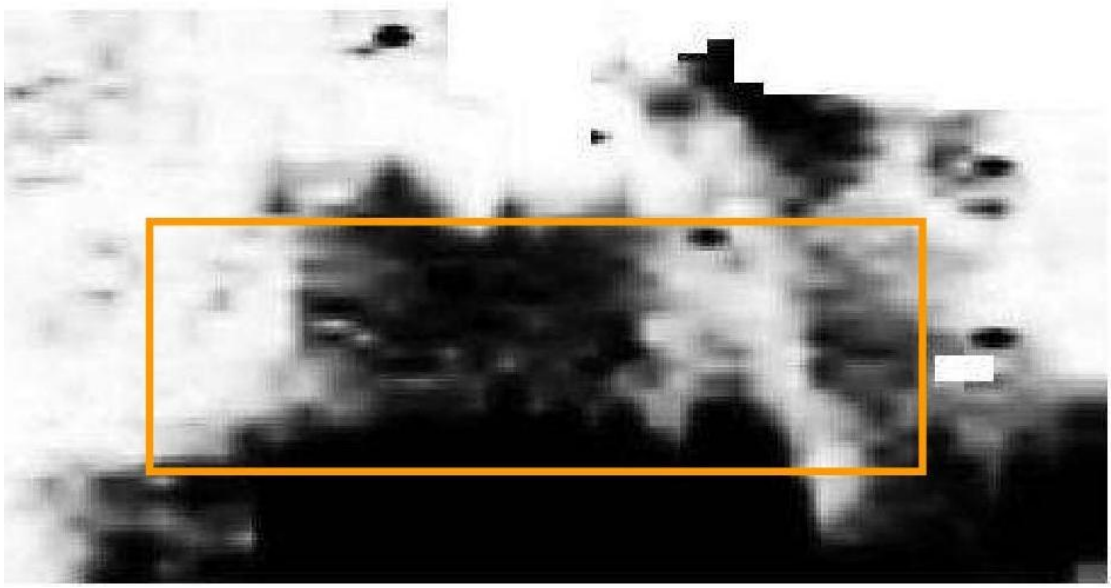

Figure 3.4 Area covered by first radar survey overlaid on resistance survey on lawn. North to bottom

The survey was done at 250 MHz, a frequency suitable for finding masonry but not for providing fine detail. Wave speed was not calibrated, but a value of 0.04 m/ns was assumed, commensurate with moist clay soil, which might be expected close to the pond. Near surface analysis was marred by strong backscatter, but at 0.75 m (nominal depth), a mass of masonry and the possible diagonal wall could still be detected. The depth slice is shown in figure 3.5. At 1 m nominal depth, (50 ns), the diagonal wall had gone but some footings of earlier structure remained. See figure 3.6.

Figure 3.7 shows a vertical cut through at 3 m from the northern edge of the radar survey, 7 m south of the resistance survey baseline. Signals can be seen extending to a considerable depth in the centre, approximately 1 m. Note that 50 ns corresponds to a nominal depth of 1 m.

A second area was surveyed on the concrete driveway just to the east of the garden, between it and the castle mound. This fell within the scheduled area and is also reported in part 1 of this series. As the driveway was curved and the sides were cluttered, it was only possible to cover an area 25 m long by 3 m wide (4 traverses). This could not be tied into the grid but is shown from overhead in figure 3.8 in its approximate position. Figures 3.9 and 3.10 show the southern and northern ends of the area, marked by red pegs, and how they relate to gateways in the garden wall, so this survey could be replicated. Wave speed through concrete is high, and a value of 0.1 m/ns was assumed.

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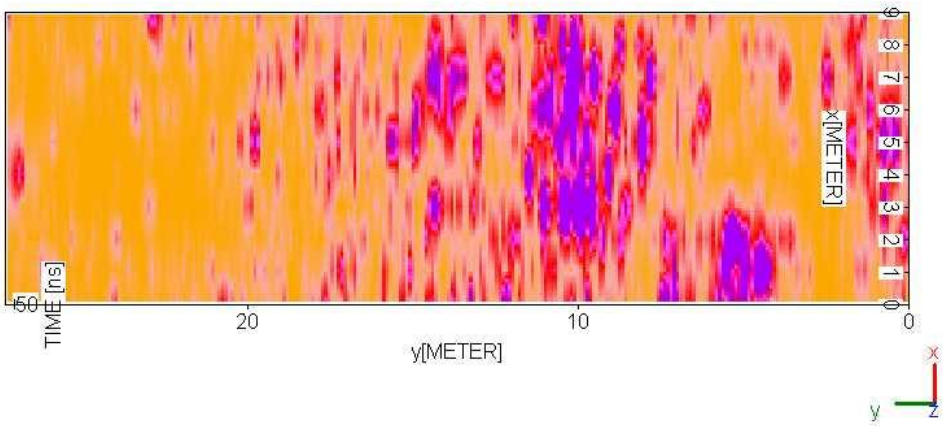

Figure 3.5 Nominal depth slice at 0.75 m depth below lawn

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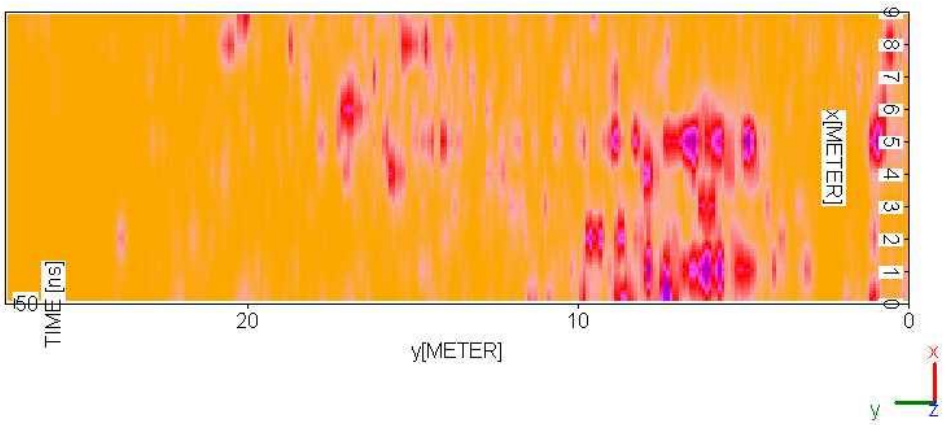

Figure 3.6 Nominal depth slice at 1 m depth below lawn

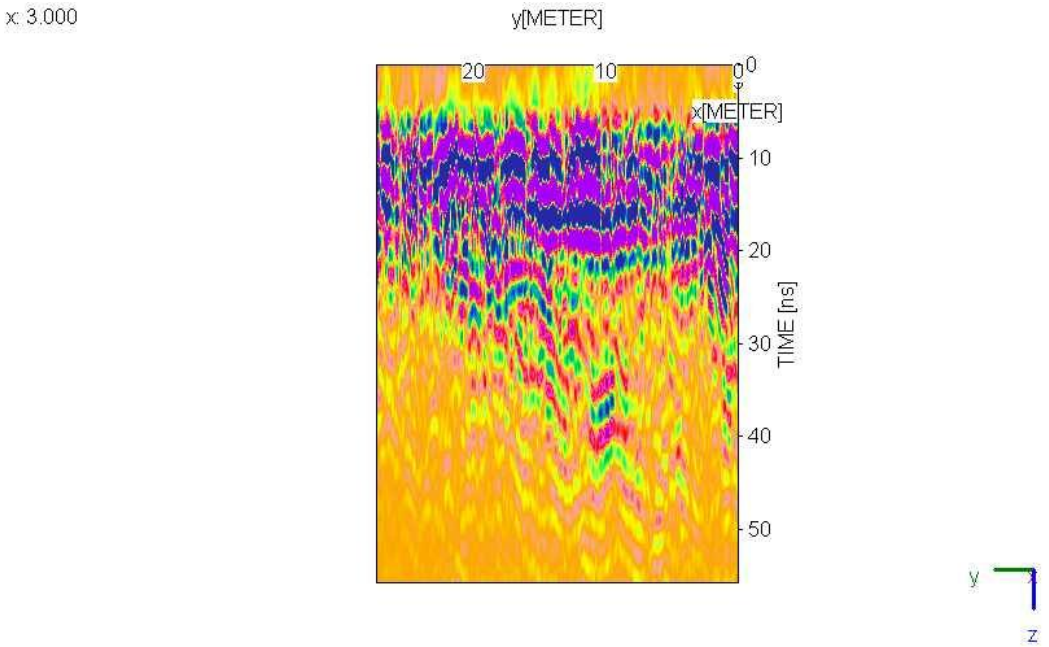

Figure 3.7 Radar vertical section at 3m from northern edge of radar area

Figure 3.8 Second radar survey, showing location on driveway

Figure 3.9 Southern end of second survey, showing start in relation to gate

Figure 3.11 shows the depth slice at 32 ns (1.6 m nominal depth). It appears to show an area of no return (possibly a ditch) emerging out of solid return, assumed rock, in the north-west corner.

Figure 3.10 Northern end of surveyed area.

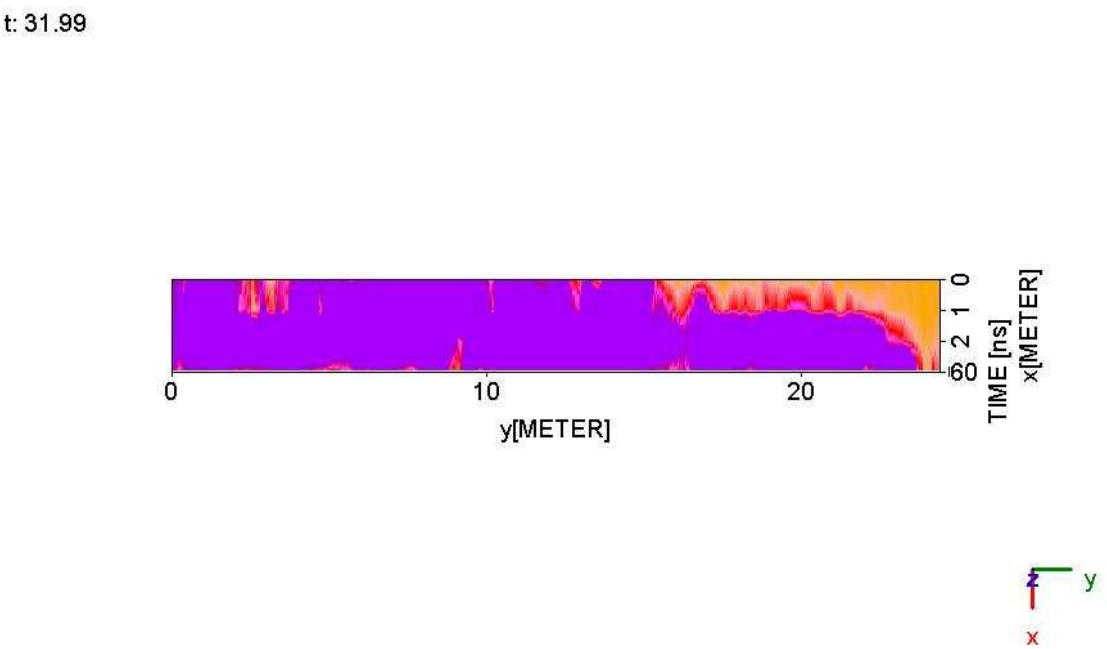

Figure 3.11 Radar area 2 depth slice at 1.6 m nominal under concrete driveway

4. *Discussion*

Magnetometry was able to contribute little to the survey of Manor Farm, but twin-probe resistance showed the presence of structure and rubble from earlier builds of Manor farm, built by Richard Colt Hoare sometime before 1829.

Walls to either side of the earlier footings lie at an angle to these structures and may be even earlier, possibly relating to the castle itself. Evidence from the radar survey tends to support this. Although another possibility is that they may have formed part of the revetment wall, which was approximately 2.2m in width and comprised of large unmortared limestone blocks and packing stones, which had been set on the sloping ground at the foot of the castle keep mounds as a revetment (Leach and Ellis 2003).

Excavation by Leach and Ellis suggested that after the abandonment of the castle, the size of the new manorial enclosure would have been approximately 150m by 100m and that within this enclosure would have been cited the original manor house along with associated buildings. One of these associated buildings dating from the first phase of this new enclosure, was a stone building measuring 10m in width by 35m in length, and with stone walls of 1.1m in depth and set on a stone foundation 1.8m wide, which indicated a major load bearing building (see figure 4.1 building one).

Leach and Ellis suggested that buildings of this size are generally associated with castles and monastic sites, and the best parallels are the later medieval tithe barns, reflecting the manors economic status and power within the community. The position of the stone building which faces south would also indicate that it lay on the north side of the contemporary manor house. Based on the resitivity results, it may be possible to suggest that the figures 4.2 and 4.3 show possible evidence to the south of the present manor house the earliest phase of construction after the abandonment of the castle.

One further building which is possibly contemporary with the earliest phase of the original manor house is building 4 (see figure 4.1). Excavations by Leach and Ellis, provided evidence of a major building adjacent to the modern day manor farm which comprised of a massive east-west running wall with mortared foundations and bonded walls, and an upper mortared floor level. The remains indicated a large building running for an unknown distance to both the south and east, with its wall foundations 1m lower than those buildings excavated to the north, possibly making it part of, or associated with, the earlier manorial building.

4.1 The wider picture

Figure 4.2 shows the resistance survey and second radar survey at Manor Farm in conjunction with the resistance survey on the castle site. This shows the main features located during this survey of both Manor farm and Castle Cary.

Figure 4.3 shows an interpretation of these results. Red represents masonry, green represents earthworks. Blue indicates footings of earlier structures under the present farmhouse. Earlier structures under Manor Farm do not appear to relate directly to the castle, except possibly two walls either side of the footings. Apart from the radar survey on the concrete driveway, there were no strong signs of a castle moat. However, as this is under concrete, there is no easy way of confirming this feature as part of the moat.

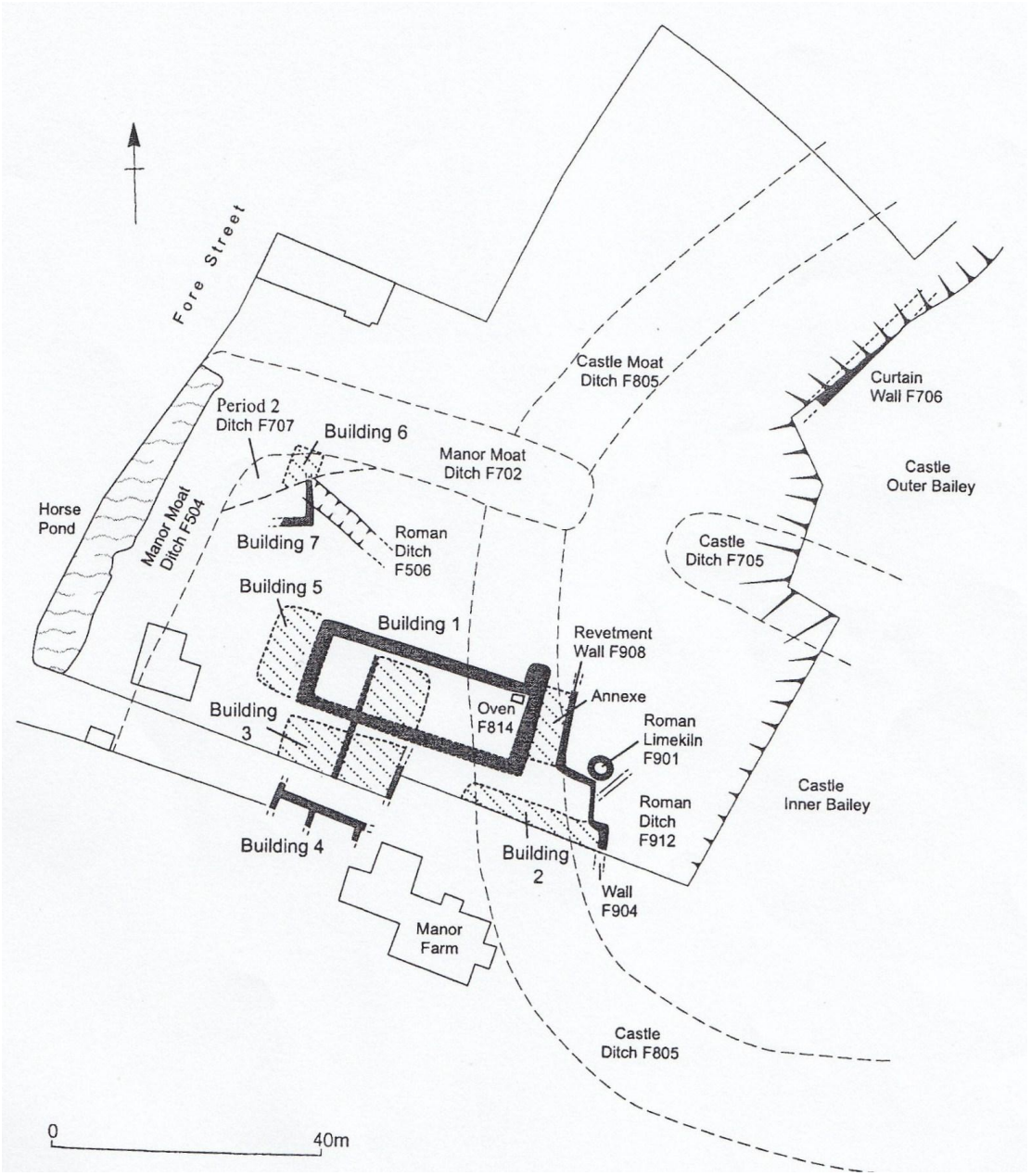

Figure 4.1 Location of earlier structures at Manor Farm, including building one and building four (Leach and Ellis 2003).

The topography adds to the difficulty in interpretation. Manor Farm is 8 m or more below the inner bailey of the castle, and the farm lawn is nearly a metre below this, on a level close to the pond, which forms the start of the River Cary. The north side of the castle has been scarped away but the western steep slope of the inner bailey down to Manor Farm is more difficult to explain, especially as there is a strong masonry line heading from the keep down to the farm. This could be a later feature relating to the abandonment of the castle and the erection of a manor house in its stead. It is not obvious whether the inner bailey was sleighted when the first manor house was built or whether that steep slope is original. Any further work, which could elucidate this, would be beneficial. Further geophysical survey on the castle site would be severely restricted by the steep slopes.

Figure 4.2 Showing both the resistance survey and second radar survey at Manor Farm with the resistance survey at the castle site.

Figure 4.3 An interpretation of the geophysics of figure 4.2, showing features on Manor Farm

4.2 Future research

Somerset is not noted as one of the richest counties for moats and although there are many farm sites in the Somerset levels with surrounding ditches, they are too narrow to be called moats in accordance with current definitions established by the former Moated Sites Research Group (Aston 2000).

The origins of these moated sites were almost certainly military and any consideration of their function must take into account the fact that the principal period of construction covers the 350 years between 1150 and 1500 (Le Patourel and Roberts 1978). It is for this reason that sites such as Manor Farm in Castle Cary have an important role to play in helping us to understand the significance and subsequent development of these manorial structures, which imposed their dominance over a community and their eventual demise and subsequent reuse over time.

In order to increase our understanding of the original manor, small scale trial trenches placed over key selected areas may help to provide further dateable evidence as to the chronological construction of this site and increase not only our understanding but also our interpretation of this once important moated manor house.

Appendix A Survey data

Raw data from the geophysical surveys can be made available on request. The purpose of this appendix is to provide sufficient information for those data to be re-assembled in the correct sequence.

A1 Magnetometer

Figure A1 shows the grids surveyed by magnetometer. The device was a Bartington 601-2. The grids were 20 m square. The arrow indicates the start position and direction of first traverse. It is bacas' standard to start a grid 1 m in from the start corner, such that the final line finishes on the grid line (a 20 m square has 21 lines 1 m apart). Similarly, the first data point is taken one away from the baseline, so that the final point of each traverse is on the top line. This ensures grids mesh together without hiatus or overlap.

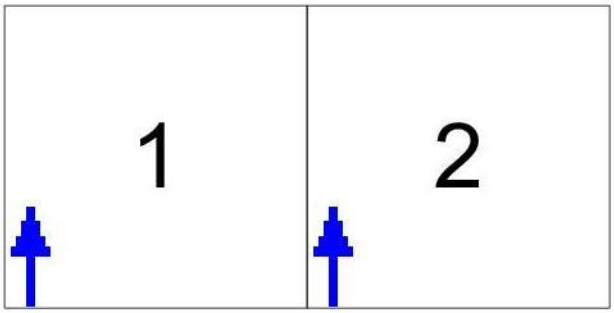

Figure A.1. Grid layout for magnetometry on the Manor Farm garden site.

The Bartington was set to take readings every 0.25 m on lines 1 m apart, giving 1600 readings per complete 20 m square. Although a zig-zag pattern was walked, the data logger automatically sorted these to parallel data. 'D' files in the raw data folder represent de-striped data, 'M' files represent raw data. The D files should be used.

A2 Twin probe resistance

Figure A2 shows the sequence of the three grids of resistance measurement. Note that the two grids on the lawn were done first, before the grid on the raised garden. As with magnetometer, grids were started 1 line in, 1 point up from baseline to ensure grids mesh without hiatus or overlap.

The TR/CIA was set to take readings every 0.5 m along traverses 1 m apart, giving 800 readings per complete 20 m square. A zig-zag pattern was walked, but the data

logger automatically sorted the data to parallel. In the data folder, resistance files are prefixed ‘R’.

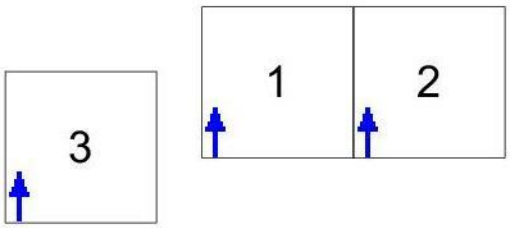

Figure A.2 Grid layout for twin-probe resistance survey in Manor Farm garden site

A3 Radar

The data were taken on a MALA X3M at 250 MHz, with readings taken every 0.1 m, as controlled by an odometer wheel. Traverses were 1 m apart. In set 1, in the garden, 10 lines were taken, each 28 m nominal long. In set 2 on the concrete driveway, 4 lines were taken 1 m apart. A wave speed of 0.04 m/ns was assumed in set 1, and 0.1 m/ns assumed in set 2.

In both cases, a zig-zag pattern was walked and recorded, so in assembling a three-dimensional readout, each second traverse must be reversed.

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