YCCCART 2012/

North Somerset HER 2014/

# Manual surveys using an electronic, hydryostatic level (NIVCOMP) at Woodspring Priory

## YATTON, CONGRESBURY, CLAVERHAM AND CLEEVE ARCHAEOLOGICAL RESEARCH TEAM (YCCCART)

*General Editor: Vince Russett*

*Brian Wills taking measurements at Woodspring Priory under difficult conditions!*

| Page | Contents |
|---|---|

**Abstract**

*Following a geophysical survey at Woodspring Priory (YCCCART 2012/Y12) the purpose of this report is to describe a manual survey of a 'moated area', re-examine the spring area, and survey outer field 3, using an electronic , hydrostatic level (NIVCOMP) and a computer programme (Surfer 10, Golden Software) as described previously (YCCCART 2012/Y4), to produce contour and 3-dimensional images of the features.*

**Acknowledgements**

A Heritage Lottery Grant allowed YCCCART to acquire a Nivcomp, electronic, hydrostatic level which provided the data for the "Surfer10" programme, kindly donated by Golden Software Ltd, USA.

This survey could not have been carried out without the willing permission of the Landmark Trust.

The authors are grateful for the hard work by the members of YCCCART in performing the surveys, and Vince Russett for editing this report.

**Introduction**

YCCCART is one of a number of Community Archaeology Teams across North Somerset, supported by the North Somerset Council Development Management Team.

The objective of the Community Archaeology Teams is to carry out archaeological fieldwork, for the purpose of recording, and better understanding and management of, the heritage of North Somerset.

**Site Location**

Woodspring Priory (Fig 1) is a former Victorine (Augustinian) priory beside the Severn Estuary about 3 miles (5 km) north-east of Weston-super-Mare, North Somerset.


*Fig 1: Site location: Woodspring Priory*

**Historical and archaeological context**

See previous report *[Gradiometry & Resistivity Surveys at Woodspring Priory, (YCCCART 2012/Y12)].*

## Land use and geology

The site lies on the Blue Lias Formation – at this site, it consists of interbedded Mudstone and Limestone.

Much of the site is open to the public, and is used for grazing. Part of the site, including the farmhouse and its adjacent gardens is let by the Landmark Trust to private individuals and is only open by special arrangement.

## Survey Objectives

To survey, using an electronic, hydrostatic level (NIVCOMP);

1. An apparent 'moated area' in the approach field to the precinct (outer field 1).
2. The spring area.
3. Outer field 3.

## Methodology

The surveys were undertaken during the period June to August 2012 by teams from YCCCART. The method was similar to that described previously (*YCCCART 2012/Y4*). Briefly, in order to show the three-dimensional appearance of the selected features, grid surveys using an electronic, hydrostatic level (Nivcomp), were performed. Tapes were laid relative to baselines established for the RM15 survey. For each feature, a zero point for the electronic hydrostatic level was established, and height readings in millimetres above or below the zero point were recorded on paper. An appropriate interval of recording was selected, for each feature, which was considered to provide the best representation. The data were entered into an Excel file (Microsoft) and processed using the "Surfer 10" software programme (kindly donated by Golden Software, USA). Paper and electronic copies of the raw data are preserved in the archives. The surveyed sites are shown in Figure 2.

Spring

Orchard

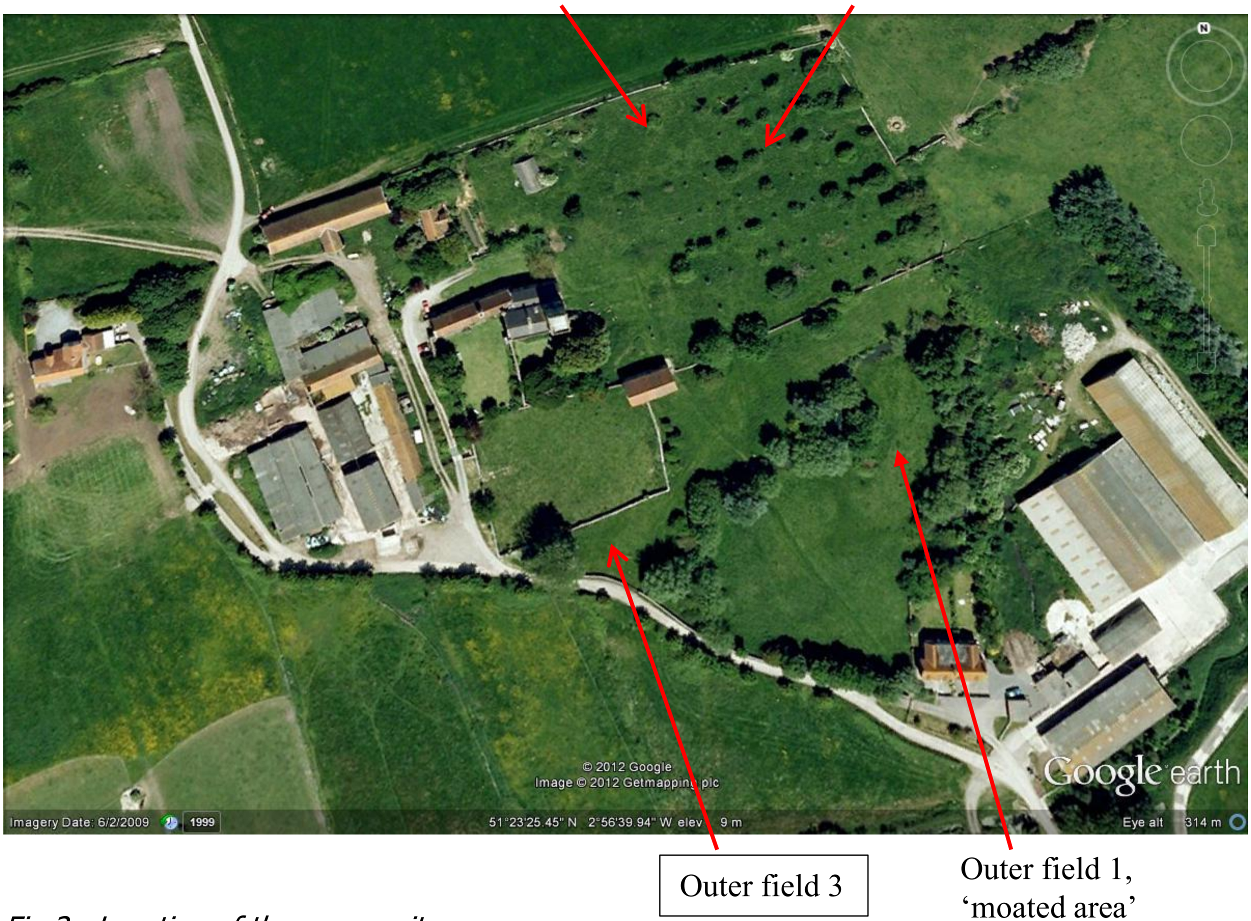


*Fig 2: Location of the survey sites*

## Results

1 *Outer field 1, 'moated area'.*

This feature, (Fig. 1) (Appendix 1, A - C), is situated in the upper part of the field and was surveyed using 2 separate grids (Grids 1 and 2). These were then combined to give the final result (Appendix 1C).

*Fig 3: The 'moated area'.*

For Grid 1, a tape grid, 30 x 26m, was laid out using the RM 15 survey baseline. Heights were measured at 2m intervals along the X axis, northeasterly (14 columns), and along the Y axis, northwesterly (16 columns). The zero point was set in the centre of the feature. For Grid 2, (Fig 4), a grid, 20 x 12 m was laid out adjacent to Grid 1. Heights were measured at 2m intervals along the X axis, northeasterly (7 columns), and along the Y axis, northwesterly (11 columns). The zero point was set at the 60m point on the RM15 baseline. The zero point for grid 2 was 699mm above the zero point for Grid 1, and this figure was used in calculating the data for the combined Grids 1 and 2, in preparing the 3-dimensional figures using *Surfer 10*. The Z axis for both grids was the height above, (+), or below, (-), the zero point in mm. The results were recorded on paper. Maximum heights above or below the zero point were 607 to -965 mm. The raw data were processed electronically as described previously, and a 3-dimensional image, including contours (Fig 5), was produced. A plain contour map was also produced (Fig 5 B)

*Fig.4. Grid 2 is laid out with the zero point for the electronic, hydrostatic level (arrow) shown at the side of the grid.*

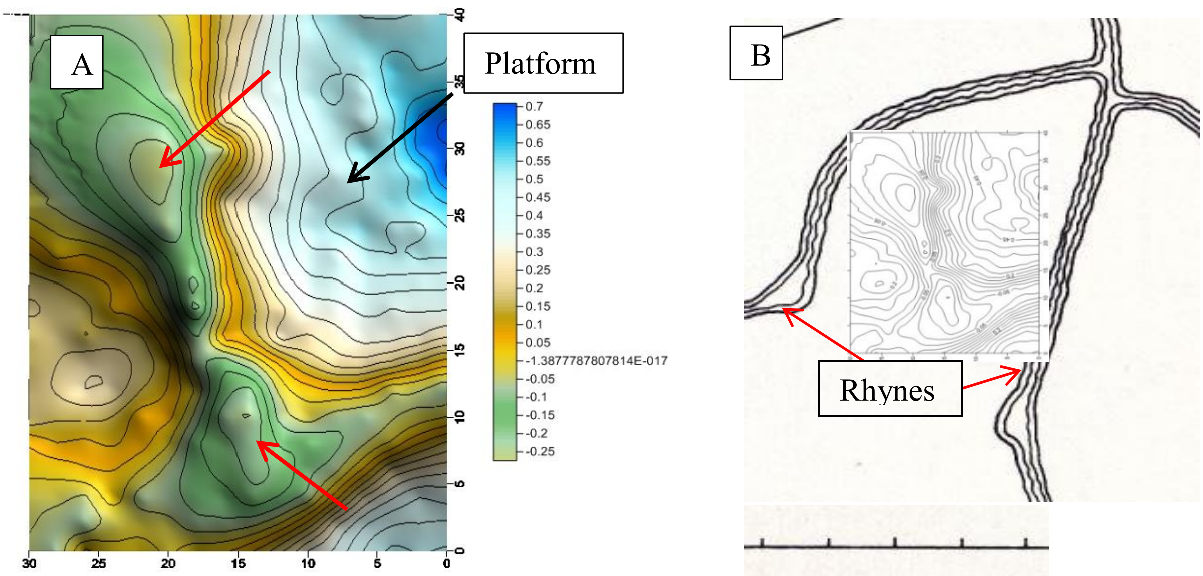


*Fig. 5. A, The 3-dimensional figure, with contours, shows the raised platform, and the 'L-shaped' ditch (red arrows). B. The contour image, superimposed on Tomalin's 1972 survey (Courtesy of The Landmark Trust) (Scale interval 10m).*

The results demonstrated that the area included in the survey comprised a raised platform, partially surrounded by an 'L- shaped' ditch, suggesting that this may have represented a 'moated area', although this was not definitely established.

2 *Spring area.*

The feature, (Appendix 2) (Figs 6 and 7), is situated close to the orchard (Fig 2). A tape grid, 34 x 26m, was laid out using the RM 15 survey baseline along the boundary wall. Heights were measured at 2m intervals along the X axis, southerly (14 columns), and the Y axis, easterly (18 columns). The zero point was set in the north west quadrant of the feature. The Z axis was the height above, (+), or below, (-), the zero point in mm. The results were recorded on paper. Maximum heights above or below the zero point were 2782 to -171mm. The raw data were processed electronically as described previously and a contour and 3-dimensional image, including contours (Fig 8), was produced.

*Fig 6. The spring area, looking north.*

*Fig 7. The electronic, hydrostatic level (arrow) in use; looking west.*

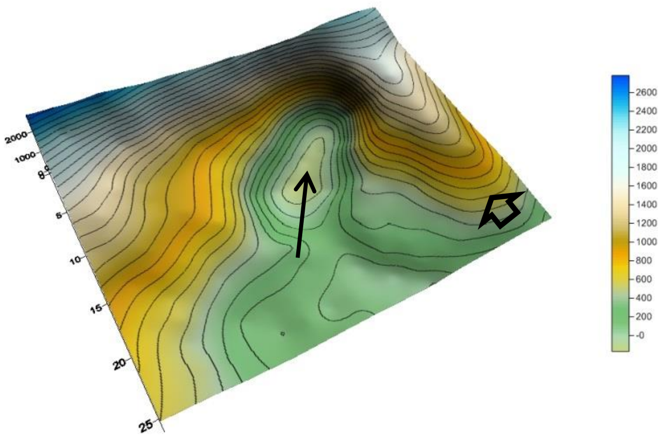

*Fig. 8. Spring area, 3-dimensional appearance, looking north east. The hollow (arrow), containing the small tree and the linear bank (open arrow), can be clearly seen.*

With the 3-dimensional representation, (Fig. 8), the 'hollow' area can be clearly identified with a linear bank at the north east edge. Furthermore, this representation allows comparison with an earlier, conventional, manual survey (Tomalin, 1972) (Appendix 3) (Fig 9B). The linear bank at the eastern edge (Fig.9B), approximates to the contours in figure 9A

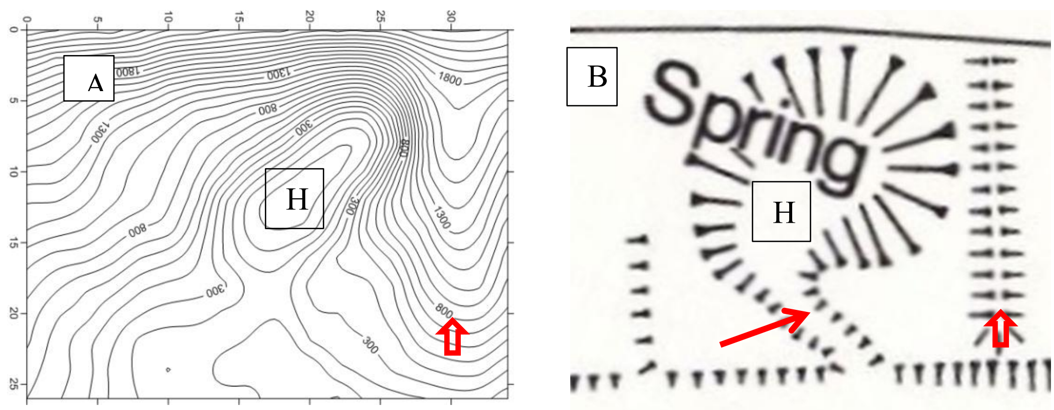


*Fig. 9. A, plain, contour plan of the spring area; B, Extract from Tomalin's 1972 survey (Courtesy of The Landmark Trust).*

(open arrows, figs. 9A and B). The 'hollow' (H) also corresponds in both figures. However, the 'channel' shown in Tomalin's survey (Fig. 9B, arrow), is not clearly identified in the 3-dimensional (Fig. 8), or the plain contour (Fig. 9A) images, obtained using the electronic, hydrostatic level.

## 3 *Outer field 3.*

The feature (Fig. 2) (Appendix 4) is situated close to the road adjacent to outer field 1. A tape grid, 30 x 13m, was laid out using the RM 15 survey baseline along the boundary wall to the north of the area (Fig 10). Heights were measured at 1m intervals along the X axis, southerly (14 columns), and 2 m intervals along the Y axis easterly (16 columns). The zero point was set within the feature. The Z axis was the height above, (+), or below, (-), the zero point in mm. The results were recorded on paper. Maximum heights above or below the zero point were 340 to -642 mm. The raw data were processed electronically as described previously and a 3-dimensional image, including contours (Fig 11A), was produced. The image demonstrated the slope and undulating surface.

*Fig. 10. Outer field 3, tape grid, looking north.*

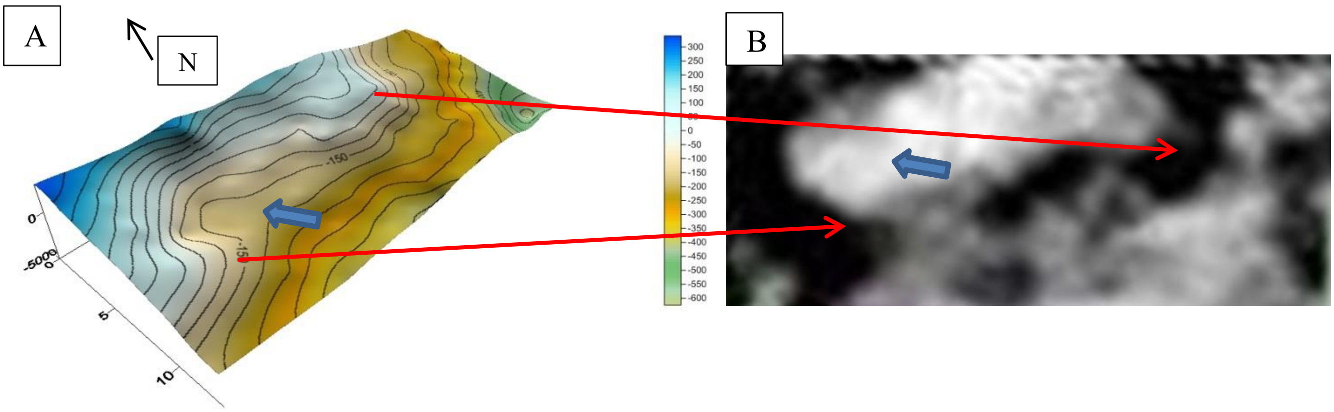


*Fig. 11.Outer field 3. A, 3-dimensional, contour image of the surveyed area, illustrating the slope of the field with undulations to the contours. B, extracted, RM15 result (grids 1 and 2 Jul 5) of the corresponding area. Potential, corresponding features between the two images are represented by the red and blue arrows (see text).*

Comparing the RM15 result *(YCCCART 2012/Y12)* (Fig 11B), with the 3-dimensional image, some features appear to be correlated. In the contoured image, an approximately semi-circular area facing south, may correspond with a similar appearance in the RM15 image, indicated by the red arrows. The indented area of the semi-circular feature in the RM15 image appears to correspond with a similar feature in the 3-dimensional image (blue arrows).

**Comment**

This report describes the use of an electronic, hydrostatic level (Nivcomp), to survey, manually, archaeological surface features, and computer software (Surfer 10 programme, kindly provided by Golden software, USA) to prepare 3-dimensional amnd contoured images. It's use has been described previously *(YCCCART 2012/Y4).* Since time available on the site was limited, areas to be surveyed were restricted. A ditch, or 'moat', was identified in outer field 1, the spring area was a recognised, prominent feature, and as part of the RM15 survey ( *YCCCART 2012/Y12),* a small area (outer field 3) had been surveyed; it was felt that these would be suitable features to examine further using this novel survey technique.

The survey of the possible 'moated area' demonstrated a raised area, surrounded by a ditch feature. Whether this represented a 'moat', or other water channel, could not be determined.

The spring area survey gave a 3-dimensional representation, which was compared to an earlier plan (Tomalin, 1972). The 'hollow' of the spring area and a linear bank at the eastern edge, shown in the 3-dimensional image, compared well with similar features in the earlier survey. However, the channel, orientated leaving the 'spring' in a south easterly direction, was not confirmed with the present survey, in which a wider channel was seen. This may be due to possible earthworks or other changes occurring during the intervening 40 years between the two surveys. Thus the electronic, hydrostatic level technique may pick up different features from those observed by the naked eye. Furthermore, as the technique becomes more familiar, the measurement interval, (sensitivity), may be varied. Thus it is possible that, in this instance, the use of a smaller reading interval may have picked up a more subtle structure.

The outer field 3 was chosen because the RM15 survey had completed what was a relatively small area. It was bounded to the north by a wall, from which the ground sloped gently (Fig 11A). In the geophysical report *(YCCCART 2012/Y12),* a structure was clearly identified and it was suggested that it may represent a building. In retrospect, similarities between the RM15 survey and the 3-dimensional, contoured image were recognised, suggesting that at least part of a possible wall may be represented on the ground (Fig 11). This was not obvious on visual inspection, and appears to have been picked up by the survey using an electronic, hydrostatic level.

## Recommendations

Further work on the spring area, at a smaller, measuring interval (eg 0.5 m), may help to resolve the difference, with respect to the narrow channel observed in the present study, with that recorded in an earlier survey.

The possible correlation between a geophysical survey (in this case RM15) and surface features (observed in outer field 3), using an electronic, hydrostatic level and the Surfer programme, may have potential use on other archaeological sites.

## References

Tomalin D J. (1974). *Woodspring Priory, Somerset. The Landmark Trust. First edition.*

YCCCART Report, (2012/Y12). *Gradiometry & Resistivity Surveys at Woodspring Priory*.

YCCCART Report, (2012/Y4).*Cadbury Congresbury Hill Fort: Use of an electronic, hydrostatlevel as an aid to manual surveying.*

**Authors** YCCCART members **Date** 22nd October, 2014