BRINKBURN PRIORY, NORTHUMBERLAND

Report on geophysical survey conducted at Brinkburn Priory

Conducted by the Bernician Studies Group October 2019

Conducted under a Section 42 licence issued by Historic England

Brinkburn Priory Church and Manor House from East

SUMMARY	
Name of Site	Brinkburn Priory
County	Northumberland
NGR Grid Reference	NZ1185 9810
Start Date	7 October 2019
End Date	8 October 2019
Geology at Site:	Alluvium over Carboniferous Sandstones
Known Archaeological Sites	23233; HA 1007508
Site Period and Type	Medieval Monastic
Surveyor (organisation)	Bernician Studies Group
Client	None (Bernician Studies Group research project)
Purpose of Survey	To test ground conditions and the possibility of pre-monastic remains
Location of Primary Archive	https://drive.google.com/drive/folders/1Rt3IehnqjZuwIO4ulOdsXspcLt_4S6pd?usp=sharing
Location of Full Report	http://www.bernicianstudies.eu/?page_id=464

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The Bernician Studies Group (BSG) conducted magnetometry and resistivity survey according to the document *Application for a Section 42 Licence* and supported by the document *Brinkburn Research Design 2019*, as submitted to Historic England on 26 April 2019, and according to the licence issued by Historic England (Reference AA/010591/5; Case No: SL00212046).

1: Site setting

The setting of the geophysical surveys is the site of Brinkburn Priory, of which the structural remains, along with later buildings, occupy a narrow river-edge platform at the head of a tight loop of the River Coquet which has here cut a steep-sided gorge through sandstones of the Carboniferous Era. Alluvial deposits have accumulated on the platform. After the dissolution of the priory in 1538, a manor house was built on the site of the former frater and an ornamental landscaped garden was created. The result of this is that the land east of the priory church and the manor house is terraced in three levels. The effects of this on the previous ground surfaces and any archaeological features, whether scraped away or buried beneath overburden are unknown and cannot be assessed from observation of the surface.

2: Survey Areas

The disposition of buildings and pathways around the priory site means that the land available for survey is broken into three small separate areas (numbers 1 – 3) around the priory church and the post-dissolution manor house. Area 1 is 10 metres by 20 metres on a lawn between the west end of the priory church and the fence marking the edge of the English Heritage site, close to the river bank. Areas 2 and 3 are each 10 metres by 10 metres. Area 2 is on a lawn in between the south side of the priory church and the manor house within the area of the priory cloister, and area 3 on a lawn immediately E of the manor house, between the house and a terrace edge. In addition to these, a larger area (Area 4) of 30 metres by 30 metres was surveyed across the grassed area of the former manor house garden east of the buildings. From north to south, this took in three terrace levels and two slopes. The total of areas surveyed is 1300 square metres, 0.31 hectares. Area number 1, between the west end of the priory church and the river lies beyond the area of the scheduled monument; areas 2, 3, and 4 are within the scheduled area.

3: Equipment and Methods

3.1: Magnetometry Survey

Magnetometry survey was conducted with a Geoscan FM Fluxgate Gradiometer set at a sensitivity of 0.01NT, balanced, aligned and zeroed against drift. Within gridded areas of 10m * 10m, E-W zig-zag traverses were made at a spacing of 0.5m and with reading intervals of 0.125m, that is 1600 data points (20*10*8) per square of 10 metres. Geoplot 4 was used for data processing. Post-survey processing methods adhere to *EAC Guidelines for the Use of Geophysics in Archaeology*. The graphic output for this report is greyscale plot of minimally enhanced data, conforming to *EAC Guidelines for the Use of Geophysics in Archaeology.*

3.2: Resistivity Survey

Resistivity survey was conducted with a Geoscan MT15 Magnetometer with twin electrode array in precisely the same areas as the magnetometry survey. Zig-zag traverses were taken

at spacings of 1m, with reading intervals along the traverse of 0.5m. Post-survey processing software, methods and graphic output are as for the magnetometry survey.

It was intended that the corner points of the survey areas should be geo-referenced by use of a Geode GNSS receiver. In the event, it became evident that the close proximity of high-walled buildings was distorting the signal, with resulting errors of up to some 5 metres. This was unsatisfactory and so the four survey areas were established by traditional methods of offset and tape measurement from the standing buildings.

4: Survey Results

Magnetometry survey was conducted on 12 June 2019 as part of a field training programme by BSG personnel for undergraduate students of Newcastle University. It became evident that the data were grossly corrupted (it seems likely that one or more of the students were wearing or carrying metallic objects) to the extent of being beyond recovery. The raw data are retained in BSG archives but form no part of this report which is based on a repeat magnetometry survey and a resistivity survey both conducted by BSG personnel on 7-8 October 2019.

The results are discussed by area 1 – 4, comparing in each case the magnetometry and the resistivity.

Area 1

A small blank towards the SE corner of both marks the position of a sculpture placed on the lawn. The main feature of the magnetometry is a band running in a slight curve from SW to N centre; there is a hint of the same in the resistivity. It could be an indicator of a boundary feature, or else an episode of alluviation. High magnetic readings in the NE corner, and reflected to a weaker degree in the resistivity, are likely to be from a drain from the NW end of the church. Some high readings in the resistivity aligned diagonally from the SW corner are not reflected in the magnetometry, but both methods are consistent in showing a high spot on the W side towards the NE corner. There is a slight raised mound here and information from Mr Mark Fenwick is that there was a building of some sort here at some time.

Processing applied to Figs 1 and 2 Area 1:

Magnetometry: Zero Mean Grid, Threshold = .25 Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied.

Resistivity: Zero Mean Grid, Threshold = .25 Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied

Area 2

The most prominent feature of the magnetometry is a band running W-E across the middle of the area; there is a fainter reflection of this in the resistivity. With bi-polar magnetic readings, this seems to be from sections of a metal pipe, for drainage or some other service. Magnetometry shows a few isolated small high spots which need be nothing more than debris within the topsoil. The main points of the resistivity, in addition to the W-E feature already described, are a low-resistance area towards the NE corner and, less tightly defined, generally higher readings across the area from W of centre towards the N and more central towards the S.

Processing applied to Figs 1 and 2 Area 2:
Magnetometry: Clip Min=-3.0SD Max=+3.0SD Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied.
Resistivity: Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied.

Area 3
Here there is some disparity between the results of the two methods. The magnetometry shows an area with strong high readings in the form of an inverted 'V', with apex N, in the NW quarter of the area. This corresponds to an area of relatively low readings in the magnetometry, but in this case there is no definite shape, as there is in the magnetometry. The strongest feature in the resistivity is a high-resistance band, with well-defined edges, extending from the N edge in towards the middle, W of the centre line.
Processing applied to Figs 1 and 2 Area 3:
Magnetometry: Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied.
Resistivity: Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied.

Area 4
This is the terraced lawn area east of the buildings. On the plans Figs 1 and 2, the two terrace steps (sloping, not vertical) running W-E are shown in grey tone. Both show strongly in the resistivity, while in the magnetometry, there are hints of the lower of the two, but not the upper. There is an isolated high magnetic reading towards the edge of the top terrace near the W edge; this is not obviously matched in the resistivity. The small blank in the resistivity W edge towards the NW corner is a point at which flagstone encroaches on to the lawn. Fragments of high magnetic readings E of centre on the lowest terrace could hint at a curving feature of some sort. If so, the patch of high resistance E of centre and close to the S edge might also hint at the same thing. A scattering of spots of high magnetic reading might be no more than metallic debris within the topsoil.
Processing applies to the images shown here
Processing applied to Figs 1 and 2 Area 4:
Magnetometry: Zero Mean Grid, Threshold = .25 Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied.
Resistivity: Zero Mean Grid, Threshold = .25 Zero M Trav., Grid=All LMS=On ZM=Mean Thresholds not applied.

5: Comments
5.1: The feature attracting most strongly meriting further investigation is the curved band in Area 1. If this is from a boundary feature, and not an episode of alluviation, and if its line were projected southwards, it would run through the footprint of the manor house and former priory frater. This would hint at a stratigraphic sequence, with the banded feature being earlier than the priory buildings.

5.2: There is little to pursue in Area 2, within the priory cloister. It is perhaps surprising that resistivity has given no hint of burials (though we cannot be certain that the cloister was the canons' burial area).

5.3: The inverted 'V' shaped feature of the Area 3 magnetometry cannot be readily explained. The well-defined high-resistance feature in this area follows the alignment of

walls in the priory buildings, and it could be a wall line from some priory structure not previously observed.

5.4: The Area 4 former terraced garden is still puzzling for any attempt to understand the natural ground levels and how they have been affected by the terracing and whether archaeological features could survive and, if so, where. To resolve these questions, other investigative methods would be needed, perhaps a different technique in geophysics – ground-probing radar, for example – or a borehole survey, or test pitting.

6: Personnel

The surveys were conducted by the following BSG personnel:
Max Adams, Colm O'Brien, Jack Pennie, Ray Shepard, Geoff Taylor.

7: Acknowledgements

The Bernician Studies Group expresses its thanks to the following who have assisted us in this work:
i: To English Heritage for granting access to the Brinkburn Priory site for this survey, and in particular to the site manager Juliet Phipps who facilitated the group's work.
ii: To the University of Newcastle, through the good offices of Professor Sam Turner and Dr. Alex Turner, for the loan of the Geoscan MT15 magnetometer.
iii: To the Fenwick family of Brinkburn for their continuing support in the group's wider researches at Brinkburn.

Report Date 6.12.2019

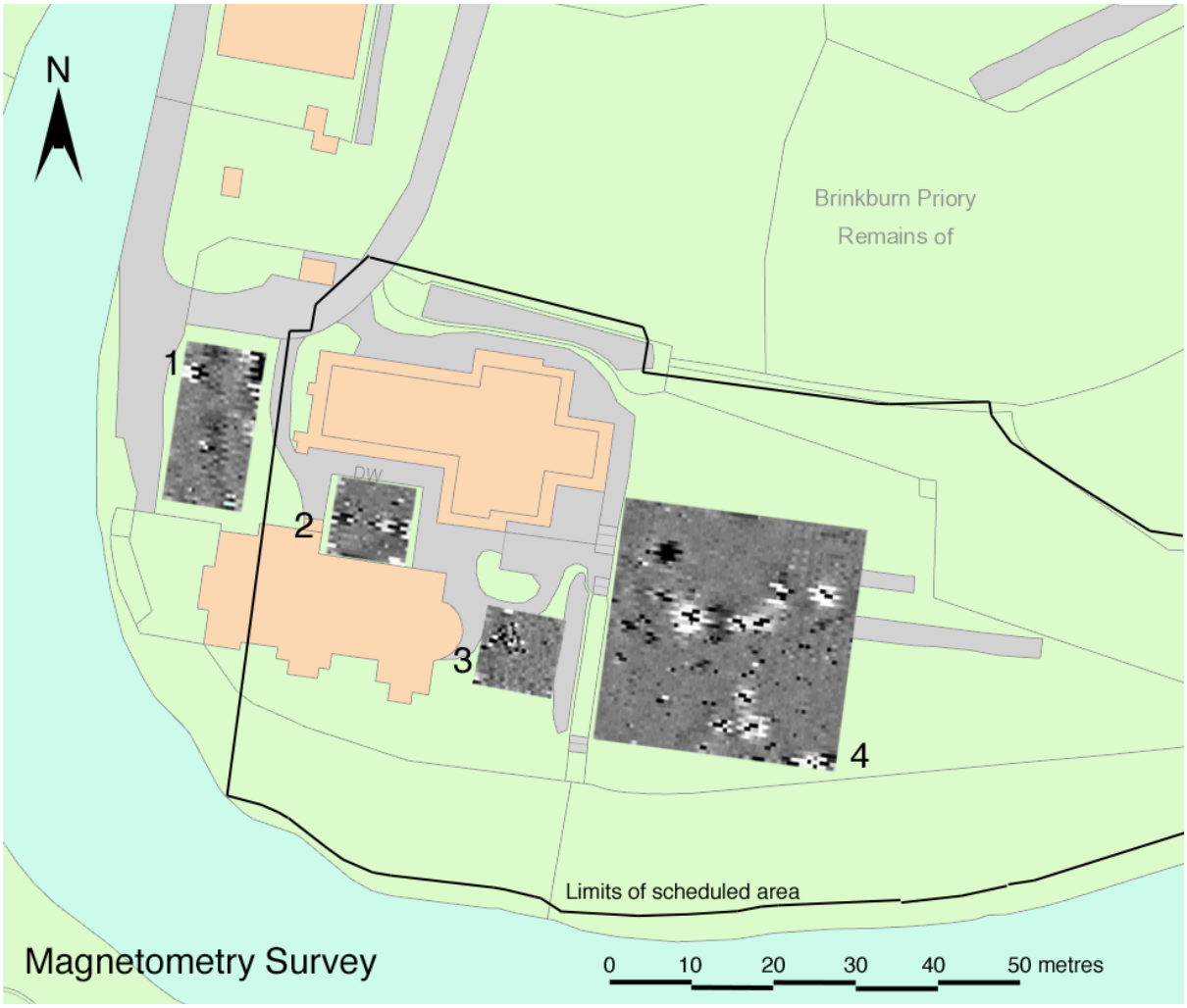


Fig 1: Magnetometry Survey

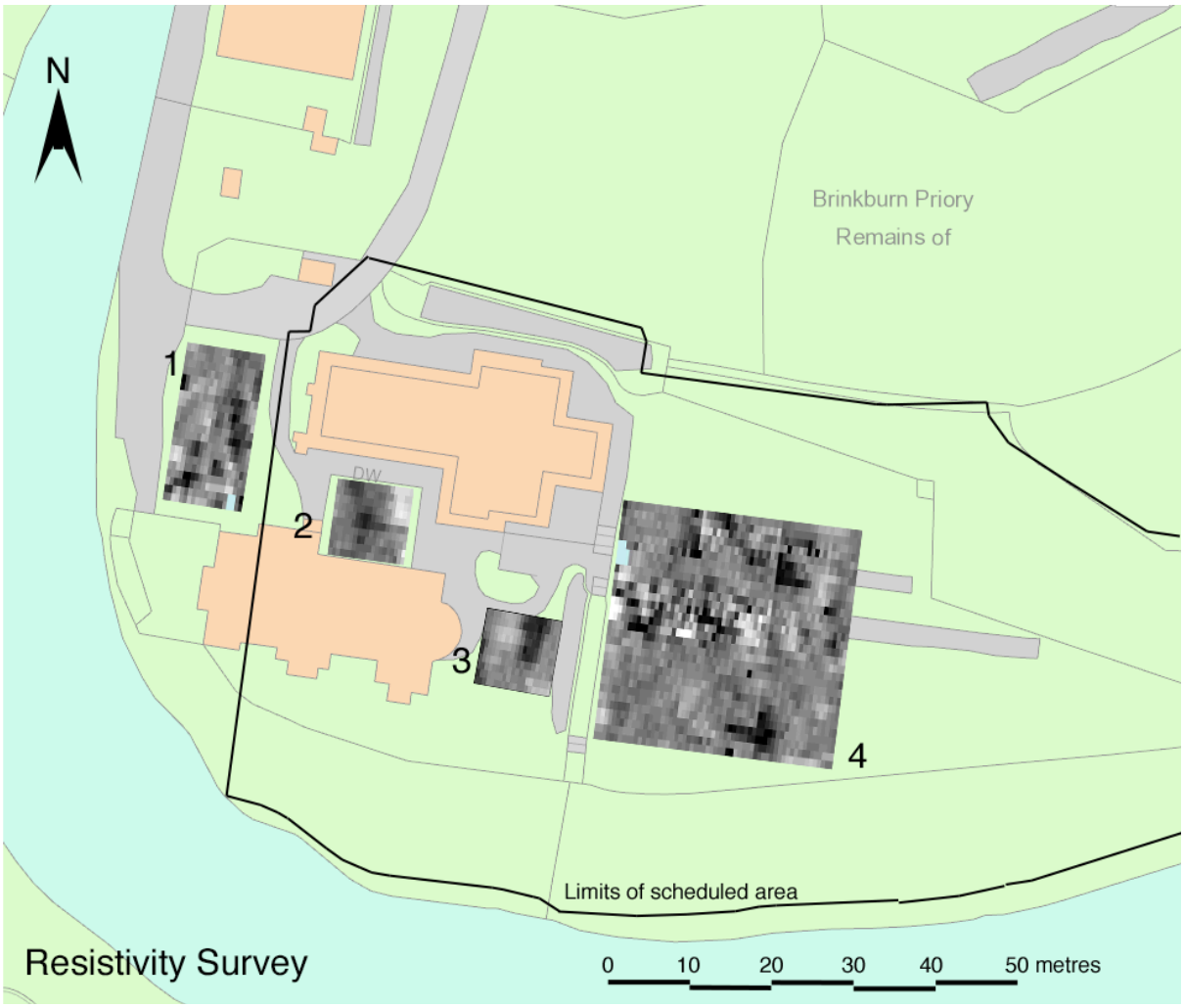


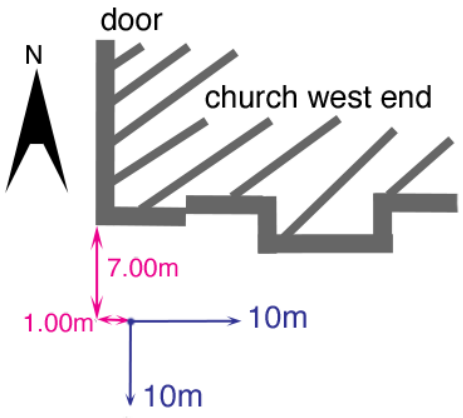
Fig 2 Resistivity Survey

Offset Measurements

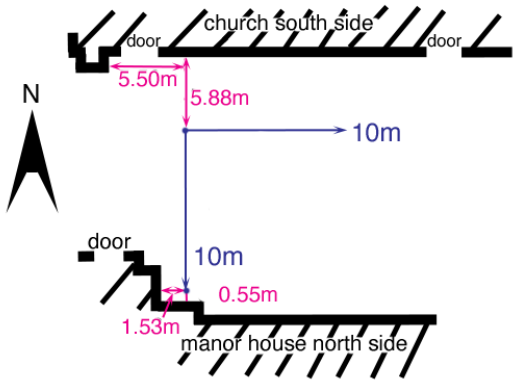
As stated in section 3.2 above, the four survey areas were fixed in relation to standing buildings on the site by offset and tape survey. The following four diagrams, which are not to scale, show the measurements and the points from which the offsets were taken. From these measurements the original survey grids could be reconstructed on the site.

Fig 3

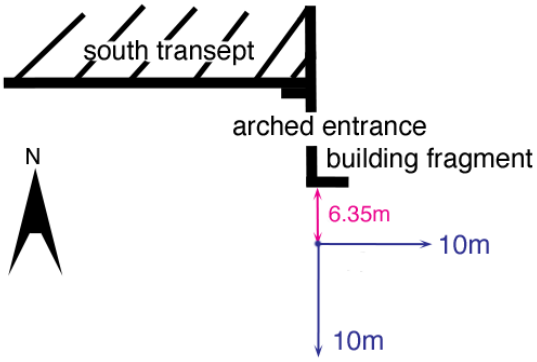
Area 1



Area 2



Area 3



Area 4