GUARD ARCHAEOLOGY

Flodden 500 Project
Wark Castle: Geophysical Survey
Project 3669

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Flodden 500 Project

Wark Castle: Geophysical Survey

On behalf of:	Flodden 1513 Ecomuseum
NGR:	NT 82169 38784
Project Number:	3669
Report by:	Christine Rennie
Illustrations:	Fiona Jackson
Project Manager:	John Atkinson
Approved by:	
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This document has been prepared in accordance with GUARD Archaeology Limited standard operating procedures.

GUARD Archaeology Limited
52 Elderpark Workspace
100 Elderpark Street
Glasgow
G51 3TR

Tel: 0141 445 8800
Fax: 0141 445 3222
email: info@guard-archaeology.co.uk

www.guard-archaeology.co.uk

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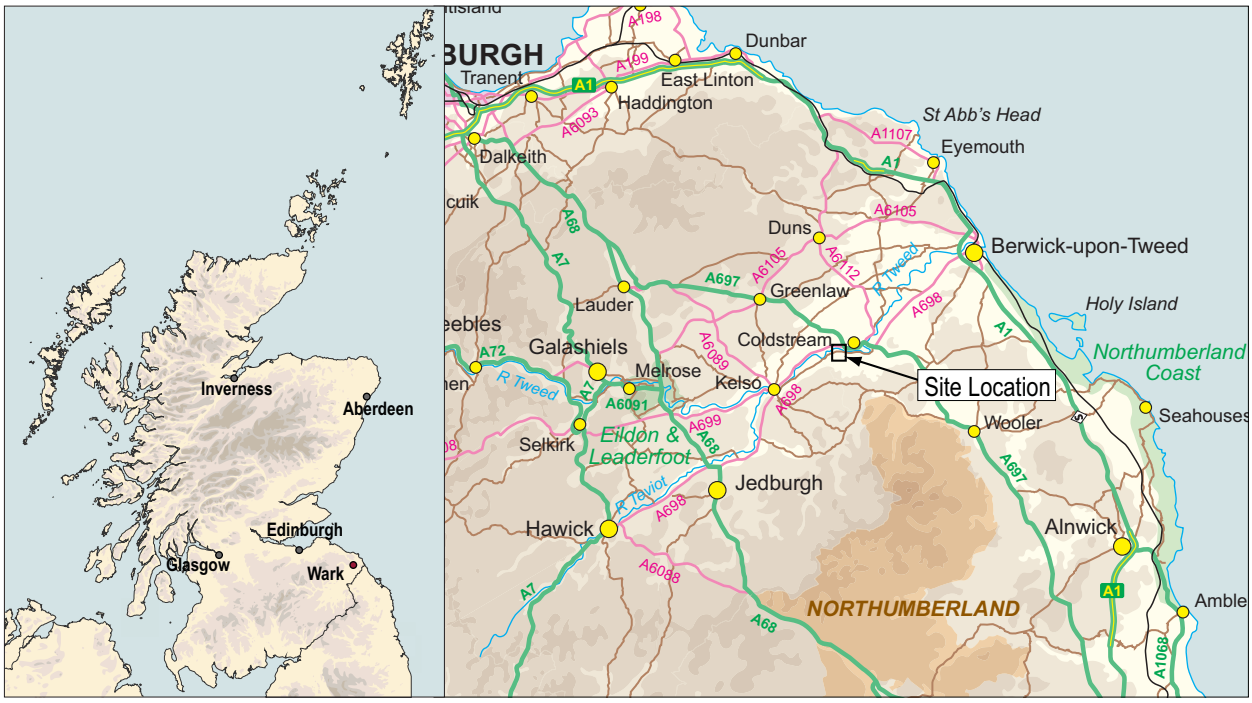

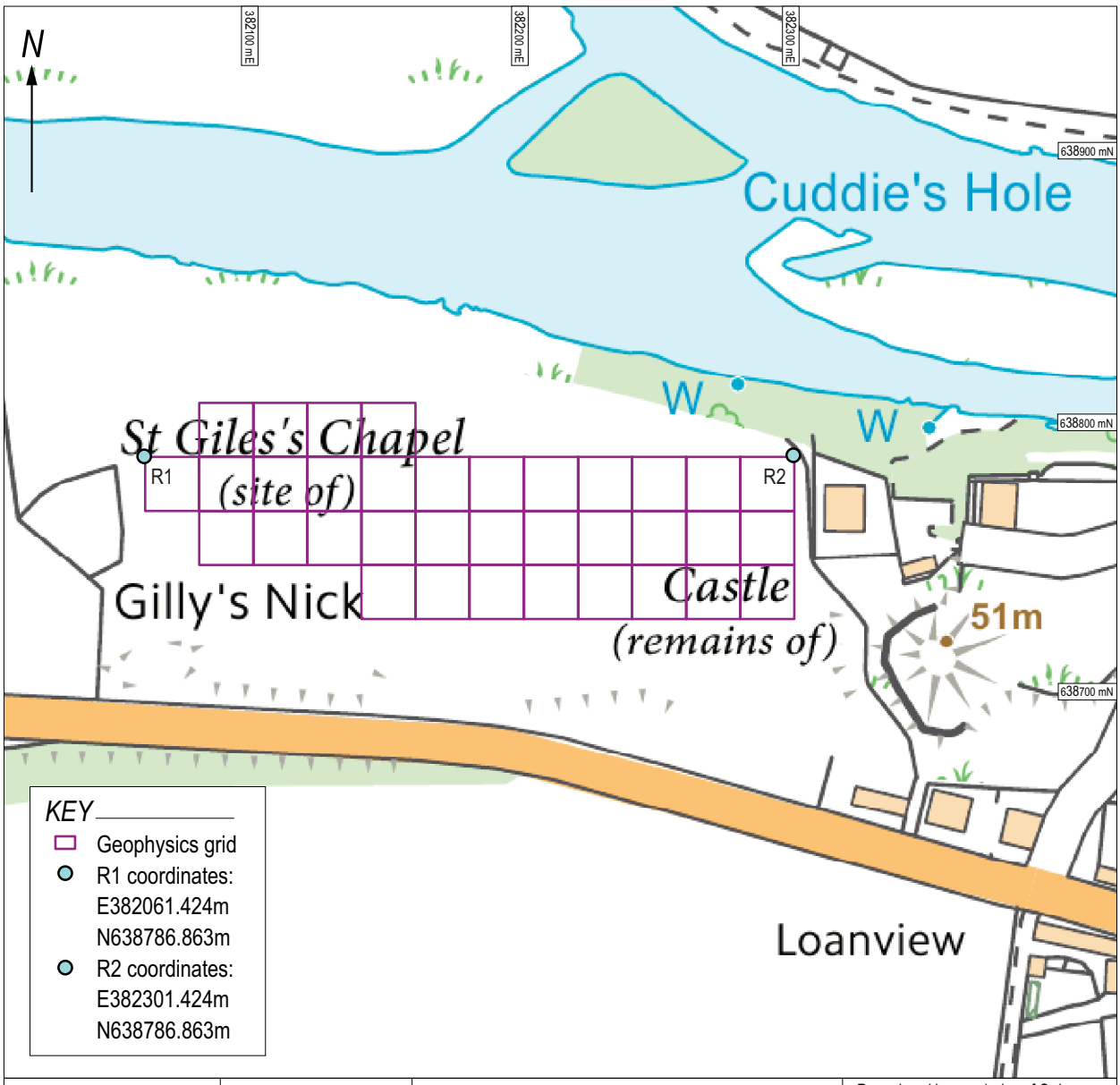

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Figure 1: Site location.

0 100 m

Executive Summary

1.1 In March 2014, GUARD Archaeology Limited undertook a geophysical survey of the outer ward of Wark Castle, Northumberland on behalf of the Flodden 1513 Ecomuseum. The survey, which was carried out as part of the Flodden 500 project, aimed to assess evidence for the past human use of the site, gauge its archaeological sensitivity and the locate targets for future intrusive fieldwork.

1.2 The survey recorded what appear to be linear and curvilinear defensive works within the outer ward of the castle, as well as a path leading westwards from the outer ward to the Medieval St Giles' Chapel. The remains of a boathouse and three other possible structures were also located.

Introduction

2.1 This report sets out the results of a geophysical survey undertaken by GUARD Archaeology Limited, with on-site assistance from local volunteers, on behalf of Flodden 1513 Ecomuseum Limited. The survey was carried out as part of the Flodden 500 project, and took place in the vicinity of Wark Castle, Northumberland. The work was carried out between 3rd and 5th March 2014, and was funded by the Heritage Lottery Fund.

2.2 The site is located immediately west of the remains of Wark Castle, on the western perimeter of Wark-on-Tweed (NGR: centred at NT 8253 3868). The area surveyed comprises a single field with a series of fairly steep natural mounds marking its southern edge, and a ridge lies at the western end of the site, where the ground slopes down to the remains of St Giles' chapel. The ridge is orientated north/south and its regular morphology strongly suggests that it is not a natural landscape feature, but one that has been humanly constructed to define the limit of the outer ward of the castle.

2.3 The site is bounded to the south by the B6350 public road and to the north by the River Tweed. The remains of Wark Castle lie to the east, while open fields lie to the west.

2.4 The bedrock over the Site is Ballagan Formation, a sedimentary rock unit that comprises grey mudstones and siltstones, with nodules and beds of ferroan dolomite (cementstones); thin layers of sandstone may also be present. The superficial geology over the majority of the Site comprises Glaciofluvial Deposits of sand and gravel, although the northernmost part of the Site is River Terrace Deposits of sand, silt and gravel. None of these geological units would be expected to adversely affect the geophysical survey (BGS 1979).

Aims and Objectives

3.1 The aims of this study were to identify geophysical evidence of any previously unrecorded archaeological or historical features within what may be the outer ward of Wark Castle, and to recommend potential targets for future intrusive investigation. To this end, the westernmost and easternmost extent of the geophysical survey was marked with survey stakes, and their NGR co-ordinates are annotated on Figure 1.

3.2 The specific objectives of the assessment were:

- to survey 1.4 hectares using gradiometry and resistivity;
- to report on the results of the investigations; and
- to utilise the information from these surveys to define areas that would benefit from further archaeological investigation.

Methodology

4.1 The survey comprised a gradiometry survey and a resistivity survey. The gradiometry survey was carried out using a Geoscan FM256 Fluxgate Gradiometer and the resistivity survey was carried

out using a Geoscan RM15 Resistivity meter with a twin-probe array and a probe separation of 0.5 m.

4.2 For both geophysical techniques, readings were taken at a 0.5 m sample interval and a 1 m traverse interval, giving 800 survey points per 20 m by 20 m grid. This survey frequency allowed a good resolution of detail with the minimum impact in terms of the time required to complete the survey.

4.3 The data was downloaded into Geoplot v3 for analysis and plot production. The resulting plots were overlaid onto the existing plan of the site, showing where any anomalies lay in relation to the surface features. The location of the geophysical survey was recorded using a Leica Smart Rover sub-centimetre DGPS. This creates fully geo-referenced information for each grid point for the accurate placement of the geophysics results within the Ordnance Survey national grid, allowing for the ease of relocating areas identified for further assessment.

4.4 Gradiometers are very sensitive to the presence of metal and will produce erroneous readings if used in their proximity, or if the operator is wearing clothing that contains metal or that have metal fasteners. All of the volunteers were scanned for metal prior to taking part in the survey and, although all possible precautions were taken to minimise interference, it was not possible to ensure that the operators of the gradiometer were completely metal-free. As a result, magnetic interference due to clothing and other metal items was recorded in a number of the grids surveyed.

4.5 For health and safety reasons, the resistivity survey could not be carried out over the steep slope at the south-east of the area surveyed.

Archaeological Background

5.1 The area surveyed lies between two Scheduled Monuments, Wark Castle motte and bailey castle and artillery fort (English Heritage list entry number 1013100) and St Giles's medieval chapel and burial ground (English Heritage list entry number 1014496).

5.2 Wark Castle, which lies adjacent to the River Tweed on the Anglo-Scottish border, played a key strategic role in the wars between England and Scotland throughout the 12th to 16th centuries. Built as a private castle for Walter l'Espec in the 12th century, the original castle was razed to the ground by the Scots in 1138. It had been re-fortified by 1158, but was again burnt in 1216 when King John marched against the northern barons. It was rebuilt shortly afterwards and in 1255 Henry III used the castle as a base for negotiations with the Scots. The castle took on a more prominent role during the reign of Edward I, who visited the castle in 1292 and again in 1296, at the beginning of his campaign into Scotland. In 1300 it was borrowed for a year `for the safety of the March' and placed under the control of Robert FitzRoger, commander of the king's forces in Northumberland. During the reign of Edward II the castle came into royal possession, but by 1329 had reverted into private hands. Edward III visited the castle shortly after the siege of Wark in 1342. It has been suggested that the events that occurred during this visit later led to the formation of the Order of the Garter. Wark suffered considerably during the almost constant warfare of the late 14th century. In 1390 the castle was reported to be in ruins, and in 1399 the castle was again attacked, the inhabitants ransomed, and the walls beaten down. The castle was attacked again in 1460 and the fortifications dismantled.

5.3 Wark reached the height of its importance during the 16th century, when the Earl of Northumberland described it as `the stay and key of all this country'. During this period it belonged to the Grey family but came into royal hands on a number of occasions, and was garrisoned and repaired largely at the king's expense. In 1513 the castle fell to James IV of Scotland before the battle of Flodden and, as a result of this, Henry VIII ordered that Wark should be fortified and strengthened. The fortifications were reviewed in 1517 and a detailed account of the castle survives from this period, as well as recommendations for further work. Some alterations to accommodate artillery had been made by this stage and further restoration works were carried out. However, despite this work, surveys in 1523 and 1541 showed that the fortifications still left much to be desired. In 1523 strong reinforcements were sent to the castle

in response to a threat by the Duke of Albany. The Earl of Surrey inspected the fortifications and ordered the bulwarks to be strengthened. He described the keep as `the strongest thing I have ever seen'. In November 1523 the castle was assaulted by 2000 Frenchmen, under the Duke of Albany. They breached the outer ward, but were eventually driven back and the garrison was quickly relieved by the Earl of Surrey. A full report of the state of the castle was made in 1541 and showed that it was again in disrepair. The great strategic importance of the site was recognised and in 1543 the sum of one thousand eight hundred and forty six pounds was spent on the castle. This work included the platform known as The Ring. A detailed survey and plan was produced in 1561 by Rowland Johnson, surveyor of the works at Berwick, who was ordered by the crown to report on the state of Norham and Wark castles. This report describes the artillery platform and keep and the strengthened curtain wall on the south side which now comprised a double skinned wall with a `little rampart' between. Another plan, possibly produced slightly earlier, describes the outer ward as containing a great gate, porter's lodge and stone house used by the lord of the castle, the middle ward contained the constable's house, bakehouse, kitchen and other buildings, and the inner ward with the keep contained a hall, parlour, kitchen and several chambers. However, it is clear from Johnson's description that Wark was again in a poor defensive state. Another plan by an Italian, Antonio de Bergamo, is undated but probably also Elizabethan. This shows a strongly defended castle with elaborate, multiple defences of walls, ditches and bastions. It is not clear whether this was a plan of existing fortifications, or proposals for new fortifications.

5.4 Control of the castle continued to be divided between the owners, the Grey family, and the crown throughout the 16th and early 17th century. But it is clear from contemporary reports that the Greys were doing little to maintain it. Towards the end of the 16th century the Border unrest quietened. A garrison and ordnance were kept at Wark until 1633, after which the castle was abandoned, only being occupied once more, in 1644, when part of the Scottish army invading England was quartered there.

5.5 St Giles's Chapel and burial ground remain readily identifiable despite having been abandoned in the 18th century. They will contain significant evidence of how they were used between the 12th to 18th centuries, including information on the individuals buried there. They will also contribute to understanding of the history of the adjacent castle and village of Wark.

5.6 The monument includes the remains of a post-Norman Conquest medieval chapel and graveyard. The chapel is situated in a shallow natural bowl between the glacial ridge, or kaim, to the south and a slight rise to the lip of the river cliff to the north. A natural gap in the kaim, known as Gilly's Nick, has been utilised as an access route; a terraced trackway leads from the south gateway to this gap and this trackway is included in the scheduling. The chapel lies approximately 280 m to the west of Wark Castle. The visible remains consist of a stone built, rectangular chapel, surrounded by a graveyard set within a kite-shaped enclosure. The chapel occupies the northern part of the enclosure and is aligned east/west. The walls of the chapel survive as low banks up to 2 m wide and up to 0.4 m high, the chapel has a chancel 13 m wide, and a broader nave, 17 m wide. It is at least 25 m long, although the western end wall does not survive above ground. The chapel is surrounded by the burial ground, referred to in 1823 as `the burial ground at Gilly's Nick`. Two gravestones are visible in the area immediately to the east of the chapel. One of these, which is Listed Grade II, is a medieval grave slab bearing an incised cross and two other symbols, now very weathered, but which were identified in the mid-18th century as being two swords. The other gravestone is a partly buried headstone of probable 18th century date. The northern wall of the graveyard enclosure is 42 m long, the southern wall is 15 m long, the east and west walls are 40 m and 38 m respectively. There are opposing entrances near the centres of the north and south walls. The enclosure walls are up to 0.8 m thick and survive up to 0.7 m high. The chapel of Wark belonged to the priory of Kirkham. This priory had been founded by Walter l'Espec, who also founded Wark Castle in the early 12th century. The chapel is believed to have served the castle and village of Wark on Tweed. It is dedicated to St Giles, the patron saint of beggars, which has been taken to explain its siting at a distance from the settlement, outside the castle walls.

5.7 As far as can be ascertained, no archaeological investigations have previously been carried out within the outer ward of the castle.

Results

Gradiometry survey

6.1 Thirty-five grids were surveyed using gradiometry; the processed results are illustrated on Figure 2. The raw data was de-spiked to remove erroneous data but, apart from those grids affected by the magnetic interference referred to in 5.4, the anomalies were otherwise of sufficient clarity not to require further processing.

6.2 The most obvious features of the gradiometry survey are the series of linear and curvilinear anomalies recorded over much of the site. The longest of these (Anomaly A) is oriented WNW to ESE, is approximately 1.5 m to 2 m wide and is visible for about 120 m. An area of magnetic disturbance lies at the east end of this possible feature.

6.3 Anomaly B lies about 10 m north of Anomaly A, and appears to run parallel to it. It is also about 1.5 m to 2 m wide, but its full length has not been recorded as some of the anomaly lies partially out-with the northern limit of the survey. A small di-pole lies at the eastern end of this anomaly.

6.4 Anomaly C is curvilinear, about 2 m wide and extends for about 35 m. This magnetic anomaly may meet Anomaly A, although unfortunately their likely point of intersection is obscured within one of the grids where a metal object being carried by the gradiometer operator produced magnetic interference.

6.5 Curvilinear Anomalies D and E are each about 20 m long and about 2.5 m wide and, as with Anomalies A and B, appear to be parallel features.

6.6 Anomaly F is linear and oriented south-west/north-east and was recorded for a distance of about 25 m. It is 2.5 m to 3 m wide at the south-west but tapers to about 1.5 m to 2 m at the north-east.

6.7 Anomaly G appears to be a hook-shaped feature with a possible gap at its western limit. The southern arms of this anomaly are about 25 m long by 1 m wide, while the northern arm is 8 m long by 1 m wide.

6.8 Anomaly H is curvilinear and extends for about 9 m north/south and is between 2 m and 4 m wide. Anomaly G may meet or cut this possible feature.

6.9 Three areas of magnetic disturbance were recorded at the west of the Site, one of which (Anomaly I) lies atop the north/south ridge. This anomaly is about 2 m long by 1 m wide. Anomaly J is vaguely curvilinear in shape and extends for about 4 m north/south and about 9 m east/west. Anomaly K is a small area about 2 m long and 1 m wide.

Resistivity survey

6.10 Thirty-four grids were surveyed using resistivity, and a range of potential features were recorded over the Site. The processed results are illustrated on Figure 3. The raw data was de-spiked to remove erroneous data and was filtered to reduce the geological effects (darker areas) most visible at the centre of the Site.

6.11 One anomaly recorded by gradiometry at the south centre of the Site was also recorded by resistivity, albeit with slightly different morphology. Anomaly C appears to be more linear than curvilinear and is of more substantial width than was suggested by the gradiometry survey. The relatively lower resistance recorded over this possible feature suggests that it may be negative-cut.

6.12 Linear Anomaly L is aligned north-west/south-east, extends for some 40 m, crossing the ridge at the west of the Site, and is about 1.5 m wide. Anomaly I, which lies on the north side of this possible path, is about 4.5 m by 4.5 m and appears to be almost square in shape. Its size and morphology differ from those recorded by gradiometry.

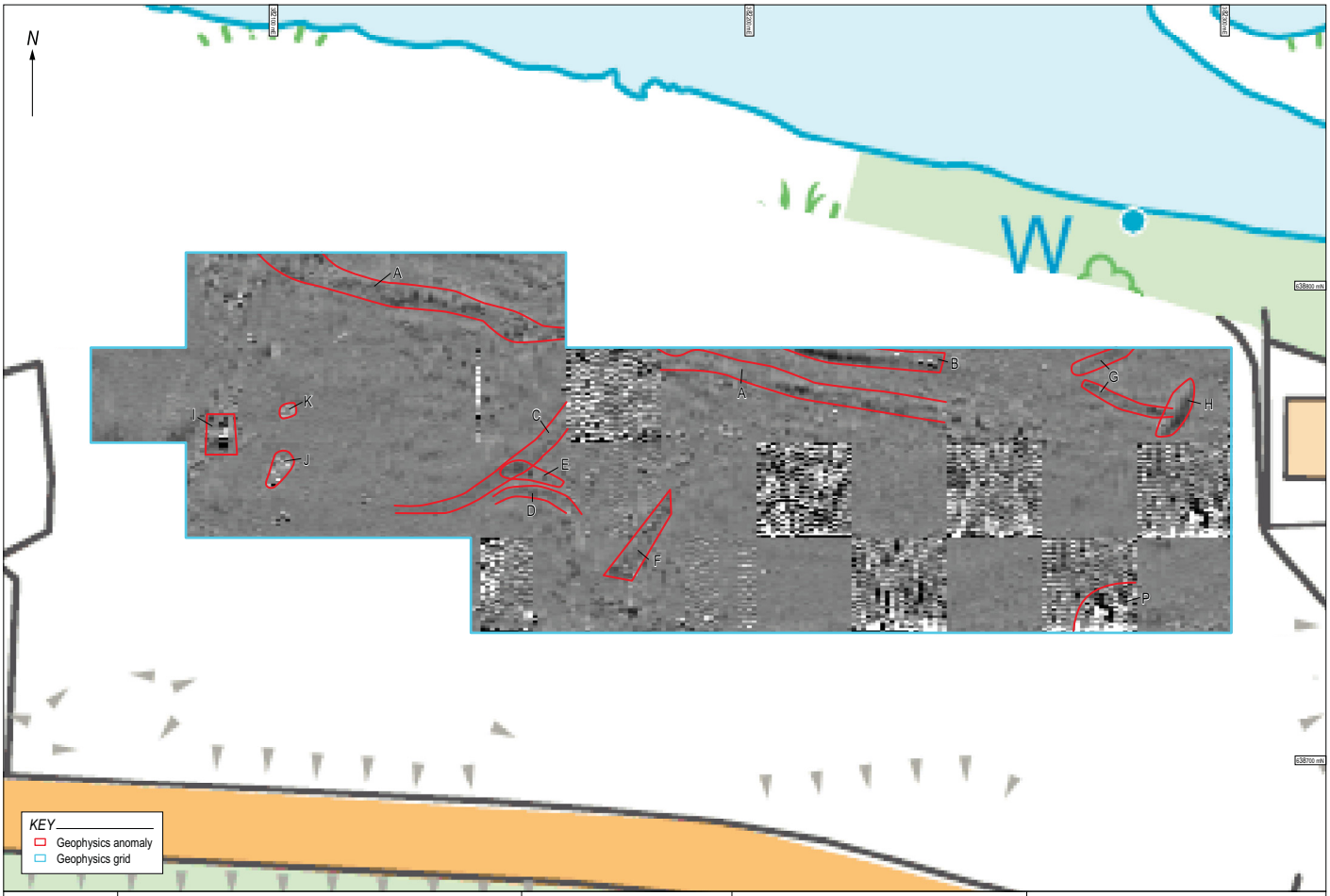

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Figure 2:
Annotated gradiometry results.

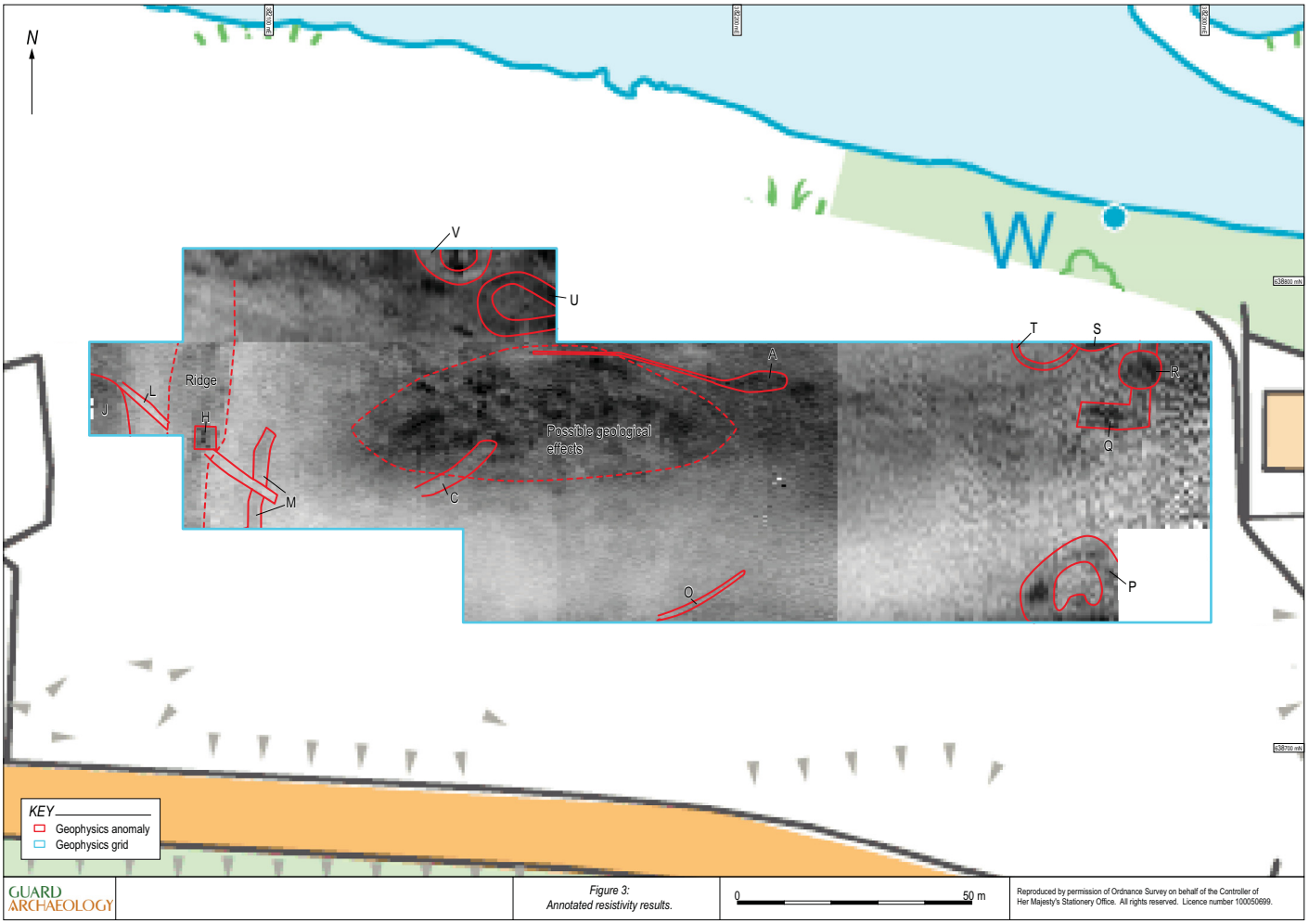

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Figure 3:
Annotated resistivity results.

6.13 Anomaly M is a linear band of relatively higher resistance about 20 m long and 3 m wide; it appears to have been cut by Anomaly L.

6.14 Anomaly N is an area of higher resistance at least 1 m north/south and at least 7 m east/west. A possible area of lower resistance may lie within this feature.

6.15 Linear Anomaly O is a band of relatively lower resistance located on the sloping ground at the south of the Site. It is about 20 m long, 0.5 m to 1 m wide and is aligned WSW/ENE.

6.16 Anomaly P is a circular area of relatively higher resistance also located on the sloping ground at the south of the Site. It is about 18 m north/south and about 20 m east/west with a possible square feature defining its western extent.

6.17 Anomalies Q, R, S and T all lie at the east end of the Site, the only location where a possible stratigraphic relationship was recorded. Anomaly Q is rectilinear, measuring about 20 m north/south and about 12 m east/west. Anomaly R is a circular area about 9 m in diameter that lies along the eastern arm of Anomaly Q. The visible portion of Anomaly S is 8 m long and 2.5 m wide, while Anomaly T is a curvilinear band immediately west of S. All of these features were recorded as areas of relatively higher resistance.

6.18 Two curvilinear anomalies were recorded at the north-west of the Site. Anomaly U appears to be oval shaped and is defined by bands of higher resistance. The anomaly extends for about 17 m east/west, with the higher resistance forming bands about 2 m wide. Anomaly V may be circular, with the northern half of the features truncated by the limit of the survey. This anomaly comprises a semi-circle of relatively lower resistance with patches of higher resistance in the presumed interior of the circle. This anomaly extends for about 15 m east/west with the lower resistance forming a band that is about 2 m wide.

Discussion

7.1 It is noticeable from the data sets obtained at Wark Castle that the results differ quite widely between anomalies recorded by resistivity and those detected by gradiometry. It is also apparent that where an anomaly was recorded using both techniques, for example Anomalies A, C and I, the dimensions and morphology of the possible features differed. While this may be due to the different ways on which each technique records sub-surface features, i.e. relative moisture content versus magnetic changes within the subsoil, it could equally reflect the different depths to which each instrument is able to record. In general, gradiometry records to a depth of about 0.75 m while resistivity records to about 0.5 m.

7.2 Anomalies A and B were recorded as linear anomalies within the northern part of the Site. These appear to be of similar dimensions and run in parallel for at least part of their course. The location and dimensions of these features may suggest some form of linear barrier, none of which survives above ground.

7.3 It is possible that Anomaly A is associated with Anomaly C as the projected course of the latter may intersect with A although, as stated above, the data from the grid where the two would meet has been corrupted by the presence of metal.

7.4 The dimensions and shapes of Anomalies D and E would suggest that these potential features are linked, possibly sharing a similar function to Anomalies A and B. Anomaly F, which lies at the foot of sloping ground, may also be the remains of a ditch.

7.5 At the east of the Site, the remains of a former building or structure are strongly suggested by resistivity Anomaly Q and gradiometry Anomaly H, which may actually represent the same feature. The Royal Commission on the Historical Monuments of England notes a Boathouse at about this location, and it is most likely that the sub-surface remains of this building have been recorded by the surveys. The circular feature represented by Anomaly R could be tumbled stone from the boathouse, or may be the remains of another structure. Other possible structures in this area are suggested by Anomalies G, S and T.

7.6 Linear Anomalies L and O have the characteristics of cut features. While the location of Anomaly O on a down-slope suggests that it had/has a drainage function, Anomaly L is less easily explained. In addition to crossing the ridge at the west of the Site, Anomaly L appears to pass through or truncate Anomaly M, by-pass Anomaly I and lead towards Anomaly N. All three of these anomalies are defined by relatively higher resistance that can indicate the presence of stone or of heavily compacted ground that may be associated with structural remains. These features could, therefore, represent three structures linked by a path that leads towards St Giles' Chapel.

7.7 Gradiometry Anomaly J is probably the same feature as the northern portion of resistivity Anomaly M, while Anomaly K most probably represents the casual loss of a small metal object.

7.8 Anomaly P, which is located on the fairly steep slope at the south of the Site, appears to be a circular or sub-circular feature with a stone component in its matrix; the stone is particularly visible in the western part of this anomaly. This could be a negative-cut feature, possibly a structure, with stone used either as a foundation or within the fill of the cut.

7.9 Anomalies U and V were recorded only by resistivity, although some magnetic disturbance was recorded in their general vicinity. Anomaly U is a rather vague horseshoe-shaped feature defined by relatively higher resistance, probably indicating a stone element in its make-up. Anomaly V appears to be a negative-cut semi-circular feature of quite large proportions, the lower resistance recorded here probably indicating the presence of a ditch. The higher resistance recorded within this anomaly may be an interior structure with a stone or heavily compacted soil base. The location of this close to the south bank of the River Tweed, along with its morphology, may be an indication that this was a redoubt.

Conclusions and recommendations

8.1 The geophysical surveys at Wark Castle have indicated that there are a number of anomalies that potentially indicate the survival of archaeological or historical remains that pre-date the current pastoral use of the Site.

8.2 Anomalies A, B, C, F, J, M and V may be the remains of defence-works within the outer ward of the castle. We would therefore suggest that these potential features could be investigated via trial trenches, with the aim of establishing their nature and possible date-range.

8.3 Other previously unrecorded structures appear to be represented by Anomalies D, E, I, P and U, while Anomaly L may be a path linking the outer ward with St Giles' Chapel. Any temporal relationship between L and M could be tested by excavating test pits or small trenches that may show a stratigraphic association between these possible features.

8.4 Anomalies G, H, Q, R, S and T are probably the remains of a boathouse, the date of which is not known.

Acknowledgements

9.1 GUARD Archaeology would like to thank Chris Burgess of Flodden 1513 Ecomuseum Ltd for his input into the fieldwork. We appreciate the time and assistance that our volunteers Caroline Aylott, Ruth Brewis, Geoff Cooper, Philip Hanson, Josie McChrystal, George Martin, Megan Pearson and Diana Smith gave to the project, and would like to thank them for their hard work. Technical and administrative support was provided by Jen Cochrane, Aileen Maule and John Kiely. The illustrations were produced by Fiona Jackson, who also carried out the GPS survey of the geophysics grids, and the report was desk top published by Gillian McSwan. The author was assisted in the field by Maureen Kilpatrick and Beth Spence, and the project was managed for GUARD Archaeology Limited by John Atkinson.

9.2 OASIS reference number: guardarc1-175020

Flodden 500 Project
Wark Castle: Geophysical Survey

Section 2: Appendices

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Appendices

Appendix A: Sources Consulted

British Geological Survey 1979 *Ford (S&D)* 1:50000

English Heritage website http://www.english-heritage.org.uk [Accessed 17 March 2014].

Appendix B: Geophysical Raw Data

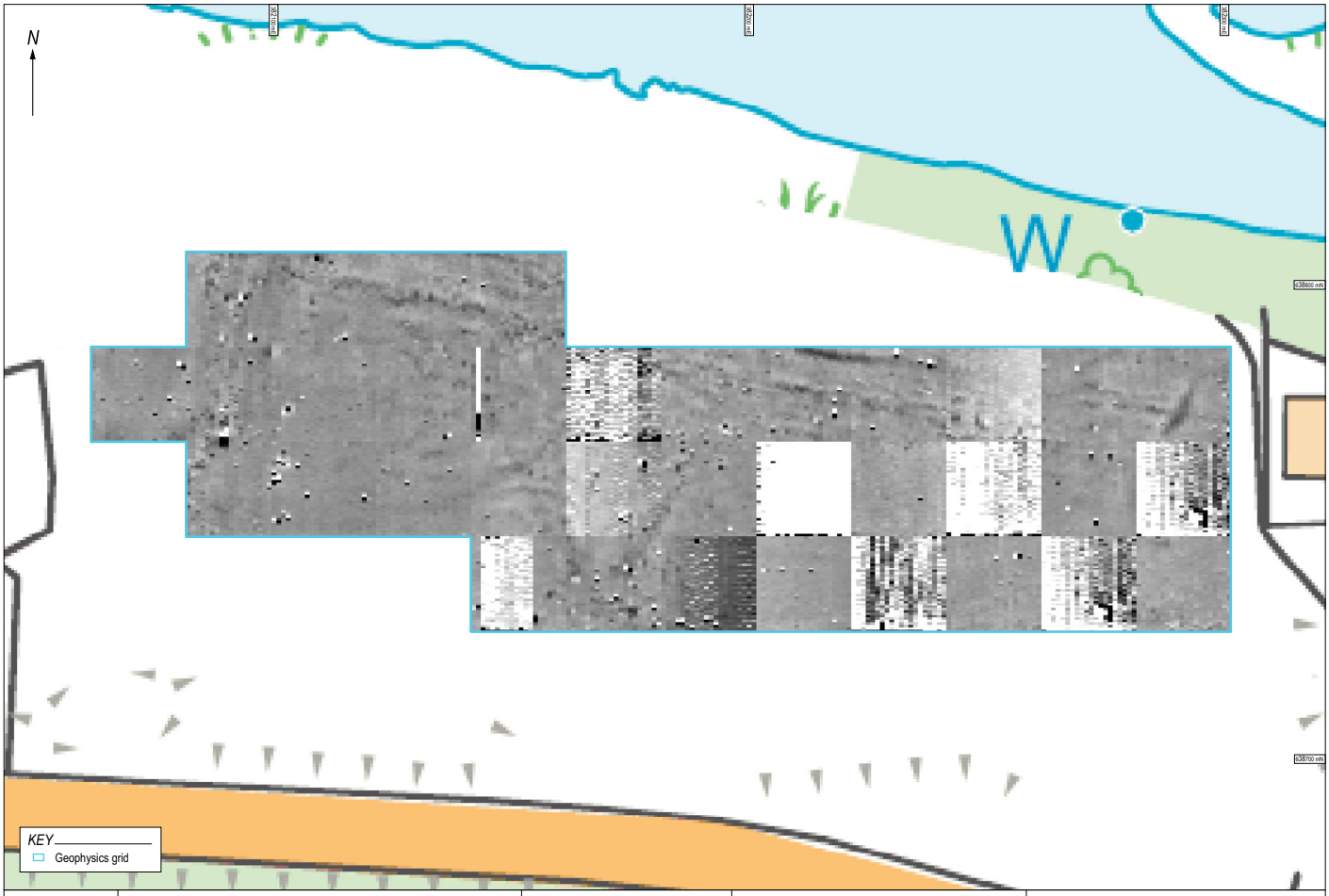

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Figure 4:
Raw gradiometry data.

0 50 m

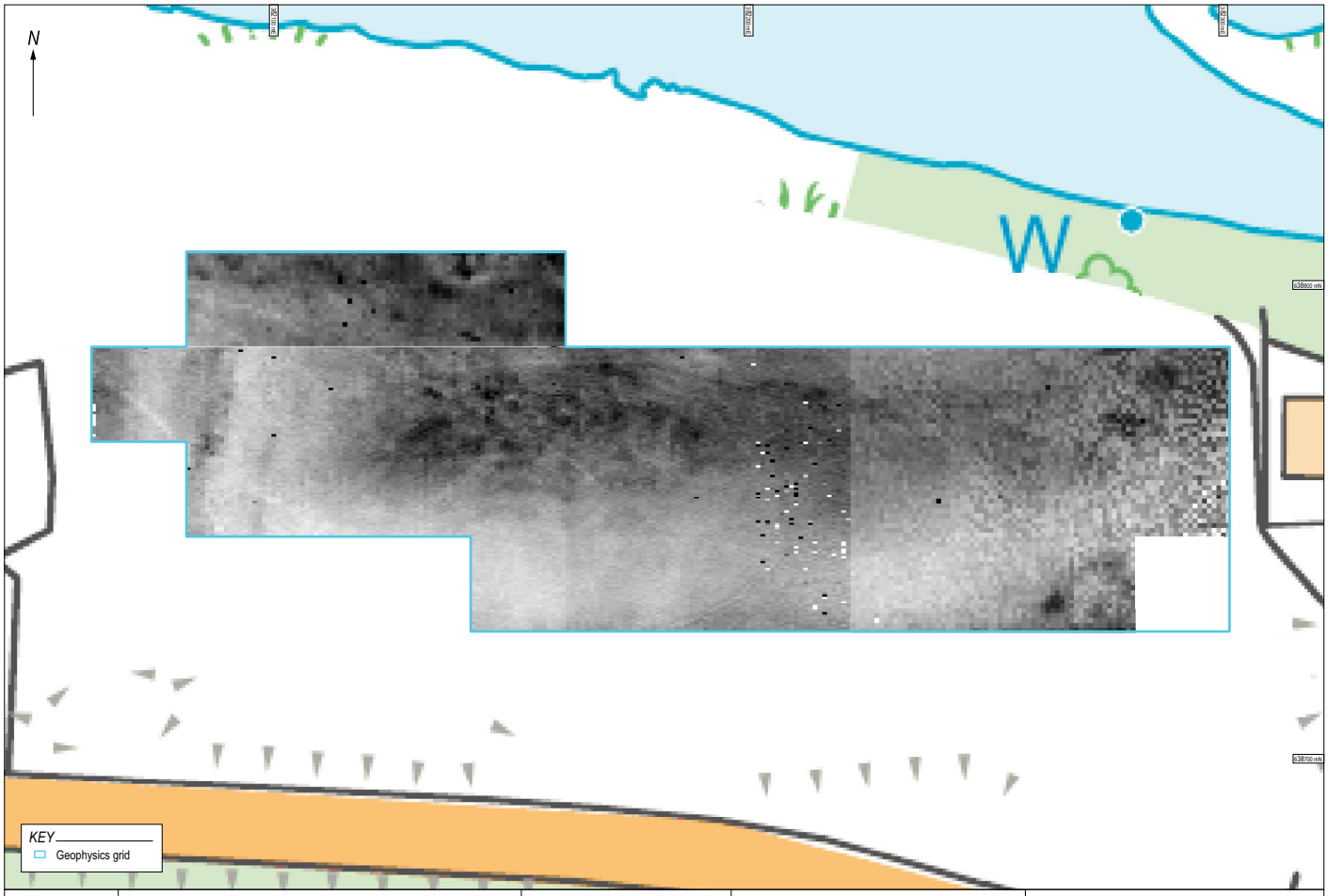

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Figure 5:
Raw resistivity data.

0 50 m

GUARD Archaeology Limited
52 Elderpark Workspace
100 Elderpark Street
Glasgow
G51 3TR

Tel: 0141 445 8800
Fax: 0141 445 3222
email: info@guard-archaeology.co.uk

www.guard-archaeology.co.uk